Macrothink Institute™

Journal of Management Research
ISSN 1941-899X
2013, Vol. 5, No. 4

Impact of Derivatives Usage on Firm Value: Evidence from Non Financial Firms of Pakistan

Hamid Bashir (Corresponding author)

Department of Management Sciences, University of Central Punjab, Lahore, Pakistan

E-mail: hamiddhillo@gmail.com

Khurram Sultan

Faculty of Banking and Finance Department, Cihan University Erbil Kurdistan Region, Iraq

E-mail: k.sultan@msn.com, Khurram.Sultan@cihanuniversity.edu.iq

Omar Khazaal Jghef

Faculty of Banking and Finance Department, Cihan University Erbil Kurdistan Region, Iraq

E-mail: Omar_alnasery@yahoo.com

Received: July 24, 2013 Accepted: September 20, 2013 Published: October 1, 2013

doi:10.5296/jmr.v5i4.4050 URL: http://dx.doi.org/10.5296/jmr.v5i4.4050

Abstract

The current study aims at investigating the impact of derivatives usage on firm value. For the given purpose, a sample of 107 non-financial firms listed on Karachi Stock Exchange (KSE) for the period of 2006-2010 is considered. Firm value is measured mainly through Tobin's Q along with two more alternative measures named Alt. Q1 and Alt. Q2. Usage of three types of derivatives named General Derivatives (GD), Foreign currency derivatives (FCD) and Interest rate derivatives (IRD) are used as independent variables. Different panel data techniques of LM (Lagrange Multiplier) test, Random effect, Hausman specification test and fixed effect are applied in order to analyze whether the use of derivatives increases, decreases or does not have any impact on firm value. The current study finds no significant impact of derivatives usage on firm value while using Tobin's Q is used as valuation measure. However use of FCD is associated with lower firm value while use of IRD adds value only in case when alternative measures of firm value (Alt. Q1 and Alt. Q2) are considered.

Keywords: Derivatives, Hedging, Firm value, Pakistan

1. Introduction

Use of financial derivatives for hedging purpose is becoming trendier for the last few decades. According to International Swaps and Derivatives Association (ISDA) survey report (June 2008) the outstanding notional amount of interest rate swaps and options was $465 trillion which was 22.5% higher than that of December 2007. In the same manner, use of Equity forwards, swaps and options was increased by 19% with the outstanding notional amount of $11.9 trillion from December 2007 to June 2008. This upward trend is attributed to the augmented volatility of financial markets in the whole world. In earlier times, mangers were little apprehensive about the management of foreign exchange and interest rate risks because at that time both of these risks were quite stable in the period of Bretton Woods system (1944-1971). This system was formulated in 1944 but came in practice the following year with the main two objectives, to control exchange rate fluctuations by instituting fixed exchange rate and reconstruction of Europe after World War II. Under this system, most of the currencies were pegged to gold, but in practice, many currencies linked to the U.S dollar and the U.S dollar was tied to gold. Finally, the system was collapsed in October 1971 when dollar and gold were de-pegged by US and opted floating exchange rate. After the collapse of Bretton Woods system, major fluctuations were considered in exchange rate especially in dollar which was devalued in December 1971 (Just after one moth). Consequently, these exchange rate movements affected interest rate stability because many monetary authorities used interest rate as a tool to manage exchange rate fluctuations.

The persistent volatility of exchange and interest rate in the present era has made it compulsory and inevitable for domestic and multinational firms in order to hedge these risks otherwise it can lead to the inclusive breakdown of the business. Exchange rate fluctuations can alter the position of firm's foreign assets and liabilities while movements in interest rate can affect adversely to the expected cash flows and structure of firm's portfolio because investment behavior depends on interest rate movements. With the increased globalized economic activities and volatility in exchange and interest rate, risk management has devised some financial instruments like derivatives to hedge these risks.

Hedging by the use of financial derivatives such as interest rate and foreign exchange derivatives protects firm's cash flows and earnings from adverse exchange and interest rate fluctuations. Now financial institutions provide a range of products like financial derivatives to manage firm's financial risks. Now a day's future, forward, option and swap are the most commonly used derivatives.

Many studies have analyzed the determinants of hedging policy and its correlation with some other firm's aspects like leverage, investment and growth opportunities but very little work has been done to check the impacts of derivatives usage on firm value. According to Modigliani and Miller (1958) hypothesis hedging does not affect firm value in the absence of market imperfections. They propose that in perfect markets where shareholders have access to information about risk exposures and risk management tools there is no reason for hedging. In this scenario hedging can be performed by the shareholders on their own behalf by investing in well performed portfolios.

On the contrary, some recent hedging theories found that the use of derivatives for risk management could increase firm value because firms face different problems in real financial markets such as financial distress, problem of underinvestment, cost of bankruptcy, heavy taxes, and costly external financing etc. Hedging, by the use of derivatives, increases firm value by reducing tax payments, cost of external financing, probability of financial distress and underinvestment problems.

Most of the studies on derivatives have been done on the liquid and developed financial markets. In Pakistan this topic is not well explored yet. The present study will extend the existing literature by investigating impact of derivatives usage on firm value. Besides the fact that risk management objectives are same for US and Pakistani firms but impact of derivatives usage may be different in Pakistan than that in US because of poor corporate governance environment, fragile rules for the protection of investors and concept of concentrated ownership.

The current study results will contribute in two ways. First it will provide empirical evidence on the controversial relationship between the use of derivatives and firm value for Pakistani firms. Since earlier literature still has not reached on single consensus and results vary across boundaries. Secondly, this study will be helpful for managers, policy makers and practitioners in determining whether the use of derivatives adds value for Pakistani firms or not.

The remaining study, organized as Section II, explains related literature. Section III explains methodology of the study which includes data and sampling, variables of the study and model used for estimating impact of derivatives usage. Section IV presents the results and section V concludes the whole study.

2. Literature Review

Till now most of the derivatives and hedging related studies have been done on US markets consequently major part of the literature review of each study is dominant by US based studies.

Allayannis and Weston (2001) made the first attempt to investigate the valuation perspective of derivatives usage on firm value. The study made use of a large sample of 720 non-financial U.S firms in order to check the effects of FCD usage on firm value. Study results showed that there was a significant and positive correlation between the use of FCD and firm value. Moreover, they documented that the market value of hedging firms is 5% higher than that of non-hedgers. Graham and Rogers (2002) used a sample of US firms to investigate how hedging can affect to firm value when firms use derivatives to minimize their financial risks and for taking tax benefit from this activity. Study results showed that hedging had increased debt capacity of firms by 3.03%. This increased debt capacity yielded tax savings of 1% to 2% and an equivalent increase in firm value. Callahan (2002) made an attempt to investigate the relationship between gold hedging and firm value. He took a sample of 20 gold mining firms of North America for the period of 1996-2000. Results showed that the extent usage of gold hedging was associated with lower firm value.

Guay & Kothari (2003) found no significant relationship between the use of derivatives and

firm value. Allayannis et al, (2003) took a broad sample of firms from 39 countries to check the impact of derivatives usage on firm value. Results showed that there is a positive relationship between FCD and firm value for those firms which have good Corporate Governance environment. Jin and Jorion (2006) reported that hedging has no concern with firm value. The study used a sample of 119 US oil and gas producers for the period of 1998-2001 to investigate the impact of hedging on firm value. Study found no significant impact of hedging on firm value. Carter et al. (2006) examined 28 companies from US Airline industry to check the impact of fuel hedging on firm value. Results showed that jet fuel hedging was positively and significantly correlated with firm value. According to Reb & Connolly (2006) the act of using derivatives by a company attracts to investors irrespective of the impacts of derivatives usage on firm value.

Bartram et al. (2009) considered a large sample of 7319 non financial firms from 50 countries for the period of 2000-2001 to investigate the relationship between the use of derivatives and firm value. Their results supported to the hypothesis that hedging is a value enhancing activity. Further they revealed that this positive relationship was more significant for interest rate derivatives and weak for foreign exchange derivatives. Magee (2009) used a sample of 408 large US firms to investigate the impacts of foreign currency derivatives on Tobin's Q. Study results showed positive relationship between foreign currency derivatives and firm value. But found no relationship between firm value and foreign currency hedging after controlling the dependence of foreign currency hedging on past amount of firm value. Bartram et al. (2011) considered a large sample of 6888 from 47 countries to investigate the effects of derivatives usage on firm's risk and value. Study results showed that use of derivatives mitigated both, total and systematic risks. Study also found positive but weak impact of derivatives usage on firm value.

Following studies investigated valuation effects of derivatives usage for Asian countries like Nguyen and Faff (2003) attempted to test the hypothesis that whether hedging by the use of financial derivatives is a value enhancing strategy or not. Study used a sample of Australian firms for the period of 1999-2000 and found that use of general derivatives and FCD was associated with lower firm value. Ameer (2009) investigated the relationship between firm value and notional amount of FCD and IRD used by Malaysian firms for the period of 2003-2007. Results showed positive and significant relationship between the use of derivatives and firm value. Further they documented that the notional amount of derivatives also added value but this addition was very minimal. Allayannis et al. (2003) also supported to the value enhancing theories of hedging after studying eight Asian economies.

In Pakistan some work has been done on the determinants of Hedging policy by Afza and Alam (2011,a). They used a sample 105 non-financial Pakistani firms to investigate the hedging determinants. Their results proposed that tax shield advantage, managerial incentives, financial distress and underinvestment problems were the important determinants of hedging policy for Pakistani firms. Again Afza and Alam (2011,b) investigated the factors behind the decision to use foreign exchange derivatives for Pakistani firms. Study results showed that firms with higher foreign sales used foreign exchange derivatives to reduce their foreign exchange exposure.

3. Methodology

3.1 Data and sampling

In order to investigate the impacts of derivatives usage on firm value a sample of non financial firms listed on Karachi stock Exchange for the period of 2006-2010 is considered. Only non financial firms are considered and financial firms are excluded from the sample because financial firms are the users and issuers of derivatives and, sometimes, act as market makers. So the hedging behavior of financial and non financial firms cannot be same. For the above given reason only non financial firm are considered for the consistency of results. Only those non financial firms are taken under consideration which discloses information regarding the use of derivatives and make their annual reports available on their websites. Appendix 1 provides complete list of sample firms along with their websites (Data source) and type of derivatives they use against each firm.

The final sample consists of 107 firms which fulfill these requirements; finally a balanced panel data for five years with 535 observations is employed as a sample for the current study. According to Baltagi (2009) there are certain advantages of using balanced panel data which are: panel data is comprised of different states, firms and categories over time so the element of heterogeneity is essential but panel data techniques allow to control individual heterogeneity, provides more information and effectiveness, reduces the probability of co-linearity problem with greater degree of freedom. The panel data is also effective in order to observe the effects which cannot be otherwise detected in single cross section or time series data.

Mainly data of the study is collected from annual reports of the firms which are taken from websites. The stock prices are also taken from business recorder website. Information regarding the use of derivatives is available under the heading of financial instruments in note to the account of annual reports. Appendix 2 presents an example of how firms in Pakistan disclose information regarding the use of derivatives in their annual reports.

The sample is classified into two broad categories on the basis of derivatives usage named hedgers and non hedgers. Then hedgers are categorized as FCD users and IRD users. In the full sample firms which use at least one type of derivatives for risk management purposes are considered as hedgers and in this case the dummy variable of hedging will take the value of 1. On the other hand, firms which do not use any type of derivatives are non hedgers and for those firms hedging dummy variable attains value of 0. In the same way, firms which use FCD or IRD for those firms FCD and IRD dummy variables is assigned value of 1 otherwise 0 to non users.

Table 1 presents the summary statistics for all firms which use General derivatives, FCD and IRD. The 58 firms out of total 107 firms use general derivatives while 49 firms and 46% of the total sample do not use any type of derivatives. Foreign currency derivatives users are 42% while the users of Interest rate derivatives are 28% of the sample.

Table 1. Statistics of users and non users of derivatives

This table shows the summary statistics of derivatives users, it also presents the number of firms and percentage of firms using general derivatives, FCD and IRD.

	Users	%	Non Users	%
General Derivatives	58	54	49	46
Foreign Currency Derivatives	45	42	62	58
Interest rate Derivatives	30	28	77	72

Author's own calculation

3.2 Variables of the study

3.2.1. Dependent Variable

Firm value is taken as dependent variable of the study which is measured through Tobin's Q. Tobin's Q is generally defined as the ratio of market value of the firm to the replacement cost of assets. According to this formula, it is a complex calculation in which the data of firm's long term debts and replacement cost of fixed assets is required which is not easily available against all firms. Allayannis and Weston (2001) find that complex and improved Tobin's Q which was used by Lewellen and Badrinath (1997) and Perfect and Wiles (1994) does not yield different results. Further Allayannis and Weston find very high correlation of 0.93 between simple and complex Tobin's Q. Lemmon and Lins (2003) and Daines (2001) argue that simple Tobin's Q require very less data as input and yield very effective results for the measurement of firm's value. So simple Tobin's Q is used as proxy of firm value as measured by earlier researchers which is calculated as:

$$\textit{Tobin's Q} = \frac{\textit{[Book value of Total Assets + Market value of Equity] – Book value of Equity}}{\textit{Book value of total Assets}}$$

In this calculation Book value of Total Assets, Book value of Equity and Market value of Equity is consider as a proxy for market value while book value of total assets is taken as a proxy for replacement cost of assets. Firm value is further measured thorough two more alternatives named Alt. Q1 which is calculated as ratio of market value of equity to book value of equity and Alt. Q2 that takes the ratio of market value of equity to total sales.

3.2.2. Independent Variable

Firms listed on Karachi Stock Exchange under IAS 32 are required to disclose the information regarding the use of financial derivatives used for risk management purposes. Firms are also required to disclose the information of the risks they face and how these risks are tackled. Normally this information is presented under the heading of Financial Instruments in notes to the accounts.

Use of general derivatives, FCD and IRD are taken as independent variables. Hedging by the use of general derivatives is measured through a dummy variable which takes the value of 1

if firm use any type of derivatives otherwise it will be 0. Similarly two more dummies for the use of FCD and IRD are used in order to check the impact of each one.

3.3.3. Control Variables

*a) Firm size***:** According to general perception, larger firms are more likely to hedge because huge fixed cost is involved in running the operations of large firms. Earlier studies control firm size for two reasons first is that Allayannis and Weston (2001) find differences in Tobin's Q for smaller and larger firms. Secondly, larger firms are more likely to hedge than smaller firms (Mseddi and Abid 2010). Firm's size is controlled by taken the natural logarithm of total assets.

*b) Leverage***:** High leveraged firms are more likely to hedge by the use of derivatives (Campbell & Kracaw, 1987), (Modigliani and Miller, 1983), (Dolde 1995) and (Tufano, 2012). Smith and Smithson (1993) and Graham and Smith (1999) documented that hedging increases debt capacity, and this increased debt capacity allows the firms to use more debts and this practice yields tax shield advantage. Some other researchers found negative relationship between firm value and leverage. According to Titman and Wessels (2012) huge debts lead to financial distress and it decreases firm value. Further Rees (2003) also show negative relationship between firm value and total debt. In order to control the leverage effect the ratio of long term debts to total assets is used.

c) Liquidity: Firms with higher liquidity have enough internal financing that they need no external financing for undertaking projects so it can be expected that liquidity is positively correlated with firm value. Liquidity decreases the probability of financial distress, the cost of external financing and makes valuable projects affordable. Current ratio is used as a measure of liquidity.

*d) Growth***:** According to Myers (1977) future investment opportunities also affect firm value. Many researchers like Smith and Watts (1992), Sougiannis (1994) and Yermack (1996) argue that firm's future investment opportunities have positive impact on firm value. Generally, hedgers have large investment opportunities so growth is controlled by taking ratio of capital expenditures to total assets.

e) Return on Assets (ROA): ROA is considered as a measure of profitability. According to general perception, profitable firms have higher Q ratio. ROA is measured through the ratio of net profit after tax to total assets.

f) Dividend: Dividend dummy is used as a proxy for access to financial markets which takes the value of 1 if firm paid the dividend in observed year and 0 otherwise. Firm's Tobin's Q remains high even if firms forego the projects when required financing is not available, for this reason this variable is expected to be negatively correlated with firm value.

g) Geographic diversification: Geographical diversification affects firm value in both ways, positively and sometimes negatively. Morck and Yeung (1991) reported positive impacts while Christophe (1997) has documented negative impacts of geographic diversification on firm value. Geographical diversification takes the ratio of foreign sales to total sale.

4. Empirical results

4.1 Descriptive Statistics

Table 2 presents the descriptive statistics of variables of the study in five panels named A,B,C,D and E for the full sample, hedgers, non hedgers, FCD users and IRD users respectively. Panel A depicts the statistics for the whole sample of 107 firms and 535 observations.

Starting from dependent variables the mean values of Tobin's Q, Alt. Q1 and Alt. Q2 in the whole sample are 7.1, 46.08 and 7.98 respectively. The median values of these three variables are substantially different from their mean values.

Table 2. Descriptive statistics

Panel A: Full Sample

Variables	No.	Mean	Std. Dev	Median	Min	Max
Tobin's Q	535	7.11	7.60	4.14	0.85	39.69
Alt. Q1	535	46.08	41.75	28.60	0.19	161.00
Alt. Q2	535	7.98	10.23	3.88	0.02	60.32
SIZE (T. assets)	535	15.33	1.49	15.21	11.93	19.19
LEV	535	0.26	0.43	0.19	0.00	8.10
Growth	535	0.61	0.65	0.54	0.03	11.29
ROA	535	0.07	0.23	0.04	-0.22	3.74
Diversification	535	0.16	0.31	0.00	0.00	2.29
Div Dummy	535	0.60	0.49	1.00	0.00	1.00
C. Ratio	535	1.26	1.00	0.99	0.08	7.85
Hedge	535	0.54	0.50	1.00	0.00	1.00
FCD	535	0.42	0.49	0.00	0.00	1.00
IRD	535	0.28	0.45	0.00	0.00	1.00

It means that the distribution of Tobin's Q, Alt. Q1 and Alt. in the current sample is skewed to the right side. I order to control this skewness, natural log of these variables is taken in Multivariate analysis. The mean value of size (Total assets) in the whole sample is 15.53, 26% portion of the capital is financed through long term debts. The growth rate is 61% while ROA is 7%. The 16% firms are geographically diversified. The mean value of dividend shows that 60% of the firms pay dividend while current ratio depicts strong liquidity position. In the whole sample 54% of the firms use general derivatives, 42% use FCD and 28% of firms use IRD.

Panel B and C help to compare the mean and median results for Hedgers and non Hedgers. Tobin's Q on average of hedgers is higher than the mean and median value of Tobin's Q of

non hedgers. This result is in consistent with the argument that investors value higher to those firms which manage their risks by hedging. The other two alternative measures of market value Alt.Q1 and Alt. Q2 also show higher mean and median value for hedgers. The average size of hedging firms is 15.66 which is greater than the mean value 14.94 of non hedgers. This result is in accordance with the prior studies whose results show that larger firms are more likely to use derivatives than smaller firms. Larger firms hedge more because of two reasons; first is that some initial costs are required to establish the derivatives markets and this cost is easy to pay for larger firms due to economies of scale.

Panel B: Hedgers

Variables	No.	Mean	Std. Dev	Median	Min	Max
Tobin's Q	290	8.02	8.15	5.07	0.85	39.69
Alt. Q1	290	51.70	42.90	34.86	0.19	161.00
Alt. Q2	290	8.58	10.33	4.68	0.02	56.50
SIZE(T. assets)	290	15.66	1.32	15.57	12.84	18.75
LEV	290	0.20	0.17	0.17	0.00	0.64
Growth	290	0.49	0.21	0.47	0.04	1.35
ROA	290	0.07	0.11	0.05	-0.19	0.42
Diversification	290	0.17	0.35	0.00	0.00	2.29
Div Dummy	290	0.70	0.46	1.00	0.00	1.00
C. Ratio	290	1.39	1.07	1.03	0.16	7.85
Hedge	290	1.00	0.00	1.00	1.00	1.00
FCD	290	0.78	0.42	1.00	0.00	1.00
IRD	290	0.52	0.50	1.00	0.00	1.00

Panel C: Non Hedgers

Variables	No.	Mean	Std. Dev	Median	Min	Max
Tobin's Q	245	6.03	6.74	3.41	0.86	33.00
Q1	245	39.43	39.41	23.00	0.65	157.00
Q2	245	7.28	3.07	10.09	0.14	60.32
SIZE(T. assets)	245	14.94	1.57	14.80	11.93	19.19
LEV	245	0.33	0.60	0.23	0.00	8.10
Growth	245	0.76	0.92	0.64	0.03	11.29
ROA	245	0.08	0.32	0.02	-0.22	3.74
Diversification	245	0.14	0.27	0.00	0.00	1.80
Div Dummy	245	0.48	0.50	0.00	0.00	1.00
C. Ratio	245	1.11	0.90	0.91	0.08	6.04

Second reason is that larger firms hedge because they have installed heavy fixed costs and it becomes necessary for them to hedge against that huge cost. The mean value of leverage of hedgers is 20% which is significantly less than the mean value 33% of non hedgers. It shows that hedgers are less leveraged than non hedgers and it is not in accordance with the previous findings which show that hedging increases debt capacity which allows firms to take tax shield advantage. The mean value of growth of hedgers is 49% which is far smaller than the mean value 76% of non hedgers. This result indicates that the decision to use derivatives affects negatively to firms growth. ROA on average for hedgers and non hedgers is almost same. Hedgers are more geographic diversified with the mean value of 17% against the mean value of 14% for non hedgers. It is in line with the argument that diversified firms in different states are more likely to hedge against foreign exchange and interest rate risks. The payment of dividend is interpreted as an access to financial market. The 70% of hedging firms pay dividend while, on the other hand, on average 48% of non hedgers pay dividend. Firms which pay dividend can avoid the problem of financial distress even without use of derivatives. Hedging increases liquidity of firms as a result of excessive cash and unused debt capacity. Same results are depicted in the table where current ratio of hedgers on average is 1.39 which is higher than the mean value 1.11 of non hedgers. In hedgers most of the hedgers hedge against foreign exchange risk that is 78% of the hedging firms while 52% firms hedge against interest rate risks.

At last panels D and E of Table 2 present the summary statistics of FCD and IRD users. Tobin's Q on average is higher for FCD users than IRD users while two other measures of market value are higher in case of IRD users.

Panel D: FCD USERS

Variables	No.	Mean	Std. Dev	Median	Min	Max
Tobin's Q	225	7.93	8.21	4.83	0.85	39.69
Alt. Q1	225	49.97	43.09	29.65	0.19	161.00
Alt. Q2	225	7.91	10.05	4.07	0.02	56.50
SIZE(T. assets)	225	15.75	1.37	15.80	12.84	18.75
LEV	225	0.19	0.17	0.16	0.00	0.64
Growth	225	0.47	0.21	0.45	0.04	1.35
ROA	225	0.07	0.11	0.06	-0.19	0.42
Diversification	225	0.14	0.27	0.00	0.00	2.14
Div Dummy	225	0.71	0.45	1.00	0.00	1.00
C. Ratio	225	1.46	1.14	1.05	0.16	7.85
Hedge	225	1.00	1.00	0.00	1.00	1.00
FCD	225	1.00	1.00	0.00	1.00	1.00
IRD	225	0.38	0.49	0.00	0.00	1.00

Panel E: IRD Users

Variables	No.	Mean	Std. Dev	Median	Min	Max
Tobin's Q	150	7.50	8.02	4.18	1.07	38.98
Alt. Q1	150	51.50	41.97	35.26	1.50	157.00
Alt. Q2	150	8.51	9.93	4.65	0.14	47.93
SIZE(T. assets)	150	15.64	1.27	15.58	13.23	18.75
LEV	150	0.24	0.18	0.23	0.00	0.64
Growth	150	0.53	0.21	0.54	0.11	0.91
ROA	150	0.05	0.09	0.04	-0.19	0.37
Diversification	150	0.23	0.39	0.04	0.00	2.29
Div Dummy	150	0.64	0.48	1.00	0.00	1.00
C. Ratio	150	1.19	0.72	0.98	0.23	4.44
Hedge	150	1.00	0.00	1.00	1.00	1.00
FCD	150	0.57	0.50	1.00	0.00	1.00
IRD	150	1.00	0.00	1.00	1.00	1.00

The remaining control variables on average are almost same for FCD and IRD users.

4.2 Univariate analysis

According to the main hypothesis of the study, firms using derivatives for hedging are valued higher than non users. In order to empirically investigate this hypothesis, a test of equality of mean values of firm value and control variables is conducted to make a comparison among hedgers, non hedgers, FCD and IRD users. Table 3 presents the results of univariate analysis in three panels named panel A, panel B and panel C. Panel A provides the comparison of Hedgers and non hedgers for each variable while Panel B and C give same comparison for FCD and IRD users. The first two columns from the left side of the table present mean values of hedgers, non hedgers, FCD and IRD users while column no. 3 presents the difference between mean values. The last two columns present whether the given difference is statistically significant or not.

Starting from panel A which presents the comparison of hedgers and non hedgers, the difference between mean values of Tobin's Q for hedgers and those for non hedgers is positive and significant. This difference is also positive in both cases of alternative Q1 and Q2 but it is significant only for Q1. The results till here show that hedging firms are valued higher than non hedgers because the difference is positive against each measure of market value. The size, on average, of hedging firms is higher than that of non hedgers and this difference is found highly significant. This significant difference approves the hypothesis of huge fixed cost and economies of scale. The negative and significant difference in case of leverage shows that hedging firms are characterized as low debited firms than non hedgers.

Table 3. Comparison of hedgers and non hedgers

Panel A: Hedgers versus non hedgers

	1	2	3	4	5
Variables	**Hedgers**	**Non Hedgers**	**Difference**	**t-stat**	**p-value**
Tobin's Q	8.024	6.034	1.990	3.090	0.002
Q1	51.700	39.426	12.274	3.446	0.001
Q2	8.577	7.283	1.295	1.463	0.144
SIZE(T. assets)	15.663	14.938	0.725	5.715	0.000
LEV	0.198	0.333	(0.135)	(3.385)	0.001
Growth	0.487	0.761	(0.274)	(4.579)	0.000
ROA	0.069	0.081	(0.012)	(0.546)	0.586
Diversification	0.172	0.138	0.034	1.266	0.206
Div Dummy	0.698	0.483	0.215	5.042	0.000
C. Ratio	1.392	1.108	0.284	3.376	0.001

Results of growth and ROA also show negative difference but this difference is only significant for growth mean values. The diversification results show that hedging firms are more geographically diversified than non hedgers but this result fails to meet the significance level. The hedging firms paid more dividends than non hedgers because, by paying, dividend firm can avoid the problem of financial distress and its results are perhaps statically significant. The difference between current ratio is positive and significant because hedging increases the liquidity of firms. Panel B presents the comparison of FCD users and non hedgers while panel C compares the results of IRD users and non hedgers.

Panel B: FCD users versus non hedgers

	1	2	3	4	5
Variables	**FCD Users**	**Non Hedgers**	**Difference**	**t-stat**	**p-value**
Tobin's Q	7.930	6.034	1.897	2.724	0.007
Q1	49.972	39.426	10.547	2.761	0.006
Q2	7.913	7.283	0.630	0.678	0.498
SIZE(T. assets)	15.754	14.938	0.817	6.021	0.000
LEV	0.190	0.333	(0.143)	(3.559)	0.000
Growth	0.466	0.761	(0.295)	(4.893)	0.000
ROA	0.075	0.081	(0.006)	(0.277)	0.782
Diversification	0.139	0.138	0.001	0.022	0.983
Div Dummy	0.710	0.483	0.227	5.098	0.000
C. Ratio	1.457	1.108	0.349	3.690	0.000

Results of FCD and IRD users against non hedgers are same as in the case of panel A. Panel B and C also approve the hypothesis that firms which use derivatives are valued higher than non hedgers.

Panel C: IRD users and non hedgers

	1	2	3	4	5
Variables	**IRD users**	**Non Hedgers**	**Difference**	**t-stat**	**p-value**
Tobin's Q	7.497	6.034	1.463	1.866	0.063
Q1	51.502	39.426	12.076	2.840	0.005
Q2	8.512	7.283	1.229	1.187	0.236
SIZE(T. assets)	15.638	14.938	0.700	4.845	0.000
LEV	0.237	0.333	(0.096)	(2.327)	0.021
Growth	0.534	0.761	(0.227)	(3.728)	0.000
ROA	0.054	0.081	(0.027)	(1.237)	0.217
Diversification	0.228	0.138	0.090	2.499	0.013
Div Dummy	0.644	0.483	0.161	3.124	0.002
C. Ratio	1.190	1.108	0.082	1.044	0.297

This test of equality of means shows that hedging firms are valued higher than non hedgers but this argument cannot be concluded at this stage for that a multivariate analysis is required in order to investigate the other factors which may affect firm value.

4.3 Multivariate analysis

Impacts of derivatives usage on firm value is estimated through the model of Allayannis and Weston (2001) which has been commonly used in prior studies:

$$lnTobin'sQ = \alpha + \beta(Use\ of\ Derivatives) + \sum\lambda(\text{Control Variables}) + \varepsilon \qquad (1)$$

In the above given equation, Tobin's Q is taken as a measure of firm value while natural log is taken to control the skewness of the variable. α is the constant coefficient and β is the coefficient of use of derivatives, FCD and IRD variables whereas ג denotes to coefficient of control variables and ε is the error term.

In order to check the problem of multicollinearity among independent variables Variance inflation factor test (VIF) is conducted. The VIF values of all independent variables lie between 1.08 t0 5.62 which is less than 10, it shows that there is no serious problem of multicollinearity.

One advantage of balanced panel data is that it allows controlling the potential existence of

non observable individual characteristics that may vary across cross sections but remain constant over time. Panel data is comprised of different cross sections over time so the element of heterogeneity is must (Baltagi, 1995) and simple pooled OLS regression does not take into account the individual heterogeneity and leads to biased estimations. Due to this inability of OLS technique, most of the researchers have used different techniques from OLS like random effect or fixed effect model. In current study, Lagrange Multiplier (LM) test is applied in order to check whether OLS estimates are suitable or not. Test results reject the null hypothesis, meaning by, that individual specific characteristics exist in data so random effect is a better technique than OLS.

Further Hausman specification test (Hausman, 1978) is used in order to determine which empirical test is more suitable for estimating Tobin's Q equation. Under the null hypothesis of this test the individual effects are not correlated with other regressors so random effect estimates are more consistent and efficient in such situation. Test statistics are presented in the form of tables of regression analysis. The null hypothesis of no correlation between individual effects and independent variables is rejected at 1% significance level. Test results illustrate that fixed effect model is more suitable for estimating Tobin's Q equation.

4.3.1. Regression Results

Table 4 presents the regression results in three panels named A, B and C. Panel A shows the regression results in case when Tobin's Q is taken as a measure of firm value while in Panel B and C Alt. Q1 and Q2 respectively are taken as measures of market value.

In Panel A the hedging coefficient negates the main hypothesis that the firms using any type of derivatives for hedging are valued higher. The hedging coefficient with value of 0.083 shows positive relationship between the use of derivatives and firm value but this relationship is not statistically significant with a p-value of 0.157. This insignificant relationship is in contrast to the prior studies like Graham and Rogers (2000) where they proposed that hedging added value premium of 1.1% while Kapitsinas (2008) reported a value premium of 4.6%. Some researchers have document that this size of value premium sometimes reached to 16-26% in firms which were in high risk exposures. The FCD coefficient shows that use of FCD is associated with lower market value of 5.7% but this relationship also carries no significance. This result is in contrast to the Allayannis and Weston (2001) who reported that US non financial firms using FCD were valued 5% higher than non users. Coefficient of IRD users shows that use of IRD adds value but p-value of this relationship shows that this is not a significant relationship. This positive but insignificant relationship is not in line with the study of Bartram et al. (2004) whose results showed that use of FCD and IRD has positive impacts on firm value but this relationship was more significant for IRD users.

Table 4. Regression Results

Panel A (Dependent Variable: lnTobin's Q)

	Hedge		FCD users		IRD users	
Variables	**coef.**	**p-value**	**Coef.**	**P-value**	**Coef.**	**P-value**
C	-0.175	0.584	-0.244	0.446	-0.198	0.534
Hedge	0.083	0.157				
FCD			-0.057	0.331		
IRD					0.083	0.185
SZ	0.062	0.002	0.071	0.001	0.065	0.001
LEV	0.003	0.984	0.011	0.928	0.001	0.992
GT	-0.088	0.380	-0.109	0.278	-0.094	0.349
ROA	1.138	0.000	1.151	0.000	1.143	0.000
DIVERSI	-0.208	0.022	-0.204	0.025	-0.216	0.018
DIV	0.497	0.000	0.508	0.000	0.501	0.000
CR	0.311	0.000	0.317	0.000	0.317	0.000
Observations	535		535		535	
R-squared	0.536		0.535		0.536	
Hausman Test						
Chi Sq. Stat -d.f.	152.23-7		157.07-7		157.13-7	
Chi. Sq. Prob.	0.000		0.000		0.000	

Most of the control variables indicate expected relationships and some of them are statistically significant. Size of the firm is found positively related to Tobin's Q in all three regressions of Hedge, FCD and IRD users as was confirmed by earlier researchers like Nance et al. (1993). Leverage coefficient also shows positive relationship with firm value but this relationship has no significance. The negative Growth coefficient demonstrates that firm's future investment opportunities are associated with lower firm value for Hedgers, FCD and IRD users respectively but again this relationship carries no significance. This negative relationship is against the findings of Smith and Watts (1992) and Yermack (1996) that explain that firms having investment opportunities in future have higher market value. Firm's profitability which is measured through the ratio of net profit after tax divided by total assets is positively and significantly correlated with Tobin's Q and this relationship is consistent for general derivatives, FCD and IRD users. The ratio of foreign sales to total sales, which is used as measure of geographical diversification, shows negative relationship with Tobin's Q for hedgers, FCD and IRD users and this negative relationship is also significant for all cases. According to prior studies, dividend and liquidity show positive and significant relationship with Tobin's Q and this relationship is consistent for general derivatives, FCD and IRD users. Investors value dividend paying firms higher and they perceive that such firms` management is enough competent to generate constant future profits. The fact of positive relationship

between liquidity and Tobin's Q is that liquidity enhances internal financing which can be used by firms to undertake profitable projects.

Panel B presents the results for same variables as are presented in panel A but in panel B lnQ1 is used as dependent variable. In this panel hedging attains negative coefficient of -0.014 which shows that use of general type of derivatives is associated with lower firm value but again this relationship is not statistically significant. The negative and significant coefficient of FCD users shows that use of FCD is associated with a lower market value of 19.1%.

On the other hand, IRD users show positive and significant relationship between the use of IRD and firm value. The positive IRD coefficient shows that firms using IRD are valued higher by 20%. All control variables show the same results as were in panel A but only two variables, geographical diversification and growth, show different results. Here geographical diversification shows negative but insignificant relationship with firm value. But negative and significant growth coefficient shows that investment opportunities are associated with lower market value.

Panel B (Dependent variable: lnAlt.Q1)

	Hedge		**FCD users**		**IRD users**	
Variables	**Coef.**	**P-value**	**Coef.**	**P-value**	**Coef.**	**P-value**
C	0.164	0.743	0.054	0.914	0.197	0.692
Hedge	-0.014	0.876				
FCD			-0.191	0.039		
IRD					0.199	0.043
SZ	0.157	0.000	0.169	0.000	0.151	0.000
LEV	0.039	0.844	0.053	0.788	0.025	0.900
GT	-0.382	0.015	-0.409	0.009	-0.365	0.020
ROA	1.021	0.000	1.042	0.000	1.017	0.000
DIVERSI	-0.128	0.367	-0.141	0.317	-0.166	0.242
DIV	1.053	0.000	1.060	0.000	1.040	0.000
CR	0.140	0.006	0.149	0.003	0.145	0.004
Observations	535		535		535	
R-squared	0.433		0.438		0.438	
Hausman Test						
Chi Sq. Stat -d.f.	58.90-7		62.45-7		58.64-7	
Chi. Sq. Prob.	0.000		0.000		0.000	

Panel C shows the results when dependent variable is lnQ2. The hedge coefficient with value of -0.053 shows that use of derivatives for hedging decreases market value by 5.3%. But, as p-value shows, this negative relationship is not statistically significant.

Panel C (Dependent variable: lnAlt. Q2)

	Hedge		FCD users		IRD users	
Variables	**Coef.**	**P-value**	**Coef.**	**P-value**	**Coef.**	**P-value**
C	-3.679	0.000	-3.842	0.000	-3.643	0.000
Hedge	-0.053	0.605				
FCD			-0.308	0.003		
IRD					0.099	0.371
SZ	0.275	0.000	0.292	0.000	0.269	0.000
LEV	0.090	0.682	0.111	0.611	0.081	0.713
GT	0.015	0.934	-0.024	0.890	0.030	0.864
ROA	1.026	0.001	1.058	0.001	1.020	0.001
DIVERSI	0.402	0.012	0.378	0.017	0.379	0.018
DIV	0.216	0.063	0.226	0.050	0.205	0.077
CR	0.380	0.000	0.393	0.000	0.381	0.000
Observations	535		535		535	
R-squared	0.331		0.342		0.332	
Hausman Test						
Chi Sq. Stat -d.f.	79.78-7		81.96-7		80.16-7	
Chi. Sq. Prob.	0.000		0.000		0.000	

The negative and significant coefficient of FCD shows that the use of FCD is associated with lower market value. Coefficient of IRD shows positive but insignificant relationship between the use of IRD and firm value. Control variables are showing almost same results as in panel A.

5. Conclusion

The current study investigates the hypothesis whether firms using derivatives are valued higher or not. In doing so a sample of 107 non financial Pakistani firms for the period of 2006-2010 is considered. Firm value is mainly measured through Tobin's Q but two more alternatives named Alt. Q1 and Alt. Q2 are also considered as measures of firm value. Impact of three types of derivatives usage named general derivatives, FCD and IRD is tested separately on firm value.

Prior studies show mix results of positive, negative and no effects of derivatives usage on firm value. Results of current study are in consistent with the theories of no relationship between the use of derivatives and firm value. From the current study analysis, it is concluded that the use of general derivatives, FCD and IRD for hedging does not add value when firm value is measured through Tobin's Q. But the use of FCD is found to be associated with lower market value when Alt. Q1 and Alt.Q2 are taken as measures of firm value. Use of

IRD adds value only in case when market value is measured through Alt.Q1.

The above results are in contrast to many US studies which shows that major differences exist in US and Pakistani markets. There are three major reasons of this difference. First is that Pakistan is a developing economy where there is no regulatory authority for the protection of investor's rights. The second reason is that in Pakistan stock, bonds and money markets are not well organized which is necessary for the trading of derivatives because many times stocks, bonds and money market instruments served as underlying assets. The final reason is that investors in Pakistan do not know about the functions and benefits of derivatives due to which they do not assign high value to those firms which use derivatives for hedging their financial risks.

Future studies can be done by considering financial firms or by using notional amount of derivatives usage along with dummy variables to check the impact of extent usage of derivatives usage.

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