Hedge Strategies of Corporate Houses

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Abstract

This paper compares and contrasts the hedge strategies through derivative instruments by Indian and USA corporate houses. The derivative instruments have little predictive power in explaining corporate hedging strategies both in the USA and Indian firms. The purpose of the study is to provide a setting where reconciling conflicting results from the literature may be appropriate and to compare different hedge strategies in a specific period in two different countries (USA and India). The evidence based on multivariate empirical relations between hedging in American firms and firm's characteristics fails to provide any support for any of the tested hypotheses except for profitability represented by dividend yield. We conclude that the relationship between hedging and dividend yield in the proposed model is negative. The same analysis conducted for Indian companies has shown that there is no statistically significant explanatory variable for hedging; therefore, it is not dependent on any of the predicted theories of hedging. On the other hand, we find some significant relationships between firms' characteristics. Large Indian firms use internal hedge strategies rather than market strategies, such as derivatives. The derivative market development then could play a major role in terms of risk management of firms across countries.

Keywords: hedge strategies, hedging, derivatives, firm value, derivatives usage, India, the USA

1. Introduction

Understanding corporate hedging decisions is valuable, especially if they vary internationally. Any increasingly common trend (more hedging among large, global firms) is very important. The purpose of the paper is to compare different hedge strategies in a specific period of time in the USA and India, which are two major economies by nominal GDP in the world (Ganguly & Mukherji, 2011). Indian economy is a fast growing and developing mixed economy whereas the US economy is a highly-developed mixed economy (Ganguly & Mukherji, 2011). The added value of the study is to provide a setting where reconciling conflicting results from the literature may be appropriate. Over the last 25 years, scholars have developed several theoretical frameworks that explain corporate hedging strategies and describe circumstances under which corporate hedging strategies add value to the firm. A hedge is an investment position intended to offset potential losses/gains that may be incurred by a companion investment. In simple language, a hedge is used to reduce any substantial losses/gains suffered by an individual or an organization (Ratings, 2004).

Approximately 50 percent of U.S. non-financial firms use derivatives and as their use continues to grow, the empirical evidence on the influence of derivative usage on firm value is mixed (Jin & Jorion, 2006). The conclusions vary by sector, period, country, and econometric techniques used in the analysis, as a result, making it difficult to make generalizations regarding the real motivations behind the use of these financial instruments by companies. Júnior (2013) conducted a narrative review on the rationales of corporate hedging and found "surprisingly mixed empirical support for rationales of hedging with derivatives on firm value at the firm level." The link between derivative usage and firm value depends on their ability to effectively address market imperfections like bankruptcy costs, financing constraints, information asymmetries, and taxes (e.g., Froot et al., 1993; Stulz, 1996; Bessembinder, 1991; Stulz, 1990; Smith & Stulz, 1985; Myers, 1977) and to report a possible positive result on a firm's value. As an example, Adam & Fernando (2006), Carter el al. (2006), Berrospide et al. (2010), and Jin & Jorion (2006) identify a positive relation between derivative usage and firm value.

However, Nain (2005), Lookman (2009), and Mello & Parsons (2000) report either no relation or solely a conditional positive or negative relation between derivative usage and firm value. Whereas these mixed valuation results are puzzling, they will be explained partly by management's use of derivatives to handle market imperfections versus management's selective use of derivatives for speculation and self-interests. Still, academics do not have a common understanding of what really induces firms to hedge. Since derivatives usage and related regulations in USA have been illustrated vastly in literature, and academics are familiar with them, we only explain derivatives usage and related regulations in India in the following section.

1.1 Derivative as Main Hedge Product and Its Regulations in India

A derivative enables a trader to hedge some preexisting risk by taking positions in derivatives markets that offset potential losses in the underlying or spot market. Since the most common hedging tools in firms are derivatives, the focus of study will be on the effect of derivatives usage, as main hedging strategies, on firm value and firm financial characteristics. Derivatives are popular financial instruments used in foreign markets from the last several decades for hedging. Derivatives were recently introduced in Indian markets (Gambhir & Goel, 2002). They are market-created financial products. A derivative is a special type of contract that derives its value from the performance of an underlying entity (Gambhir & Goel, 2002). This underlying entity can be an asset, index, or interest rate, and is often called the underlying. Derivatives can be used for a number of purposes -- including insuring against price movements (hedging), increasing exposure to price movements for speculation or getting access to otherwise hard to trade assets or markets.

Options and futures are the two most popular derivatives products. In the market, commonly-traded derivatives available include stock futures, stock options, stock index futures and options, commodity futures (gold, crude oil, wheat, sugar etc.), currency options, interest rate futures and options and some more derivatives.

Two exchanges offer derivatives trading: the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). Although, NSE now accounts for virtually all exchange-traded derivatives in India, accounting for more than 99 percent of volume in 2003. A clearing house guarantees contract performance, and it is a wholly owned subsidiary of the NSE. Requirements of marking-to-market of futures positions and margin substantially reduce the credit risk of exchange traded contracts relative to Over-the-counter contracts (Jogani & Fernandes, 2003).

Respectively, index futures were introduced in June 2000 followed by index options in June 2001 and options and futures on individual securities in July and November 2001. As of 2005, the NSE trades futures and options on 118 individual stocks and three stock indices. Derivatives on stock indexes and individual stocks have grown fast since beginning. Specially, single stock futures became vastly widespread, accounting for half NSE's traded value in October 2005. NSE actually has the best volume within the single stock futures globally, facultative it to rank sixteen among world exchanges in mid-2005. Futures are more widespread than single stock choices area unit. Index futures in an area unit progressively widespread, and in October 2005, accounted for near 40 percent of traded value (Jogani & Fernandes, 2003).

Interest rate derivatives are more active than foreign exchange derivatives, even though they have been around for a shorter amount of time. Over-the-counter instruments in currency forwards and swaps are the most popular. Banks, exporters and importers use the rupee forward market to hedge their foreign currency exposure. Liquidity and turnover in this market has been increasing, although trading is mainly in shorter maturity contracts of one year or less (Nair, 2004). In a currency swap, banks and corporations may swap its rupee denominated debt into another currency, or contrariwise. Trading in over-the-counter (OTC) currency options is still muted. There is no exchange traded currency derivatives.

Exchange-traded commodity derivatives have been trading only since 2000 with an uneven growth. The number of commodities eligible for futures trading has increased from 8 to 80 in 2000 and 2004, respectively, whereas the value of trading has increased almost four times in the same period (Gorham et al., 2005). However, many contracts barely trade, and, of those that are active, trading is fragmented over multiple market venues, including regional and central brokerages, exchanges, and unregulated forwards markets in India. Total volume of commodity derivatives is less than half the size of equity derivatives and is smaller (Júnior, 2013).

A discussion of relevant background literature in hedging strategies, especially derivative usage and firm value, is presented below followed by the data collection procedure, a summary of statistics, and data analysis. The paper concludes with results discussion, limitations, and future studies.

2. Literature Review

2.1 Derivative Usage and firm Valuation Effects

A vast body of theoretical literature on corporate finance intended to analyze why companies using derivatives began to develop in the 1980s (Smith & Stulz, 1985). Relatively few studies check for an instantaneous relation between the utilization of derivatives and firm value.

These studies (Huang et al., 2017; Kim et al., 2017; Krause & Tse, 2016; Ahmadi et al., 2014, Knopf et al., 2002; Allayannis & Weston, 2001) find support for a positive relation between hedging and firm value. Outcomes are similarly mixed regarding the frequently tested risk-management hypothesis that agency costs of underinvestment drive derivatives use; some studies find the hypothesized positive relation between derivatives use and both the market-to-book ratio and R&D expenditures, while other studies find no such relation. All research mentioned above assumes that the use of derivatives is a good proxy for risk-management activities and human risk (Jaradat and Pinto, 2015; Pinto et al. 2015). Most of the mentioned studies assume that the use of derivatives is intended to minimize firm-level cash flow volatility and that the interaction between imperfections in the financial markets. And this reduction in companies' cash flow volatility can generate gains to the firms that compensated the costs resulted in the use of derivatives in order to add value to firms. As managers want to cut back the volatility of their financial gain, this could result in managers hedging on behalf of the firm (Stulz, 1984). Bartram et al. (2009) use international data to check for the effects of interest rate and foreign exchange derivatives on firm value and realize positive valuation effects, whereas Carter et al. (2006) find a positive relation between the utilization of fuel value risk derivatives and firm value for a sample of twenty-six U.S. airlines. Perez-Gonzalez & Yun (2013) find that hedging increases firm value. Graham & Rogers (2000) find that firm value could also be increased through the rise of debt capability from the utilization of financial instruments. Watching corporations within the gold mining industry, Adam & Fernando (2006) mention that their sample of corporations generates important cash flow gains from their derivative transactions with no compensative adjustment within the firms' systematic risk. They conclude that these cash flow gains had a positive impact on stockholder value. Using a sample of 720 large non-financial corporations from 1990 to 1995, Allayannis & Weston (2001) prove that there is a positive relation between currency derivative usage, and Tobin's q. Froot et al. (1993) hypothesize that if external financing is more costly than internal financing, hedging can be a value-increasing activity if it matches fund inflows with outflows.

In distinction to the positive valuation effects mentioned above, different studies document either no valuation effects or solely conditional negative valuation effects related to derivative usage. These studies (Carter et al., 2006; Nain, 2005; Mello & Parsons, 2000; Mian, 1996; Guay, 1999; Smithson, 1996; Mayers & Smith, 1987, Ahmadi, et al., 2014) fail to find evidence of a positive relation between hedging and firm values. Jin & Jorion (2006) use a sample of 119 U.S. oil and gas producers over the 1998–2001 sample period and realize no relation between firm prices and the utilization of derivatives. Lookman (2009) uses a sample of 125 exploration and production (E&P) firms over the 1992–1994 and 1999–2000 sample periods and conjointly find no relation between firm value and the utilization of derivatives within the mixture. Particularly, Pantzalis et al. (2001) discover that foreign exchange derivative usage does not have an effect on firm value if few competitors hedge; however, it will improve firm value if several competitors hedge. Guay & Kothari (2003) argue that the potential gains of derivative usage by non-financial corporations are less compared to changes in equity prices and cash flows. Nelson et al. (2005) use a sample of 1308 corporations from 1995 to 1998 and realize that corporations using derivatives usually have abnormal returns of regarding 4WD each year. The valuation effects related to derivative usage conjointly give proof on associated agency and observance issues. A couple of studies document that managers typically incorporate their views into their hedging programs at the expense of shareholders which have negative impact on firm value (Beber & Fabbri, 2012; Dhanajarata et al., 2010; Géczy et al., 2007; Nain, 2005; Dolde, 19993; Bodnar et al., 1998). The agency costs related to derivative usage are notably relevant in light of many well-publicized cases of losses incurred by corporations as a result of their derivative commercialism practices (Li et al., 2013; Chui et al., 2002)

The objective of this study is to identify potential benefits of derivative products for corporate houses in India and the USA. We examine whether or not hedging, especially derivative usage, increases firm value in both countries.

3. Methods

First, the data collection procedures have been performed, and the top 30 companies in different sectors in India and USA has been chosen for further analysis. Second, research hypotheses for this study have been conducted. Third, the related variables for the analysis has been selected and specified. Then, financial data (fiscal year, 2013) has been collected in both countries to investigate the different hedge strategies whether they are effective in their own country or not. To examine the research hypotheses regarding the impact of derivatives usage associated to the activity of risk

management and hedging, numerous firms' data related to the size leverage, profitability, growth opportunities and ownership has been collected. Data was analyzed using multivariate analysis by SPSS software.

3.1 Data Collection

Empirical research was conducted on the largest Indian and USA corporate houses according to higher capital market amount, and the criteria for selecting companies in the samples were similar for both countries. A list of the largest 501 US companies in the year 2013 has been used, and 30 companies that have larger market capital were selected in the US sample. US Data was collected from annual reports and notes to the financial statements for the fiscal year 2013. In the case of the Indian companies, Prowess database has been used and, on the basis of mentioned criteria, 30 companies were chosen for further analysis in the year 2013. Prowess is a database of the financials of Indian companies. Annual reports of companies are the most important source of this database. For listed companies, the Prowess database contains additional data sourced from the stock exchanges. Prowess provides time-series data beginning 1989-90. The database is updated on a continuous basis. Prowess is a database of active business entities for which some structured information related to their financial performance is available. For the Indian sample, we chose the top 30 companies in NSE (National Stock Exchange of India Ltd.), based on higher capital market. NSE is one of the first de-mutualized stock exchanges in India, where the ownership and management of the Exchange is completely divorced from the right to trade on it. Though the impetus for its establishment came from policy makers in the country, it has been set up as a public limited company and owned by the leading institutional investors in India.

Descriptive statistics were presented to give an insight about corporate characteristics of firms in both samples. Correlation analysis was also conducted by calculating Pearson's correlation coefficient as it is the most common measure of linear correlation when variables are of interval/ratio nature. Regarding the multivariate analysis, linear regression was estimated to distinguish between the possible explanations for hedging. A comparative analysis was employed as a method to compare the results of empirical research conducted on the USA and Indian companies. The comparative analysis was designed as compare-and-contrast work in which results for both countries were weighted equally trying to find differences as well as commonalities in financial risk management practices and hedging rationales adopted by the USA and Indian companies.

3.2 Research Hypotheses

We hypothesize that the use of hedging is related to several financial characteristics. Linear regression was estimated to distinguish among the possible explanations for the strategies to hedge. The variables examined in multivariate analysis were based on the determinants we have presented in the literature review as the key rationales of hedging. In the proposed logical model, we have tested whether the decision to hedge or not is a function of the eight factors — debt/equity ratio, cash ratio, dividend yield, ROI, net profit to sales (profit margin), percentage of shares owned by institution investor (cost of agency), R&D investment to total assets and R&D investment to total expenses. Since we considered hedging regression in two countries (India and USA), two pairs of null and alternative hypotheses are mentioned below.

3.2.1 First Hypothesis

H0: There is no statistically significant relationship between "Hedging" as dependent variable and at least one of "D Yield," "C Agency," "C Ratio," "D/E ratio," and "R&D/TA" as independent variables in the top 30 US firms.

H1: There is statistically significant relationship between "Hedging" as dependent variable and at least one of "D Yield," "C Agency," "C Ratio," "D/E ratio," and "R&D/TA" as independent variables in the top 30 US firms.

3.2.1 Second Hypothesis

H0: There is no statistically significant relationship between "Hedging" as dependent variable and at least one of independent variables including, "C Agency," "C Ratio," "D/E ratio," and "R&D/TA" in the top 30 Indian firms.

H1: There is no statistically significant relationship between "Hedging" as dependent variable and at least one of independent variables including, "C Agency," "C Ratio," "D/E ratio," and "R&D/TA" in the top 30 Indian firms.

3.3 Variable Definitions

The following sub-sections define the dependent and independent variables used in the empirical analyses in the present study. Our objective is to identify potential benefits of derivative products for the top 30 companies in India and the USA. As a result, we examine derivatives usage on firm value and performance. We calculate firm performance as a function of debt/equity ratio, percentage of shares owned by institution investor (cost of agency), cash ratio, R&D investment to total assets, R&D investment to total expenses, dividend yield, ROI and net profit to

sales (profit margin). These variables enable us to test hypotheses related to hedging. Firm value was measured as debt ratio, agency cost, cash ratio, dividend yield, ROI and profit margin, the ratio of R&D investment to total assets and R&D investment to total expenses. First, we calculate correlation for the variables and notify that ROI, dividend yield and hedging are our dependent variables.

3.3.1 Dependent Variable: ROI

The company's Return on Investment was included in the regressions as a proxy for profitability and efficiency. A performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments. To calculate ROI, the benefit (return) of an investment is divided by the cost of the investment (Myers, 1984). The purpose of the ROI is to provide rationale for the future investments and acquisition decisions.

3.3.2 Dependent Variable: Dividend Yields

The company's dividend payout ratio was included in the regressions as a proxy for dividend policy. This variable is defined as annual dividends paid to common stockholders as a fraction of income after interest and tax (Haushalter, 2000; Géczy et al., 1997). We have assumed that the higher the firm's dividend payout ratio, the lower is its need to hedge as the company does not experience a cash-shortfall (Nance, 1993).

3.3.3 Dependent Variable: Hedging

Hedging was designed in the form of a binary (dichotomous) measure and coded as "1" for those firms that signified derivatives use and "0" for those firms that signified non-usage of product. Usage of derivatives instruments indicate hedging by corporate houses. Companies use different types of hedging strategies like operational hedging, natural hedging, international diversification of business, and so on. The majority of the earlier empirical studies on risk management have used a dichotomous variable that equaled one if a firm used derivatives and zero if it had not (Fauver & Naranjo, 2010; Adam & Fernando, 2006; Géczy et al., 1997; Nance, 1993; Mian, 1996). As shown in Table 1, 10 among the top 30 firms in USA signified derivatives usage while 13 among the 30 top Indian firms that signified derivatives usage. Fifty percent of US hedger companies are in Information Technology' industry while 20 percent of US hedger companies are in Consumer Discretionary' industry and these three industries (Consumer Staples, Financials, Energy) equally use 10 percent of total derivative usages. These two Indian industries, Computer software and Banking services, equally use 15.4 percent of total derivative usages. These Indian industries, Refinery, Minerals, Drugs and pharmaceuticals, Commercial vehicles, Electricity generation, Two and three wheelers, other fund based financial services, LNG, storage and distribution, and Diversified, equally use 7.69 percent of total derivative usages.

Table 1. Significant use of derivatives by firms

30 top US companies	Industry	Hedge	30 top Indian companies	Industry	Hedge
Apple Inc.	Information Technology	1	Axis Bank Ltd.	Banking services	1
Exxon Mobil Corp.	Energy	0	Bajaj Auto Ltd.	Two & three wheelers	1
Google Inc.	Information Technology	1	Bharat Heavy Elec. Ltd.	Boilers & turbines	0
Microsoft Corp.	Information Technology	0	Bharti Airtel Ltd.	Telecommunication services	0
Johnson & Johnson	Health Care	0	Cipla Ltd.	Drugs & pharmaceuticals	0
General Electric	Industrials	0	Coal India Ltd.	Other fund based fin. services	1
Wells Fargo	Financials	0	Dr. Reddy'S Lab. Ltd.	Drugs & pharmaceuticals	0
Wal-Mart Stores	Consumer Staples	0	G A I L (India) Ltd.	LNG storage & distribution	1
Chevron Corp.	Energy	0	H D F C Bank Ltd.	Banking services	1
Procter & Gamble	Consumer Staples	0	Hero Motocorp Ltd.	Two & three wheelers	0
JPMorgan Chase & Co.	Financials	0	Hindalco Industries Ltd.	Copper & copper products	0
Verizon Communications	Telecom. Services	0	Hindustan Unilever Ltd.	Cos., toil., soaps & det.	0
International Bus. Machines	Information Technology	0	Hous. Dev. Fin. Corp. Ltd.	Housing finance services	0
Pfizer Inc.	Health Care	0	I C I C I Bank Ltd.	Banking services	0
Oracle Corp.	Information Technology	0	I T C Ltd.	Tobacco products	0
AT&T Inc.	Telecom. Services	0	Infosys Ltd.	Computer software	1
Coca Cola Co.	Consumer Staples	1	Larsen & Toubro Ltd.	Industrial construction	0
Merck & Co.	Health Care	0	Mahindra & Mahindra Ltd.	Diversified	1
Facebook Inc.	Information Technology	1	Maruti Suzuki India Ltd.	Passenger vehicles	0
Bank of America Corp.	Financials	1	N T P C Ltd.	Electricity generation	0
Walt Disney Co.	Consumer Discretionary	0	Oil & Nat. Gas Corp. Ltd.	Crude oil & natural gas	0
Amazon.com Inc.	Consumer Discretionary	1	Reliance Industries Ltd.	Refinery	1
Citigroup Inc.	Financials	0	SesaSterlite Ltd.	Minerals	1
Philip Morris International	Consumer Staples	0	State Bank Of India	Banking services	0
Comcast Corp.	Consumer Discretionary	1	Sun Pharm. Inds. Ltd.	Drugs & pharmaceuticals	1
QUALCOMM Inc.	Information Technology	1	Tata Consultancy Serv. Ltd.	Computer software	1
Visa Inc.	Information Technology	1	Tata Motors Ltd.	Commercial vehicles	1
Schlumberger Ltd.	Energy	1	Tata Power Co. Ltd.	Electricity generation	1
Intel Corp.	Information Technology	0	Tata Steel Ltd.	Steel	0
PepsiCo Inc.	Consumer Staples	0	Wipro Ltd.	Computer software	0

3.3.4 Control Variables

a) In order to rule out the possible effects of balance sheet control variables on firm value, we followed the extent literature to add a number of control variables to the study. Below is a description of the various control variables we used in the multivariate tests and the theoretical reasons of using such variables.

b) Cost of Agency

CA is a type of internal cost that arises from, or must be paid to, an agent acting on behalf of a principal. Agency

costs arise because of core problems such as conflicts of interest between shareholders and management. Shareholders wish for management to run the company in a way that increases shareholder value. But management may wish to grow the company in ways that maximize their personal power and wealth that may not be in the best interests of shareholders. Agency costs are inevitable within an organization whenever the principals are not completely in charge; the costs can usually be best spent on providing proper material incentives (such as performance bonuses and stock options) and moral incentives for agents to properly execute their duties thereby aligning the interests of principals (owners) and agents (Myers, 1984).

c) Cash *Ratio*

The cash ratio is the ratio of a company's total cash and cash equivalents to its current liabilities. The cash ratio is most commonly used as a measure of company liquidity. It can therefore determine if, and how quickly, the company can repay its short-term debt. A strong cash ratio is useful to creditors when deciding how much debt, if any, they would be willing to extend to the asking party. The cash ratio is generally a more conservative look at a company's ability to cover its liabilities than many other liquidity ratios. This is due to the fact that inventory and accounts receivable are left out of the equation. Since these two accounts are a large part of many companies, this ratio should not be used in determining company value but simply as one factor in determining liquidity (Myers, 1984).

d) R&D/TA

This is a measure of R&D intensity that is calculated as R&D investments divided by total assets. That is useful in comparing the effectiveness of R&D expenditures between companies in the same industry. It is less obvious across industries (Myers, 1984).

e) R&D/TE

This is a measure of R&D intensity that is calculated as R&D investments divided by total expenses. That is useful in comparing the effectiveness of R&D expenditures between companies in the same industry. It is less obvious across industries (Myers, 1984).

f) D/E Ratio

This is a measure of a company's financial leverage calculated by dividing its total liabilities by stockholders' equity. It indicates what proportion of equity and debt the company is using to finance its assets. A high debt/equity ratio generally means that a company has been aggressive in financing its growth with debt. This can result in volatile earnings as a result of the additional interest expense (Myers, 1984).

g) Profit Margin

A ratio of profitability calculated as net income divided by revenues or net profits divided by sales. It measures how much out of every dollar of sales a company actually keeps in earnings. A higher profit margin indicates a more profitable company that has better control over its costs compared to its competitors. Profit margin is displayed as a percentage (Myers, 1984).

4. Results

4.1 Descriptive Statistics of Variables in Indian and the US Samples

Since numerous studies empirically test the different theories of corporate hedging strategies using univariate or multivariate analysis, same procedures of the ANOVA and regression analysis by SPSS software has been conducted in this study.

Tables 2 and 3 show the descriptive statistics of the research variables using multivariate analysis in USA and India, respectively.

Table 2. Descriptive statistics of variables – American sample

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Dividend Yield	30	.0687	.0000	.0687	.022123	.0028362	.0155347	.000
Cost of Agency	30	.6082	.2998	.9080	.660867	.0207729	.1137779	.013
Cash Ratio	30	1.9789	.0000	1.9789	.409803	.0877013	.4803596	.231
R&D/Total Assets	30	.1635	.0000	.1635	.031523	.0079783	.0436991	.002
Hedging	30	.5236	.0108	.5344	.134643	.0230326	.1261546	.016
Log(Net Profit)	30	2.1308	2.4378	4.5686	3.994230	.0739309	.4049363	.164
ROI	30	.4440	.0157	.4597	.136853	.0174851	.0957696	.009
R&D/Total Expenses	28	.2805	.0000	.2805	.078754	.0192870	.1020570	.010
Debt/Equity ratio	30	6.5595	-3.5640	2.9955	.788753	.2287545	1.2529402	1.570
Profit Margin	30	.4609	.0037	.4646	.188648	.0194227	.1063827	.011
Sales 2013	30	468422	7872	476294	96694.7	19433	106440	11329620634
Sales 2012	30	463562	5089	468651	96184.6	19978	109424	11973737229
Sales 2011	30	463318	3711	467029	93790.5	19937	109200	11924780114
Sales 2010	30	419875	1974	421849	82690.3	17363	95105	9045072570
Total Expenses	30	444868	4554	449422	76456.8	18522	101451	10292412878
Total Equities	30	240451	-7766	232685	80556.7	11905	65209	4252302521
Total Debts	30	584511	0	584511	94109.9	29387	160962	25909086475
Total Assets	30	2397794	17895	2415689	397472	119583	654983	429002957399
R&D Investments	26	10611	0	10611	3292.6	714.1	3641.6	13261711
Cash & Equivalents	30	131322	0	131322	17445.8	5188.01	28415	807465107
Price Per Share	30	544.2200	15.5700	559.7900	98.3923	20.937	114.68	13151
Dividend Per Share	30	3.9000	.0000	3.9000	1.42733	.1975	1.081	1.170
Borrowings	30	584511	0	584511	91291.6	29581	162021	26251117226
Current Liabilities	30	1748161	1100	1749261	216166	90155	493800	243838452770
Current Assets	30	2158402	7822	2166224	274465.1	110952	607712	369314103379

Table 3. Descriptive statistics of variables – Indian sample

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Dividend Yield	30	.0277	.0016	.0293	.012270	.0012982	.0071104	.000
Cost of Agency	30	.7627	.1062	.8689	.392183	.0307638	.1685000	.028
Cash Ratio	30	2.5809	.0256	2.6065	.527887	.1046258	.5730591	.328
R&D/Total Assets	30	.1635	.0000	.1635	.031523	.0079783	.0436991	.002
Hedging	30	.3886	.0625	.4511	.222393	.0177422	.0971778	.009
Log(Net Profit)	30	10.2470	-4.8670	5.3800	4.133193	.4138025	2.2664894	5.137
ROI	30	1.3906	-.0711	1.3195	.175670	.0450517	.2467583	.061
R&D/Total Exp.	23	.0810	.0000	.0810	.015057	.0046671	.0223825	.001
Debt/Equity ratio	30	2.4467	.0033	2.4500	.785677	.1479905	.8105775	.657
Profit Margin	29	.9167	-.0706	.8460	.213710	.0325269	.1751628	.031
Sales 2013	29	2076263	41007	2117271	429544.91	79920	430383	185229600704
Sales 2012	30	2756289	7431	2763720	497690.95	99236	543542	295438391286
Sales 2011	30	3678772	6938	3685710	611699.57	129754	710693	505084157266
Sales 2010	29	4076056	7864	4083920	689768.44	147561	794645	631460627184
Total Expenses	30	3970606	33875	4004480	689997.02	145189	795233	632395644412
Total Equities	30	1784480	28850	1813330	438397.90	77790	426077	181541269499
Total Debts	30	1691827	0	1691827	278803.05	87078	476947	227478522454
Total Assets	30	21276179	96585	21372764	2024849.80	722525	3957433	15661278152592
R&D Investments	24	17593	0	17593	4685.76	961.5	4711	22188828
Cash & Equivalents	30	1451916	361	1452277	170452.96	53105	290873	84607066959
Price Per Share	30	2798.4000	91.5000	2889.9000	839.273333	132.37	725.06	525722
Dividend Per Share	30	59.5000	.5000	60.0000	11.106667	2.599	14.239	203
Borrowings	30	2037232	0	2037232	395063.27	101397	555379	308446369585
Current Liabilities	30	1722899	8794	1731694	335731.42	73162	400728	160582546880
Current Assets	30	2019511	12665	2032176	364684.94	77369	423768	179579306799

4.2 Comparing Results of Financial Indexes in both Indian and the US Samples

In this section, we indicate some sub results that are not as important as regression results but prove that our data is reliable and safe. Also, we compare structure and features of firms and market in both countries (see Table 4). Table 4 shows that the total average of capital structure is about the same in both countries. This similarity is reasonable because these companies are listed as the 30 best firms in both countries which have a stronger financial interest in the business than external lenders. This amount for the 30 best US firms is less than the average of S&P 500 in the USA. These top 30 companies have financial standing and ability to repay their obligations more than the average of S&P 500. CV D/E of USA firms is higher than that of Indian firms, which means diversity and variation of capital structure in the top 30 American firms is more. CV TD of USA is nearly equal to that of India, which is fairly high. In this table, CV TD is higher than other amounts which means top companies have tight competition for financing; i.e., if a firm has a better situation for financing, it has a better opportunity for growth. The average of NP shows that American firms have much more profit than Indian firms. However, it does not imply that American firms are more profitable and attractive. The average of PM means that Indian firms are more profitable and attractive than US firms. This is logical because foreign investment is increasing in India. In the above table, CV NP in India is greater than other amounts. Since tax and audit laws are looser in India in comparison to the USA, this difference might be deemed reasonable. In this table, CV TA of Indian firms is the highest which shows a great difference in the size of Indian firms. The average of ROI in India is higher, so the Indian market is more attractive than the US market. The average of Agency cost in the USA is more than that of India, so more conflict between shareholders and

management occurs in the US, and American managers demand more power and wealth. The average of sales in Indian firms were descending from 2010 to 2013, while average of sales in US firms were ascending in the same period. We have mentioned that the Indian market is growing fast and foreign investing is ascending, so competition space is increasing. On the other hand, R&D Investment is low, which makes it difficult to keep leadership and initiative of the companies in the market. In this table, CV Sales of Indian firms is descending leading to a tighter competition, while CV Sales of US firms is descending less.

Table 4. Comparing results of financial indexes in both Indian and the US samples

Indexes	USA			India		
	Ave.	SD	CV	Ave.	SD	CV
D/E	0.7888	1.253	1.5885	0.7857	0.8106	1.0317
TD	94110	160963	1.7104	5163	8832	1.7107
TE	80557	65210	0.8095	8118	7890	0.9719
NP	12931	8226	0.6362	1272	1246	0.9797
PM	0.1886	0.1064	0.5639	0.2137	0.1765	0.8258
R&D Inv./ TE	0.079	0.102	1.2959	0.0151	0.0224	1.4866
R&D Inv./ TA	0.0315	0.0437	1.3862	0.0109	0.0132	1.2132
TE	76,457	101,452	1.3269	12,778	14,727	1.1525
TA	397,472	654,983	1.6479	37,497	73,286	1.9544
R&D Inv.	3,293	3,642	1.106	87	87	1.0053
CR	0.4098	0.4804	1.1722	0.5279	0.5731	1.0856
Cash	17,446	28,416	1.6288	3,157	5,387	1.7065
Cur. Lia.	216,166	493,800	2	6,217	7,421	1
DY	0.0221	0.0155	0.7021	0.0123	0.0071	0.5793
DPS	1.4	1.1	0.758	0.2056	0.2638	1.2829
PPS	98	115	1.1656	16	13	0.8639
ROI	0.137	0.096	0.6997	0.1757	0.2468	1.4046
CA%	0.6609	0.1138	0.1722	0.3922	0.1685	0.4296
Sales 2013	96,695	106,441	1.1008	7,955	7,970	1.002
Sales 2012	96,185	109,425	1.1377	9,216	10,066	1.0921
Sales 2011	93,791	109,201	1.1643	11,328	13,161	1.1618
Sales 2010	82,690	95,106	1.1501	12,773	14,716	1.152

4.3 Model Specification

The empirical analysis utilizes differences in means and regression analysis to investigate the relationship between the extent of hedging by the top 30 companies in India and the USA and certain financial characteristics of these companies. We hypothesize that the use of hedging is related to several financial characteristics. Linear regression was estimated to distinguish among the possible explanations for the strategies to hedge. The variables examined in multivariate analysis were based on the determinants we have presented in the literature review as the key rationales of hedging. In our logical model, we have tested whether the decision to hedge or not is a function of the eight factors – debt/equity ratio, cash ratio, dividend yield, ROI, net profit to sales (profit margin), percentage of shares owned by institution investor (cost of agency), R&D investment to total assets and R&D investment to total expenses. Because multiple proxies were available to measure some firm characteristics, we have estimated separate logistic regressions, using all possible combinations of variables representing each predicted construct. Of these main factors, the first five are expected to have a negative influence on the firm's hedging. That is, higher values for factors related to cost of agency, R&D investment to total assets and R&D investment to total expenses are expected to be associated with a greater likelihood that the firm will engage in hedging activities. The first five factors including debt/equity ratio, cash ratio, dividend yield, ROI and profit margin are expected to have a negative influence on the

firm's hedging. This relationship can be expressed as follows (Equation 1):

$$Hedging_i = \beta^0 + \beta^1 DY_i + \beta^2 CA_i + \beta^3 CR_i + \beta^4 RDTA_i + \beta_5 ROI_i + \beta_6 RDTE_i + \beta_7 DE_i + \beta_8 PM_i + \varepsilon_i \quad (1)$$ Equation 1.

Where:

Hedging = Coefficient of Variation of four-years sales;

Where hedge, binary variable which takes on a value of 1 if the firm hedges and 0 if the firm does not hedge.

DY = annual dividends per share by price per share;

CA = shares held by institutional investors divided by total shares;

CR = the ratio of a company's total cash and cash equivalents to its current liabilities;

RDTA = R&D investments divided by total assets;

ROI = the benefit (return) of an investment is divided by the cost of the investment;

RDTE = R&D investments divided by total expenses;

DE = total debts divided by total equity;

PM = net profit divided by total sales;

ε= random-disturbance term.

Tables 5-8 report multivariate analysis results relating the impact of hedging on predetermined variables for the analyzed American and Indian companies. These predetermined variables include net profit/sales (profit margin), ROI and dividend yield as a proxy for profitability and R&D investment/total expenses, R&D investment/total assets and hedging as a proxy for growth opportunities, market capital, total assets, total expenses and total equity as a proxy for size, debt/equity ratio and cash ratio as a proxy for leverage, managerial salary/total expenses, institutional investors/total shares (%cost of agency) as a proxy for ownership. First, the regression results of American firms will be illustrated then the same results for Indian firms will be showed.

4.3.1 Testing First Hypothesis: USA

Tables 5 and 6 report multivariate regression model for the USA companies using SPSS software which has revealed that the corporate hedging is related to the company's dividend yield. Respectively, Table 5 is ANOVA analyses, and Table 6 is the analysis of coefficients for these top 30 US firms. It is expected that firms with greater dividend yield are more likely to have less incentive to engage in risk-shifting and hedging. Our evidence is consistent with the predictions derived from the model because the relationship between the dependent variable and dividend yield in our model is negative. Dividend yield is an alternative variable that has been used as proxy for profitability and shown relevant to hedging. We interpret that dividend yield is used to calculate the earnings on investment (shares) considering only the returns in the form of total dividends declared by the company during the year. Consequently, a firm with higher profitability could invest in proper position and main firm operation more, therefore reducing hedging activity.

This hypothesis is shown below:

H0: There is no statistically significant relationship between "Hedging" as dependent variable and at least one of "D Yield," C Agency," "C Ratio," "D/E ratio," and "R&D/TA" as independent variables in the top 30 US firms.

Based on Table 5, the above null hypothesis has been rejected with 95 percent confidence interval. According to Table 6, there is negative relationship between "Hedging" and "D Yield" in the top 30 US firms.

Table 5. Result of first regression for US firms: ANOVAa

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	.228	5	.046	4.689	.004 [b]
Residual	.233	24	.010		
Total	.462	29			

a. Dependent Variable: Hedging

b. Predictors: (Constant), D Yield, C Agency, C Ratio, D/E ratio, R&D/TA

Table 6. Result of first regression for US firms: Coefficients[a]

Model	Unstd. Coef.		Std. Coef.	t	Sig.
	B	Std. Error	Beta		
(Constant)	.136	.126		1.087	.288
D Yield	-4.574	1.395	-.563	-3.278	.003
C Agency	.178	.172	.161	1.038	.310
C Ratio	-.031	.040	-.119	-.777	.445
D/E ratio	-.029	.017	-.286	-1.702	.102
R&D/TA	.541	.471	.188	1.150	.262

a. Dependent Variable: Hedging

4.3.2 Testing Second Hypothesis: India

Tables 7 and 8 relate a multivariate regression model for the Indian companies and have discovered that there is no significant relationship among hedging and Indian firm characteristics. Respectively, Table 7 is ANOVA analyses and Table 8 is coefficients. We couldn't find any significant relationship between Hedging and other firm characteristics among the top 30 Indian firms.

This hypothesis is shown below:

H0: There is no statistically significant relationship between "Hedging" as dependent variable and at least one of the independent variables including, "C Agency," "C Ratio," "D/E ratio," and "R&D/TA" in the top 30 Indian firms.

According to Table 7, the above null hypothesis has not been rejected with 95 percent confidence interval. And based on Table 8, there is no significant relationship between "Hedging" and each of "C Agency," "C Ratio," "D/E ratio," and "R&D/TA" in the top 30 Indian firms.

Table 7. Result of Hedging regression for Indian firms: ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1Regression	.029	4	.007	.752	.566[b]
Residual	.244	25	.010		
Total	.274	29			

a. Dependent Variable: Hedging

b. Predictors: (Constant), C Agency, C Ratio, D/E ratio, R&D/TA,

Table 8. Result of Hedging regression for Indian firms: Coefficients[a]

Model	Unstd. Coef.		Std. Coef.	t	Sig.
	B	Std. Error	Beta		
(Constant)	.234	.051		4.598	.000
CA	-.006	.129	-.010	-.043	.966
DE	-.028	.027	-.235	-1.057	.301
CR	.034	.033	.198	1.024	.316
RDTA	-.154	.423	-.069	-.363	.719

a. Dependent Variable: Hedging

Table 9. Comparing results of Hedging.

	USA	India
Ave. of (Ave. of Sales 2010-2013)	92,340	10,196
Ave. of (SD of Sales 2010-2013)	9,213	2,234
Ave. of Hedging	0.135	0.2224

Table 9 explains that the average of hedging among Indian firms is higher than US firms. Since the Indian market is

more volatile and Indian economy is weaker than the US market and economy respectively, we justify the above results. As we know, interest and inflation rates are higher, and exchange rate varies more in Indian market than US market, therefore, Indian firms are forced to use hedge strategies more than US firms. These justifications are consistent with Allayannis & Ofek's (2001) research.

5. Discussion

In this research, data was gathered for the top 30 firms headquartered and sorted by capital market share in USA and India during 2012-2013. After using regression procedures, five main variables were elicited for the firm characteristics including firm profitability, growth opportunities, size, leverage, and ownership concentration. The average standard deviation and coefficient of variation for all of characteristics factors for both countries were calculated. The evidence based on multivariate empirical relations between hedging in American firms and firms' characteristics provides one support for profitability proxy measured by dividend yield. It has been showed that hedging depends on dividend yields in the US firms. We conclude that the relationship between hedging and dividend yield in the proposed model is negative. It means that firms with greater dividend yield are more likely to have less incentive to engage in risk-shifting and hedging. Consequently, a firm with higher profitability (dividend yields is a proxy for profitability) could invest in a proper position and main firm operation more, so it reduces hedging activity. These findings are consistent with different studies documenting conditional negative valuation effects relate to derivative usage. These studies (Mian, 1996; Guay, 1999; Smithson, 1996; Mayers & Smith, 1987; Carter et al., 2006; Nain, 2005; Mello & Parsons, 2000) find evidence of a negative relation between hedging and firm values. In addition, a couple of studies observe that managers typically incorporate their views into their hedging programs and allocation of firm's dividend yield which have negative impact on firm value (Beber & Fabbri, 2012; Dhanajarata et al., 2010; Géczy et al., 2007; Nain, 2005; Dolde, 19993; Bodnar et al., 1998).

The same analysis conducted for the top 30 Indian companies showed that there is no statistically significant explanatory variable for hedging; therefore, hedging is not dependent on any of the assumed theories of hedging. These findings are consistent with the other studies that showed no relation between firm value and the utilization of derivatives (Jin & Jorion, 2006; Lookman, 2009; Pantzalis et al., 2001; Guay & Kothari, 2003; Nelson et al., 2005).

Comparing the statistical results of the top 30 Indian and US firms, US firms' results are more significant than Indian firms' results. This can be related to transparency and reliability of the USA data in comparison to India. The fact that US firms respect speculations and regulations more, US market basement is stronger and more competitive, and American firms have an up-to-date and standard structure, especially capital structure, might be other justifications in this regard. Our justifications are consistent with Hull & Basu's (2016) observations that indicate Indian derivatives markets are ineffective. They argue that lack of knowledge, market frictions, and regulatory impediments have led to low levels of capital employed in derivatives trading.

5.1 Limitations

In this study, the hedging was measured by a binary dependent variable, and it should be noted that the use of a binary dependent variable is problematic because it does not fully describe the extent of a firm's hedging activity. Another limitation is the small sample size for a single year. Dividend yield is considered a proxy for profitability throughout the study. However, to gain more accurate and generalizable results, we need to choose accounting income instead of dividend yield that may incorporate information regarding firms that may not pay dividends.

To get additional perspective on firms' risk-management practices, Guay & Kothari (2003) test the magnitude of risk hedged by the derivatives usage relative to other firm characteristics: Liquidity, measured as cash plus marketable securities; Interest expense for firms that use interest rate derivatives; Firm size, measured alternatively as cash flows from operations, absolute values of the changes in operating cash flows and net income, market value of equity, and book value of assets; and Exposures of market values of equity to financial prices—interest rate exposures for firms that utilization interest rate derivatives and exchange rate exposures for firms that utilization exchange rate derivatives. These variables are not considered in this study, and they might have some impact on firm's hedging behavior. This is another limitation of the study. Future studies are needed to investigate the effects of these variables on firms' hedging behavior.

5.2 Future Studies

To attain a more comprehensive framework, a larger sample size of companies is needed in a specific industry including, information technology, energy, health care, financials, etc.

The model could include some extra valuable additions. For example, industry indicators would be beneficial, in addition to measure of firm size like market capitalization, which the academic literature commonly uses. The impact

of managerial self-interest or speculation, foreign ownership, foreign income, export incentives including duty draw back, foreign income, stock price respond to other currency changes, and interest income by banks for interest rate swaps on hedging strategies by firms are some other interesting dimensions to expand the current study.

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