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A STUDY TO EXPLORE THE MOTIVES OF INVESTORS TO INVEST IN DERIVATIVE MARKETS: A PLS-SEM APPROACH

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Abstract

The objective of the study is to explore the motives of investors to invest in derivative markets. It is a quantitative study where a survey method was used to collect data from the investors using a probability sampling method. The data was analyzed using PLS-SEM to test the conceptual model. The results of the study show that speculation, hedging, and financial literacy are strong predictors of investors' motives to invest in the derivatives market. The R2 was 0.447 implying speculation, hedging, and financial literacy explain 44.7% of the variance of the dependent variable, that is, the motives of investors to invest in equity derivatives, and the adjusted R-square is 0.432 (43.2%) which validates the model. Few studies explore the reasons to invest in derivatives using secondary data. However, to the best of the author's knowledge studies exploring the motives of investors are rare, and there have been none using primary data from an Indian perspective. The study provides empirical evidence that could be useful to companies, investors, brokers, and policymakers to understand the motives of investors to invest in derivatives.

JEL classification:

Keywords: Speculation, Hedging, Financial Literacy, Motives to Invest, Derivatives, PLS-SEM

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Introduction

Equity derivatives have changed the traditional investment style of holding only a buy position, it has allowed trading in the falling price of stocks also. The stock market allows investors to hold a short-selling position only for intraday, whereas derivatives allow one to hold positions like short futures, short call options, or a long-put options for a month or more to trade in falling prices (Bauer et al., 2009; Meyer et al., 2014). The advantage for the economy is that derivatives help in discovering the price of the asset in the financial market by integrating information into asset values more rapidly and effectively (Sittisawad & Sukcharoensin, 2018). In June 2000, futures contracts for the Index and stocks were introduced first, and later in June 2001 stock index options were started in India at the National Stock Exchange (NSE). It has been more than 2 decades and the derivatives market has shown tremendous growth. Now the NSE has been classified as the globally largest exchange for derivatives trading for the last five consecutive years and it has been ranked first for the highest number of contracts traded, with around 17.26 billion contracts traded in the year 2021 (Panda, 2023).

Individual investors play a crucial role in participating in equity derivatives. In the last few years, the participation of individual investors in the derivatives market has increased. The derivatives are leveraged products and require less capital than an underlying asset and low transaction costs are the main reason for investors' interest in the derivatives market (Pandey, 2014; Sittisawad & Sukcharoensin, 2018). The derivatives trading volume in India has exceeded the cash market by a huge margin. Derivative-to-cash volume ratio is 422 times in India as compared to Germany 36 times and the USA 9 times. In India, the individual investor contributes an over one-fourth share in turnover in equity derivatives (Livemint, 2023). This shows a huge demand for derivative products by individual investors. With the increase in the number of investors participating in the derivatives market, the interest in academic research on emerging economies has also surged drastically (Atilgan et al., 2016).

Today, financial markets are full of diverse types of traders, every investor has different motives to invest in various financial markets and they behave differently (Abreu & Mendes, 2020). This infers that various traders participate in the derivatives market with different motives for trading- some investors trade for speculation (Goldstein et al., 2014; Srivastava et al., 2008) instead of traditional investing (Meyer et al., 2014), and some trade to reduce their price risk by hedging (Chang et al., 2000; Goldstein et al., 2014; Hsiao & Tsai, 2018; Pan, Liu & Roth, 2003). Speculation is an action where a speculator trades strategically to earn high-yield returns (Bezzina & Grima, 2012; Lantara, 2010), whereas, hedging is a way of reducing and eradicating the risk associated with forex, commodity, and stock prices (Acharya et al., 2009). Derivatives help investors to combine hedging and speculation strategies together to earn profit by limiting their potential losses (Bezzina & Grima, 2012). The volatility in the stock market and derivatives market activity are related (Chen & Tang, 2009). The increase in unexpected volatility in the market leads investors to participate more as hedgers compared to speculators (Jongadsayakul, 2019). Derivatives are considered investing tools for risk management since individuals can move the risk from those who want to avoid too much risk (hedger) to those who are prepared to accept such risk (speculator).

Another factor that impacts the motives to invest in the financial market is financial literacy, it plays an important role for investors in their investment decisions. Financial literacy is an understanding, awareness, talent, and expertise to make financial decisions (Alves, 2023). Financial literacy helps us to make sound investment decisions and to generate higher returns. Investors with low financial literacy avoid using complex products like derivatives (Hsiao & Tsai, 2018).

This study focuses on individual investors in India, due to the increasing participation of individual investors in the derivatives market and, a huge demand for derivatives. Recently the regulators have reported that 9 out of 10 individual investors in India that are trading in derivatives have shown losses (Securities and Exchange Board of India, 2023). This has led to the need for an understanding of why investors enter this market, and if they prefer this market for speculating or hedging.

Looking at the gaining popularity of derivatives among individual investors, this study aims to contribute to the existing literature by understanding the investors' motives to invest in derivatives. The remaining part of the paper has been arranged as follows: Section 2 Review of Literature Section 3 Methodology, Section 4 Data Analysis and Result, Section 5 Discusses and Summary, and Section 6. Conclusion, Implications, and Limitations.

Literature review

Several studies have examined why investors invest in financial markets and their motives for trading in the derivatives market and so this study aims to add to this strand of literature. The present study focuses on individual investors and relevant literature is presented in this section followed by the hypotheses.

Motives to invest

Derivative instruments like Futures and Options (F&O) are regularly used as hedging instruments, but these are also used as speculative instruments among investors (Leung et al., 2016). Some past studies proposed that the main use of the derivatives market is to provide hedging against price risk (Pan et al., 2003) while a wider perspective shows that it is also used as speculation, especially during earning results, and high volatility periods. Informed traders find trading in F&O more advantageous over stock markets (Black, 1975). Volatility in the market has a direct relationship with the participation of hedgers. A period of high volatility in the stock market leads to an increase in the participation of both hedgers and speculators in the derivatives market (Chen & Tang, 2009; Pan et al., 2003). There are many studies focused on understanding whether investors trade for hedging or speculation. Some explained that investors' motive is speculation (Bauer et al., 2009; Lakonishok et al., 2007; Meyer et al., 2014), and some found hedging the main motive (Chen & Tang, 2009; Lemmon & Ni, 2011; Jongadsayakul, 2019). The below section will delve into the past studies' understanding of hedging and speculation.

Speculation

The main objective of speculation is to trade in the direction in which the market is expected to move (Jongadsayakul, 2019; Singh, 2016). In speculation, a speculator is ready to take a high risk to gain a large profit by predicting the future price (Sanghvi et al., 2024). The derivatives are short-term instruments as these are settled on marked-to-market, which responds immediately to profit and loss (Cox et al., 2020). Most of the small and retail investors are engaged in speculative trading activities and are actively engaged in speculative trading during the announcements of earning results, news events, and political issues (Choy & Wei, 2012; Pan et al., 2003).

Lakonishok et al. (2007) illustrated that a majority of individual investors are motivated by speculation on expected future price movements. The primary use of derivatives is more for speculation while traders preferred to trade in the derivatives market on falling prices during the stock market crash of 2001 and 2002 rather than speculating during the stock market boom time (Bauer et al., 2009).

Meyer et al. (2014) found that individual investors use derivatives primarily for speculation and the profit and loss depends on the underlying assets traded. Bailey et al. (2008) have found that sophisticated investors prefer to speculate on highly volatile stocks and use derivatives. It has been observed by the researchers that investors entering for intraday index trading give a loss, whereas if they hold a derivatives position for mid-term in the index that gives net profit. The speculators are usually the day traders and enter the market during high volatility (Chen & Tang, 2009). Investors with higher expectations of return, trade more and prefer greater transaction size, high turnover underlying assets and use derivatives for speculation (Hoffmann et al., 2015). Investors prefer to use different types of derivative contracts depending on their motives (Sittisawad & Sukcharoensin, 2018).

H_1: Speculation and motives to invest in the derivatives market are positively related.

Hedging

Hedging allows investors to reduce and eliminate price risks of various financial assets such as forex, stocks, and commodities. Derivative instruments are used as risk management tools to reduce price risk (Dixon & Bhandari, 1997). The expectation of high price movements in stock price and increased volatility during the earnings announcement leads to an increase in demand for hedging (Choy & Wei, 2012). In contrast, Bauer et al. (2009), Lakonishok et al. (2007), and Schmitz and Weber (2012) have found that hedging is not the main motive to participate in the equity derivatives market, and the majority of investors don't hedge their underlying stock positions with options.

Kumar and Supriya (2014) using a bivariate Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model for bank futures and CNX Nifty contracts based on five years of data recommended a hedging strategy that provides an improved hedging strategy along with taking care of the transaction costs. Pandey (2014) found that investors use options more as a hedging tool while trades in index options are more commonly motivated by the hedging demands of experienced investors (Lemmon and Ni, 2011). Investors who are less informed and have less risk tolerance, demand derivatives to use for hedging to reduce their price risk (Goldstein et al., 2014; Kyle et al., 2011). Past studies have associated open interest with unanticipated volatility in the market and found that most investors use derivatives as a hedging tool to reduce unanticipated volatility in the future (Chen & Tang, 2009; Jongadsayakul, 2019).

H_2: Hedging and motives to invest in the derivatives market are positively related.

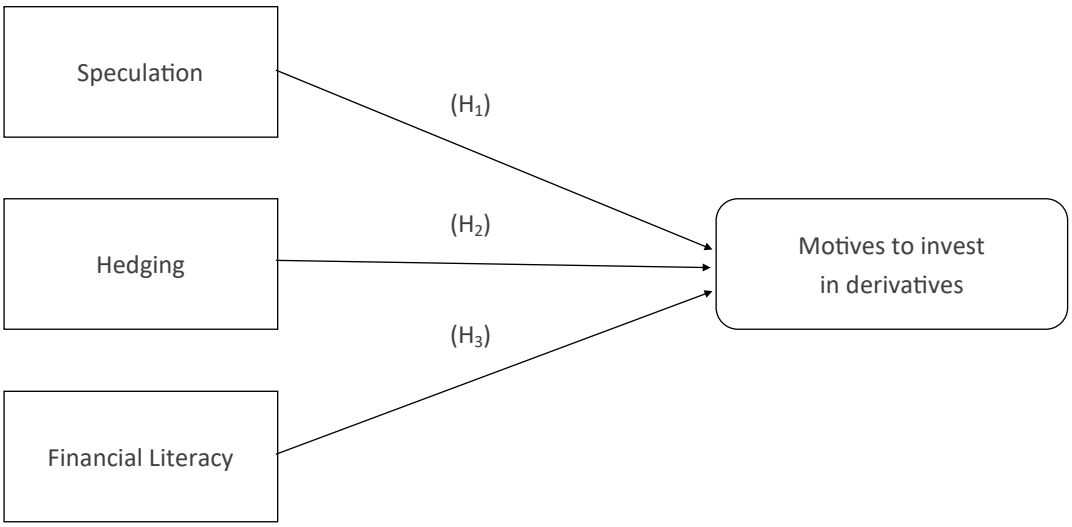
Financial literacy

Financial literacy directly impacts the investors' decision to invest in various financial markets (Hassan & Anood, 2009). Higher financial literacy allows investors to diversify their investments and allows them to channel savings into various financial markets. Perceived knowledge about derivatives was found low in Europe (Abreu & Mendes, 2010). The complexity of the

instrument may be a barrier to participation for less financially knowledgeable investors. The importance of financial literacy has enlarged due to new complex products in the financial market. Derivatives are a complex financial product that needs an in-depth understanding. Thus, financial literacy and participation in complex products like derivatives are positively related to each other (Hsiao & Tsai, 2018).

H_3: Financial literacy and motives to invest in the derivatives market are positively related.

Figure 1: Proposed conceptual model



Source: Author's own work.

Methodology

Measurement of the independent and dependent Variable

This study used the generalized scales developed by Rastogi and Gupta (2020) as well as Michels et al. (2019) to measure the dependent variable 'motives to invest', and four items were used for the same. To measure independent variables 'speculation', 'hedging', and 'financial literacy' the scales have been adopted from the existing literature and the same has been mentioned in Annexure A. Fourteen items have been used to measure independent variables, and the responses were collected in a five-point Likert scale.

Survey instrument

This study used Google Forms to create and share the survey questionnaire online. The questionnaire was divided into four sections: The first section collected demographic information like age, gender, income, education, investing experience, exchange preference, etc. The second section collected the responses to measure the dependent variable using four items. A sample item of motives is "I am clear with my future financial needs and motives". In the third section, we collected responses for 5 items to measure speculation motives, and the sample item for speculation is "My main objective is to trade for short-term speculation". Four items were used to measure hedging and the sample item is "I use equity futures and options contracts to reduce stock price risk". The scale of Bauer et al. (2009) as well as Michels et al. (2019) was adopted for speculation and hedging constructs in the last section, financial literacy was measured using a scale of Hsiao & Tsai (2018) as well as Van Rooij et al. (2011). The sample item for financial literacy is "I am capable of evaluating different financial assets".

Sampling

Considering the aim of the study, probability sampling has been used to collect the data from the relevant respondents. Probability sampling seeks to minimize bias by giving an equal chance to every member of the population selected. To estimate the sample size, the "10-times rule" method has been used, which explains that the sample size should be 10 times of inner and outer model link (Hair et al., 2011).

Data collection and data screening

The target sample was the individual investors who were trading in equity derivatives directly in India. A structured questionnaire was distributed online through emails and LinkedIn. The questionnaire was distributed through brokers to reach the relevant population, the questionnaires were collected from No-

vember 2023 to March 2024. Around 487 respondents were approached in major cities (Mumbai, Pune, Indore, Bhopal, Delhi, Kolkata, Jaipur, Lucknow and more) to fill out the questionnaire. 110 responses were received from the respondents who trade in equity derivatives directly (22.58%). The final 110 responses were considered for the data analysis. The data was scanned and cleaned; we did not find any missing values. The data was later analyzed using SPSS and PLS-SEM. The details of respondents' demographics are given in Table 1.

Table 1: Demographic of individual investors

Variables	Category	Count (abs)	Count (%)	Total
Gender	Male	98	89.10%	110
	Female	12	10.90%	
Occupation	Student	26	23.63%	110
	Private job	63	57.27%	
	Self-employed	20	18.20%	
	Government employee	1	0.90%	
Marital status	Single	50	45.50%	110
	Married	60	54.50%	
Education qualification	Undergraduate	8	7.30%	110
	Post-graduate(M.Sc.,M.Com., etc)	12	10.90%	
	Professional (MBA, CFA, CA, etc)	90	81.80%	
Age	Less than 25 years	14	12.70%	110
	Bet. 25-35 years	41	37.30%	
	Bet. 35-45 years	46	41.80%	
	Bet. 45-55 years	7	6.40%	
	> 55 years	1	0.90%	
Income (Rs in lacs)	Zero	7	6.40%	110
	Below Rs. 5,00,000	16	14.50%	
	Rs. 5,00,001 – 10 L	13	11.80%	
	Rs. 10,00,001 – 15 L	15	15.50%	
	Rs. 15,00,001 – 20 L	13	11.80%	
	Above Rs. 20L	44	40.00%	
Investing experience in the derivatives market (direct in years)	Less than 1	19	17.30%	110
	Above 1- Below 3	25	22.70%	
	Above 3 - Below 5	42	38.20%	
	Above 5 - Below 10	19	17.30%	
	Above 10	5	4.50%	

Source: Author's own work.

Results

The data has been analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM) which is one of the most commonly used approaches (Hair & Alamer, 2022) used for data with multiple variables and is primarily used to examine models with latent variables (Memon et al., 2021).

Sample profile

Most of the respondents found were male (89.1%) as compared to female (10.9%) who traded in the derivatives market. Most of the traders are below the age of 45 years, have professional degrees, and are working professionals with a private job and with income above 20 Lakhs per annum. Most of the respondents have investing experience in the derivatives market of 3 to 5 years.

Reliability, Validity, and SEM

The reliability of each item for the proposed conceptual model has been evaluated using factor loading (Hair et al., 2014) and a factor loading below 0.5 should not be accepted (Shevlin & Miles, 1998). The items with below 0.5 loadings were dropped (a detail of items dropped from each variable is mentioned in Appendix B). We measured convergent validity based on reliability analysis using Cronbach's alpha and Composite Reliability (CR). As found by Hair et al. (2020) CR is more important and reliable than Cronbach alpha because CR is weighted and Cronbach alpha is unweighted. Later, we analyzed the structural model to check the goodness of fit of data to the statistical model of the proposed conceptual model. Reliability and convergent validity refer to the strong correlation of factors with their relevant constructs. Acceptable factors load sub-

stantially on their connected constructs. The composite reliability should be more than 0.6 (Bacon et al., 1995), and the required level of Cronbach's α which should be more than 0.70 (Hair et al., 1998). We measured convergent validity using Average Variance Extracted (AVE) to test the validity of the constructs. AVE should be equal to or greater than the 0.5 value (Chin, 1998; Hair et al., 2011). The Variance Inflation Factor (VIF) test is used to test multicollinearity among predictor variables and a range of 1<VIF<5 is moderately correlated (Daoud, 2017). These values are given in Table 2.

The data was found to be reliable as Cronbach's Alpha (α) for the dependent variable motives is reported at 0.820 and for the independent variable speculation, hedging, and financial literacy, the alpha was 0.824, 0.856, and 0.833 respectively. The data passes the validity test as the composite reliability of all variables is more than 0.70. The average variable extracted (AVE) of all variables is more than 0.50 and CR is greater than AVE. The VIF of all items is below 3 only for one item it is 3.6. These values are shown in Table 2 and all the constructs were found to be reliable.

Table 2: Measurement of reliability and validity

Construct	Item	Cronbach's Alpha (α)	Variance Inflation Factor (VIF)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Motives to Invest in Derivatives	MD1 MD2 MD3 MD4	0.820	1.969 1.822 1.821 1.466	0.881	0.650
Speculation	S1 S2 S3 S4 S5	0.824	1.700 2.214 1.810 1.940 2.020	0.862	0.562
Hedging	H1 H2 H3 H4	0.856	2.933 3.992 3.313 1.272	0.888	0.666
Financial Literacy	FL1 FL2 FL3 FL4 FL5	0.833	2.281 2.706 2.342 1.228 1.769	0.885	0.613

Source: Smart PLS4.

Discriminant validity refers to the dissimilarity of the constructs in the model (Sarstedt et al., 2022). Heterotrait-monotrait ratio of correlations (HTMT) method has been used to measure the discriminant validity which assesses whether the measures of different constructs are empirically distinct. The criterion of HTMT is to find the collinearity problems among the latent constructs (multicollinearity) and the HTMT ratio needs to be less than 0.85 to ensure discriminant validity. If the value is more than 0.85 or 0.90, it indicates that constructs are not distinct from each other sufficiently. The construct of financial literacy, hedging, speculation, and motive meet the criteria of HTMT with all values below 0.85, hence we found discriminant validity satisfactory as all constructs as shown in Table 3.

Table 3: Discriminant Validity - Heterotrait-Monotrait Ratio of Correlations (HTMT)

Constructs	Financial literacy	Hedging	Motives	Speculation
Financial Literacy	1.000			
Hedging	0.113	1.000		
Motives	0.721	0.271	1.000	
Speculation	0.275	0.244	0.411	1.000

Source: Smart PLS4.

Hypothesis testing

Speculation was found to be positively and significantly related to the motives to invest in the derivatives market. Thus, the result of H1 (t-value is 2.505, p-value < 0.012) is statistically significant; therefore, we conclude that H1 was supported. Hedging was also found to be positively and significantly related to motives (t value is 2.180, p-value < 0.0029). Thus, H2 was statistically supported. H3 states that financial literacy is positively related to motives, the result of H3 (t value is 7.016, the p-value is 0.000) was also found statistically significant. Thus, H3 was supported. The measure was performed through bootstrapping. Since the p-value of all the three variables is less than 0.05. Hypothesis H1, H2 and H3 are supported and accepted.

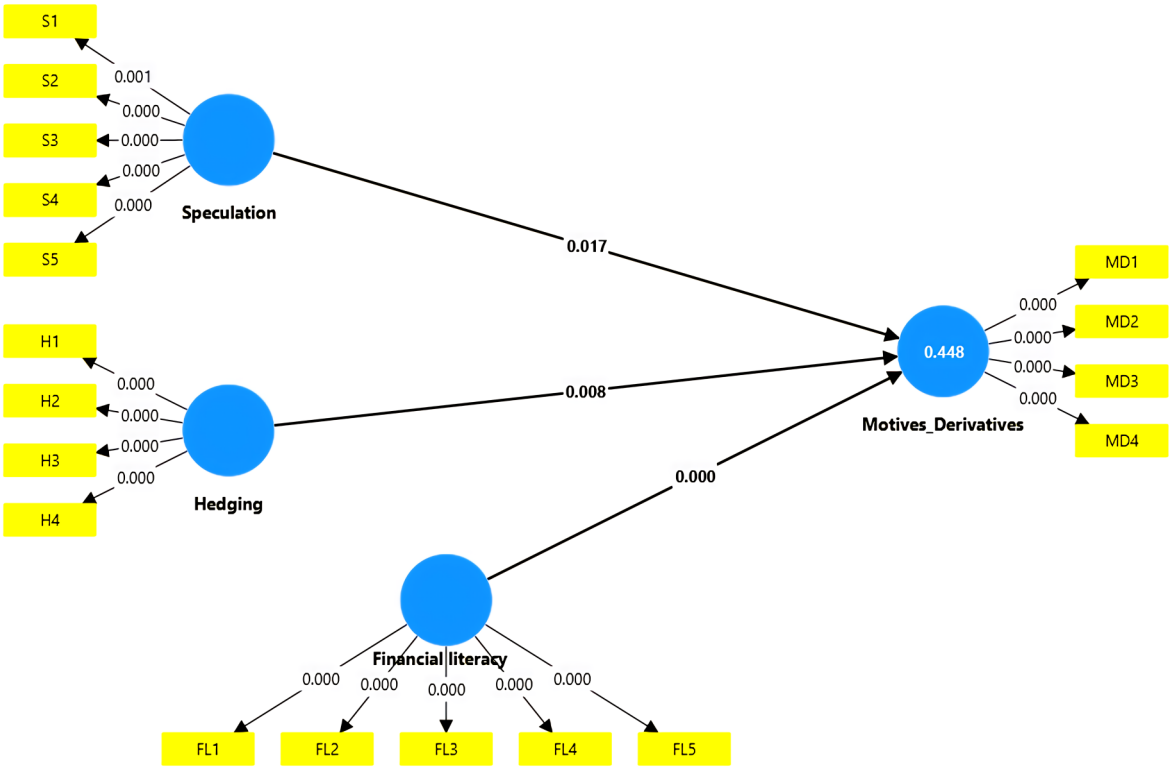
Table 4: Hypothesis Testing Results

Hypothesis	Path	Original sample (O)	Sample mean (m)	Standard deviation (s)	T statistics	p values	Result
H1	Speculation -> Motives_Derivatives	0.224	0.238	0.089	2.505	0.012	Significant
H2	Hedging -> Motives_Derivatives	0.155	0.165	0.071	2.180	0.029	Significant
H3	Financial literacy -> Motives_Derivatives	0.518	0.514	0.074	7.016	0.000	Significant

Note: Based on 5,000 bootstrapping samples and significant at p < 0.05 (two-tailed test)

Source: Author's own work.

Figure 2: Conceptual framework using structural equation modeling



Notes: Structural equation model with the speculation, hedging, and financial literacy, predicting motive to invest in the derivatives market

Source: Author's own work.

Structural model & goodness to fit

In this study, using PLS-SEM path coefficient analysis has been analyzed. The path model was assessed, including the influence of speculation, hedging, and financial literacy on the motives to invest in equity derivatives.

Falk and Miller (1992) suggested 0.10 as the minimum acceptable R2 value, whereas Hair et al. (2011) suggested 0.75 as the substantial R2 value, 0.50 as the moderate value, and 0.25 as the weak value. R square measures the goodness-of-fit of a regression model and it indicates how well the independent variables explain the variability in the dependent variable. The higher value shows that the model explains a larger proportion of the variability in the dependent variable. In social science research, an R-squared between 0.10 and 0.50 is acceptable if most of the factors are statistically significant (Ozili, 2023). Figure 2 shows that the R square for the model is 0.447. It means speculation, hedging, and financial literacy explain 44.7% of the variance of the dependent variable, that is, the motives of investors to invest in equity derivatives, and the adjusted R-square is 0.432 (43.2%) which validates the model. The hypothesized structural model represents fit to the current data. The structural model is shown in Figure 2.

Conclusion

Why individual investors invest in derivatives has been a puzzle that many authors have attempted to solve. Some past studies have found that due to an increase in volatility in the stock market, investors enter in derivatives market to hedge their stock position. Few studies have found that there is a positive relationship between speculators and investors in the derivatives market. This study sought to examine the impact of speculation, hedging, and financial literacy on motives to invest in the derivatives market in India. In the direction of this objective, this study has used path analysis to analyze the motives model. The model was estimated based on an online response of 110 investors trading in the derivatives market. PLS-SEM has been used as a methodological and analytical approach to testing the conceptual model. We tested the first hypothesis that speculation and motives to invest in the derivatives market are positively related. We found that speculation is statistically positively significantly related to motives, which means the investor's motive to enter this market is to book profit. The findings of the current paper are in line with the previous studies of Michels et al., 2019; Singh, 2016; Srivastava et al., 2008. The second hypothesis was that the hedging and motives to invest in the derivatives market are positively related and it was found to be statistically significant positive, which shows that investors use derivatives as a tool to reduce price and volatility risk. Our findings are in line with Srivastava et al. (2008) in this context. It is important to understand the impact of financial literacy on investment decisions, especially with complex products (Hsiao & Tsai, 2018). To test the relationship between financial literacy and motives to invest in the derivatives market hypothesis, we found that financial literacy is positively related to motives, which means that investors with high financial literacy prefer derivatives. The current study supports the findings of Hsiao and Tsai (2018) as well as Prasad et al. (2021). Most of the previous studies have used secondary data from discount houses, very few have used primary data to understand the investors' motive to invest in the derivatives market and the number of studies done in India is quite low (Sanghvi et al., 2024). This current study helps in understanding the motives of investors to invest in derivatives in India using primary data. The result of the study can be generalized to the emerging economy. These results will also help the investors to understand their motives for investing in derivatives. The outcome of this paper can help various policymakers and stock brokers, and financial planners of emerging economies to understand the motives to invest in derivatives speculation, hedging, and the impact of financial literacy.

Managerial implication

The derivatives market has changed the style of trading; this product helps investors to reduce stock price risk. Recently the participation of individual investors in the derivatives market has gained the attention of brokers, policymakers, and other investors. India has seen a tremendous participation of individual investors in the derivatives market and, a huge demand for stock traders to attend derivatives trading workshops. SEBI (Securities and Exchange Board of India) has recently reported that 9 out of 10 investors that are individual investors are making losses in India and there is a need to inform the risk associated with derivatives to the investors. This has led to an understanding of why investors enter this market. We approached 487 investors who are trading in the stock market and we found 110 (22.58%) trade in the derivatives market.

This study has several implications, the first study presents the motive model and explains the main motives are speculation, hedging, and financial literacy which are found to be significant while examining the impact of the motive to invest in the derivatives market. Next, the proposed model has been tested for reliability and validity using a sample of individual investors in India thus contributing to the body of knowledge. The results provide a better understanding of the motives of investors in the derivatives market. Our research has been conducted in India, and India's exchange is the world's largest exchange in terms of derivatives trading which is another contribution of the study.

Limitations and future research

There are a few limitations of this study. The first limitation is the collection of data, as the data has been collected online and the choice to employ an online survey may have increased bias. There are two main problems with taking an online survey: it is impossible to describe the population they are sent to, and respondents with fixed ideas could choose to be included in the sample (Andrade, 2020). A similar study could be conducted by having data collection using the offline method which could help in reducing the bias.

Furthermore, to determine whether the findings of this study can be applied to other nations with diverse cultures, more research needs to be done to empirically test this. Financial literacy differs from country to country. A comparison of different emerging economies as well as of the developed economies could reveal different results and motives of the investors which can be explored by future researchers.

As regards future research, we suggest it would be better to analyze the performance and profitability analysis of investors. The demographic variation construct has not been used in the model which can be considered in the future. More research can be conducted to verify the outcome of this research in different demographics and using different instruments where less focus has been given like Exchange Traded Funds (ETFs), Bond Index and more. The study has not covered the reasons for not participating in the derivatives market, which can also be a focus for further studies.

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Appendix A: Scale adopted to measure variables

Variable	Author(s)
Motive	Michels et al. (2019); Rastogi and Gupta (2020)
Speculation	Bauer et al. (2009); Michels et al. (2019)
Hedging	Bauer et al. (2009); Michels et al. (2019)
Financial literacy	Lee et al. (2015); Van Rooij et al. (2011); Hsiao and Tsai (2018)

Source: Author's own work.

Appendix B: Number of items to measure constructs

Construct	No. of Items	Items dropped	Total Items
Motive	7	3	4
Speculation	6	1	5
Hedging	5	1	4
Financial Literacy	6	1	5

Source: Author's own work.