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EFFECT OF AGRI COMMODITY TRADERS ATTITUDE AND PERCEPTION ON THEIR TRADING DECISION – A STUDY

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ABSTRACT

The traders dealing with farm commodities often experience highly volatile situations in the market. More particularly, the recent COVID-19 pandemic has created a more chaotic situation due to the inherent uncertainty, significantly affecting traders' perception of commodity markets. Several theories dealing with security or commodity markets are based on the view that investors behave rationally, but, in many practical cases, it needs to be found faithful. As a result, a contemporary area of research has emerged that considers the impact of demographic factors on investors' decision-making. Hence, it is imperative to explore the effect of traders' demographic characteristics on their overall trading experience in the commodity futures market. Given the above, the current study intends to measure the direct and interactive effect of demographic factors, awareness, motivating factors, attitude and perception of the traders on their decision towards trading in commodity futures and overall trading experience. The study has confirmed that the traders' monthly income has shown a significant main effect on their awareness, which has shown a significant main effect on their interest in trading in commodity futures. Also, their understanding has significantly affected their decision to invest in commodity futures and overall trading experience. At the same time, the attitude and perception also have shown a significant interactive and main effect on their decision and overall experience. Hence, the commodity exchanges in India should be committed to informing, educating, and training interested people to learn and engage in trading commodity futures.

INTRODUCTION

Farm-produced traders often experience price-related risks due to supply and demand market forces (Parcell & Price, 2000). The concurrent globalization and frequent variations in farm production and marketing policies within the countries also enhanced the price-related risk. The increasing price volatility has made traders think about risk management strategies. The traders can handle the price-connected risk by hedging through derivative trading, i.e., futures and options. To safeguard the interest of the farmers and traders, the markets for commodity futures perform two essential tasks, viz., authentic price discovery and efficient management of price-related risk (Eswaran & Ramasundaram, 2008). During the preceding two decades, the prices of farm commodities have revealed significant instability across the domestic and international commodity markets and have shown a magnifying effect on traders' risk and return (Santeramo *et al.*, 2018). Moreover, the recent COVID-19 pandemic has created a more chaotic situation due to the inherent uncertainty, which greatly affected traders' perceptions regarding commodity futures markets (Hohler & Lansik, 2021). Hence, the increasing price volatility forms the traders' insistence on risk management tools (Coletta et al., 2018). Hedging through agricultural commodity futures contracts aids traders in toning the risk of unfavorable price movements by looking for purchase or delivery prices well before (Hull, 2008).

Thus, futures contracts allow traders to scale down the price risk and stabilize income (Zuppiroli & Revoredo-Giha, 2016). However, the traders' usage of futures contracts depends on their degree of unawareness, which depends on their demographic factors, viz., education level, motivation, attitude, perception, etc. Moreover, contemporary research concentrates on the effect of demographic factors on investors' decision-making. Therefore, it is imperative to study the effect of traders' demographic factors on their investment decision-making and overall trading experience in the commodity futures market. Hence, the current study aims to investigate the effect of traders' demographic factors on their overall trading experience in the commodity futures market. The rest of this paper is structured into five sections. Section 2 deals with the literature review, research gap, and problem statement. Section 3 highlights the study's objectives, hypothesis, materials, and methods used. Section 4 demonstrates the results and discussion. Section 5 terminates the paper and presents the limitations and scope for further research.

REVIEW OF LITERATURE

It is pertinent to appraise the accessible literature linked to the topic of the current study. Most of the earlier studies have paid attention to the history of the commodity futures markets in India, investors' awareness, perception, preference, and attitude toward commodity futures trading. However, the current paper mainly focuses on

national and international studies on traders dealing with agricultural commodities and their perception of trading in commodity futures. Chen and Chang (2015) studied the effect of the trading position of the market participants, viz., hedgers and speculators, on the price information process in the farm commodity futures market. Hedgers' positions negatively affect price efficiency, whereas the speculators' positions positively impact price efficiency because the speculators correct the errors in pricing. It is also evident from the study that the position of swap dealers is identical to that of speculators in commodity futures markets. Liyan Han, *et al.* (2017) have examined the impact of investors' concentration on commodity futures prices and market efficiency and the correlation between attention and returns, assuming the key macroeconomic variables are constant. The study results say that the growing attention augments the information efficiency, attenuates arbitrage opportunities, and fades away the market efficiency by easing the group behaviour. Yi Kou et al. (2018) studied the participation of retail investors in commodity futures markets and the quick adoption of mobile internet interfaces. The researchers have examined whether there is any correlation between retail investors' attention and stock returns in the commodity futures market. At the same time, the relaxation is given to retail investors facing short-selling constraints. The study has confirmed that retail investors' greater attention envisages more significant positive and negative returns in the commodity futures markets, steady with disagreement of short-selling constraint in the stock market. Qiang Ji., et al**.** (2020) analyzed the sentiment of traders across futures markets, viz., agriculture, livestock, energy, metals, etc. The study says that the traders in agricultural commodity futures markets are majorly involved in cross-hedging, and most would like to avoid the risks. Further, index traders and swap dealers are engaged in farming and metal markets.

David Bosch and Smimou, K. (2022) have tried to measure the impact of trading on the prices of commodity futures by covering the market participants across all markets. The study has disclosed that the changes mainly influenced the returns on many commodity futures markets in the positions of hedgers and prominent speculators. Also, the small speculators and swap dealers were found to be crucial in soft commodity markets. Lee A. Smales (2022) studied traders' behavior in the corn, soybean, and wheat features market while the prices were at a 52-week high. The output of the study substantiates that institutional traders are likely to be pessimistic feedback traders, and non-institutional traders are likely to be optimistic feedback or momentum traders. The positions of the traders are highly informative during the market, which is at the 52-week high. Shivakumar, N. M. J., Kotreshwar, G. (2016), Hymavathi, Ch. and Kalpana, K. (2019), Sathyakala, S. *et al.* (2022) have concentrated on the perception of the traders about commodity futures market in India. The researchers tested the factors affecting the purchase intentions of traders, investors, and other participants in commodity futures markets in India. The studies have revealed that factors like perceptions, awareness, and attitude significantly impact purchasing intention among India's commodity futures market participants. Thirunarayanasamy, M., Jayakumar, P. (2017), and Gopinath, R. *et al.* (2019) have studied the investors' attitudes towards commodity futures trading throughout the age of technological disruption. The authors have focused on the attitude and level of satisfaction of the investors with particular emphasis on commodity preference, investment objective, risk management techniques, reasons for investing, and limitations experienced while trading. The authors have noticed that low risk and high return are the main attractions for investing in commodity futures.

Prasad, M.S.V., *et al.* (2019), Kumar, J.S., and Baba, M.S. (2019) have assessed the investors' knowledge about trading in commodity futures in India. The researchers have highlighted the factors influencing investment in commodity futures. The study has noted that the factors, viz., online trading facilities and brokerage services, have significantly affected investment in the commodity futures market. Ramesh, *et al.* (2019), Dhinakar J., and Jeevanandham P. (2019) have analyzed investors' awareness, behavior, and perception of the commodity futures market in India. The study has stated that

investors in the commodity futures market are glad and have an optimistic outlook on the commodity market. The study has proved that most respondent investors desire to invest in commodities like crude oil, natural gas, aluminum, gold, and silver. Sethia, P., Sharma, P. (2022), and Azhar, S. *et al.* (2020) have studied the awareness level among investors and factors that stimulated them to trade in the commodity futures market. The studies have stated that investors have a positive attitude towards the said market. The investigators have also highlighted that the prices of commodities are affected by several domestic and international market forces, exchange rates, and political and economic conditions. Lethesh, M., and Reddy, C.V. (2023) have examined the perceptions of the traders of Rayalaseema Region of A.P. regarding commodity derivative markets and concentrated on the factors influencing them to partake in commodity futures markets, their experience in commodity futures trading, their level of risk tolerance, etc. The SEM used for the data analysis said that commodity-related factors, market and exchange-related problems, and factors relating to risk and return have had a significant positive impact on traders' perceptions of trading in commodity futures.

Research Gap

The literature review states that some studies have paid attention to the effect of the trading position of various market participants on the price information process, the influence of investors' attentiveness on commodity futures prices, and market efficiency. Few other studies have focused on the sentiment of the traders across the commodity futures markets, the impact of trading on commodity futures prices, and the behaviour of agricultural commodity futures markets. Some other researchers have concentrated on the perception of the traders about the commodity futures market, the attitude of the investors about trading in the commodity futures market, the knowledge of the investors about trading in commodity futures, and the awareness, behaviour and perception of the investors towards the commodity market in India. However, the above studies, while delineating different facets, do not dealt with direct and interactive effect of – (1) The demographic factors of the traders on their awareness regarding commodity futures trading; (2) The traders' awareness and motivating factors on their interest in commodity futures trading; (3) The motivating factors and the traders' awareness of their decision towards investing in commodity futures and overall trading experience; and (4) The traders' attitude and perception on their decision towards investing in commodity futures and overall trading experience. Hence, the current study is an effort that focuses on measuring the direct and interactive effect of demographic factors, awareness, motivating factors, attitude, and perception of the traders on their decision towards trading in commodity futures and overall trading experience.

Statement of the Problem: Over several years, traders have experienced volatility in the market prices of farm commodities. During the turbulent COVID-19 pandemic, traders have experienced a precarious situation due to anomalous market and price volatility, severely affecting their perceptions regarding commodity markets. To deal with highly uncertain market situations, traders must adopt specific novel strategies to hedge the risk. At the same time, most security or commodity market theories are based on the notion that the market participants behave rationally. However, many practical cases have witnessed that it is only sometimes the case. As a result, a new area of research has come up, challenging traditional theories. This new era of research recognizes the effect of demographic factors on investors' decision-making. Given the above, the present paper aims to measure the direct and interactive impact of the traders' demographic characteristics on their decision to invest in commodity futures trading and their overall trading experience.

Objectives

1. To measure the direct and interactive effect of traders' demographic factors on their awareness of commodity futures trading.

2. To gauge the direct and interactive effect of the traders' awareness and motivating factors on their interest in commodity futures trading.
3. To quantify the direct and interactive effect of the motivating factors, the trader's awareness of their decision to invest in commodity futures and overall trading experience.
4. To calculate the direct and interactive effect of the traders' attitude and perception on their decision towards investing in commodity futures and overall trading experience.

MATERIALS AND METHODS

Research Design: Given the objectives above, the study adopts a causal research design to quantify the main and interactive effect of the predictor variables on the response variable. It also assumes a pragmatic research technique to appraise the insight of the traders involved in commodity futures trading.

Population and Sample: The traders dealing with agricultural commodities in four (04) districts in the Rayalaseema region of Andhra Pradesh who know about the commodity futures market are the population for the study—a total population of around 15,000 traders in four districts. Using the Krejcie and Morgan (1970) model at a 95% confidence limit and a 5% margin of error (M.E.), the sample size of 375 has been determined for the study. A ratio has been fixed for "each district, revenue division, revenue mandal, and revenue village" to compose a more representative sample of the population. Finally, a sample size of 392 was finalized by multistage-cum-judgment sampling, which is outlined in Table 1.

Table 1. Details of Sample Traders

Particulars		Names of the Districts				Total
		Anantha puramu	Chittoor	Kadapa	Kurnool	
Stage-1	No. of Revenue Divisions	5	3	3	3	14
Stage-2	No. of Revenue Mandals, @ 2 from each Revenue Division (SRSWOR).	10	6	6	6	28
Stage-3	No. of Revenue Towns/Cities, @ 2 from each Revenue Mandal (SRSWOR).	20	12	1	1	56
Stage-4	No. of Traders, @ 7 from each Revenue Town/Cities (Judgment Sampling).	14	84	8	8	392

Sources of Data: The study is based on primary data collected by administering the structured and pre-tested questionnaire among the sample traders.

Hypothesis:

H_{01}: There is no significant main effect of the first predictor variable on the response variable.
H_{02}: There is no significant main effect of the second predictor variable on the response variable.
H_{03}: There is no significant interactive effect of the first and second predictor variables on the response variable.

Methods for Data Analysis

Reliability Analysis: The internal consistency of the survey data collected by Likert's 5-Point Scale questionnaire has been confirmed by calculating Cronbach's Alpha (Coakes, J. C. and Ong, C., 2011) using the formula propounded by Fraenkel, J. R. and Wallen, N. E. (1996):

$$\alpha = \left(\frac{K}{K-1}\right) * \left(1 - \frac{\sum s_y^2}{s_x^2}\right)$$

α = estimated value of Cronbach's Alpha coefficient;
K = the number of items (dimensions) of the questionnaire;
$\sum s_y^2$ = sum of variances of items; and
s_x^2 = the variance of total score.

Generally, its value ranges from 0 to 1, and a high alpha value indicates that the items in the survey are highly correlated. Generally, alpha value greater than 0.7 is treated as satisfactory for the scale to be reliable (Cronbach, 1951; Ismail & Velnampy, 2013). In this study, the reliability statistic for the 12 questionnaire dimensions is 0.884; hence, the items are appropriate for analysis.

Univariate Analysis: To highlight the direct and interactive effect of non-categorical demographic factors, viz., age, gender, etc. on awareness about commodity futures trading, a fixed effect model is created. The fixed effect model assumes that the predictor variables have a fixed (or constant) relationship with the response variable across all observations. It extracts the estimated fixed-effects coefficients from a fitted model. At the same time, a random effect model is created to comprehend the level of awareness across the categorical variables, viz., educational qualifications and income level. A random effect model assumes that the predictor variables have a variable relationship with the response variable across two or more subjects. The random effects model extracts the estimated random-effects coefficients from a fitted GLME model, specifying the covariance structure of the random variables. The above relationship (fixed or random) between predictor variables and a response variable may be presented as follows:
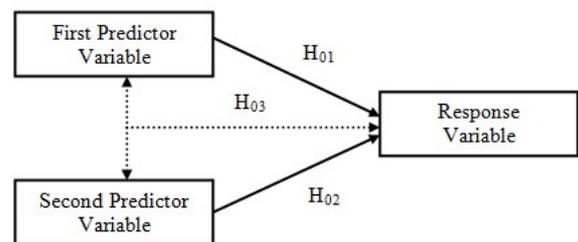
The mathematical form of the fixed effects model is:

$Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ijk}$, where
μ = the grand (overall) average response
$\alpha_i = \overline{Y}_i - \mu$ is the main effect due to the ith level of Factor-1 and $\Sigma\alpha_i = 0$
$\beta_j = \overline{Y}_j - \mu$ is the main effect due to the jth level of Factor-2 and $\Sigma\beta_j = 0$
$(\alpha\beta)_{ij}$ = the interaction effect among Factor-1 at i^{th} level and Factor-2 at j^{th} level (Factor-1* Factor-2)
It should be noted that $(\alpha\beta)_{ij}$ does not refer to the product of α and β, and it is just the name of a parameter. σ_ε^2 is the variance of Y_{ijk}. In the present model, it is necessary to test the hypotheses about α_i, β_j, and $(\alpha\beta)_{ij}$.
The mathematical form of the random effects model is:
$Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ijk}$, where
μ = the grand (overall) average response
$\alpha_i = \overline{Y}_i - \mu$ is the random effect from a population with mean 0 and variance σ_α^2

$\beta_j = \overline{Y_j} - \mu$ is the random effect from a population with mean 0 and variance σ_β^2.

$(\alpha\beta)_{ij}$ = the random interaction effect from a population with mean 0 and variance $\sigma_{\alpha\beta}^2$.

In the current model, the variance of Y_{ijk} is $\sigma_\alpha^2 + \sigma_\beta^2 + \sigma_{\alpha\beta}^2 + \sigma_\varepsilon^2$.

Here, it is necessary to estimate and the test the hypotheses about σ_α^2, σ_β^2 and $\sigma_{\alpha\beta}^2$.

Multivariate Analysis: To test the significant main effects and interaction effects of non-categorical predictor variables (PVs) on multiple response variables (RVs), a multivariate analysis of variance (MANOVA) has to be performed. In other words, MANOVA is appropriate when two or more dependent variables are correlated. The unique feature of MANOVA is that it optimally unites multiple RVs into a single value that maximizes the difference across the groups. A new or super variable, the linear combination of RVs, is created, and then ANOVA is performed on the newly created RV.
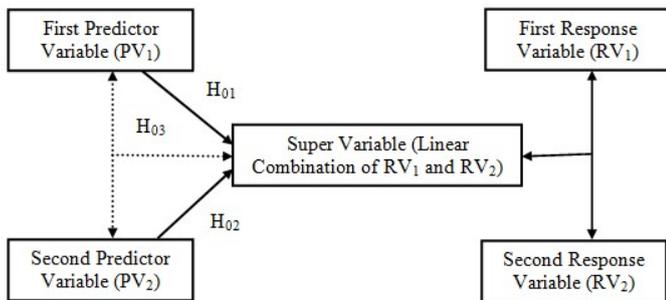
The mathematical form of the random effects model is:
$Y_{ijk} = \mu + \alpha_i + \beta_j + \gamma_{ij} + \varepsilon_{ijk}$, where
μ = the grand (overall) average response

$\alpha_i = \overline{Y_i} - \mu$ is the main effect due to i^{th} level of 1st Predictor Variable and $\Sigma\alpha_i = 0$

$\beta_j = \overline{Y_j} - \mu$ is the main effect due to j^{th} level of 2nd Predictor Variable and $\Sigma\beta_j = 0$

γ_{ij} = the interaction effect between i^{th} level of 1st Predictor Variable and j^{th} level of 2nd Predictor Variable ($PV_1 * PV_2$)
It should be noted that γ_{ij} does not refer to the product of α_i and β_j, and it is just the name of a parameter. Here σ_ε^2 is the variance of Y_{ijk}.
Here, testing the hypotheses about α_i, β_j, and γ_{ij} is necessary.

RESULTS AND DISCUSSION

Demographic Factors of Sample Traders: Table No. 2 gives the general profile of the sample traders who are aware of the commodity futures market and deal with varied varieties of agricultural commodities in the study area. According to gender, 69.9 per cent of the respondent traders are male, and 30.1 per cent of the respondents are female. About the age variable, 19.8 per cent of them are below 20-30 years, 20.4 per cent are in 30-40 years, 18.7 per cent are in 40-50 years, 22.7 per cent are in 50-60 years, and 18.4 per cent are above 60 years. Regarding educational qualifications, 12.0% of the traders have SSC qualifications, 22.2% have intermediate, 28.0% have U.G. qualifications, 17.1% have P.G. and above, and 20.7% are professionally qualified. Amongst the respondents, 15.3 per cent are students, 16.8 per cent are professionals, 24.2 per cent are business people, 20.4 per cent are Govt. employees, and 23.2 per cent are private employees. Regarding monthly income, 22.7 per cent of the respondents are earning between Rs.10,000 and Rs.25,000, 21.1 per cent are earning between Rs.25,001 and Rs.50,000, 22.9 per cent are

earning between Rs.50,001 and Rs.75,000, 21.4 per cent are earning between Rs.75,001 and Rs.1,00,000 and 11.7 per cent are earning above Rs.1,00,000.

Table 2. Demographic Factors of Sample Traders

Demographic Factor		Frequency	Percentage
Gender	Male	274	69.9
	Female	118	30.1
Age (Years)	20-30	78	19.8
	30-40	80	20.4
	40-50	73	18.7
	50-60	89	22.7
	Above 60	72	18.4
Educational Qualifications	SSC	47	12.0
	Intermediate	87	22.2
	U.G	110	28.0
	Post Graduate and Above	67	17.1
	Professional	81	20.7
Occupation	Student	60	15.3
	Professional	66	16.8
	Business	95	24.2
	Govt. Employee	80	20.4
	Private Employee	91	23.2
Monthly Income (Rs.)	10,000 – 25,000	89	22.7
	25,001 – 50,000	83	21.1
	50,001 – 75,000	90	22.9
	75,001 – 1,00,000	84	21.4
	Above Rs.1,00,000	46	11.7
Source: Authors Compilation from Field Survey.			

The Effect of Demographic Variables on Investors Awareness: This part of the paper highlights the effect of demographic variables (age, gender, qualification, income, and occupation) on the traders' awareness about commodity futures trading and the impact of awareness among the traders and motivators on their interest in trading in commodity futures. The General Univariate Model (GLM) offers regression analysis and ANOVA for one response variable by one or more predictor variables. The fixed effect model is created if the predictor variables have a fixed relationship with the response variable across all observations. Conversely, a random effect model is created if the predictor variables have a variable relationship with the response variable across two or more subjects.

The Effect of Traders' Age and Gender on Awareness about Commodity Futures Trading: A fixed-effect model is created to understand the traders' awareness level across age groups and genders. It extracts the estimated fixed-effects coefficients from a fitted model. Determining whether the interaction effect is significant before considering the main effects is essential. Table No.3 shows the SPSS output. The p-value of 0.085 indicates that the interaction effect between age and gender is insignificant (0.085>0.05). An insignificant interaction effect means that one factor's effect does not depend on the level of the other factor. Here, the impact of age on traders' awareness score does not rely on their gender. Neither of the p-values for the main effects is significant. It means that the main effect of the factors, *viz.*, age and gender of the traders, has shown an insignificant impact on their awareness level (p>0.05). The above table also depicts the *F*-statistic and the sizes of the main and interaction effects (in the column of "Partial Eta Squared"). It is found that the F-statistic for interaction among gender and age levels is 1.962, and the effect size η^2 is = 0.035. It is interpreted that η^2 (partial eta squared) is a small effect (0.002) and a significant effect (0.046), and hence $\eta^2 = 0.014$ is a medium effect. Thus, the null hypothesis (H_{01}, H_{02}, and H_{03}) is accepted.

The Effect of Traders' Qualification and Income Level on Awareness about Commodity Futures Trading: A random effect model is created to comprehend the traders' awareness level across educational qualifications and income levels. The random effects

model extracts the estimated random-effects coefficients from the fitted GLME model, specifying the covariance structure of the random variables. Here, the traders' awareness level is affected by their educational qualification and income levels (categorical variables), as they were chosen randomly. Table No.4 shows the SPSS output.

A random effect model is created to determine the traders' level of awareness across income levels and occupations. The random effects model extracts the estimated random-effects coefficients from the fitted GLME model, specifying the covariance structure of the

Table 3. Effect of Age and Gender on Awareness

Response Variable: Traders Awareness about the Commodity Futures Trading					
Source	Type III Sum of Squares	Degrees of Freedom	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	15.649[a]	11	1.423	1.171	.307	.046
Intercept	767.654	1	767.654	631.753	.000	.702
Age	2.009	5	.402	.331	.894	.006
Gender	.798	1	.798	.657	.418	.002
Age * Gender	11.921	5	2.384	1.962	.085	.035
Error	325.651	268	1.215			
Total	2946.000	280				
Corrected Total	341.300	279				
a. R^2 = .046 (Adj. R^2 = .007)						
Source: *SPSS Output.*						

Table 4. Effect of Qualification and Income Level on Awareness

Response Variable: Traders Awareness about the Commodity Futures Trading							
Source		Type III Sum of Squares	Degrees of Freedom	Mean Square	F	Sig.	Partial Eta Squared
Intercept	Hypothesis	1239.642	1	1239.642	497.78	.000	.991
	Error	11.879	4.770	2.490[a]			
Education	Hypothesis	3.161	4	.790	1.194	.321	.064
	Error	46.048	69.550	.662[b]			
Monthly Income	Hypothesis	10.412	4	2.603	3.530	.010	.121
	Error	75.676	102.622	.737[c]			
Education * Monthly Income	Hypothesis	6.809	16	.426	.338	.993	.021
	Error	320.844	255	1.258[d]			
a. 739 MS(Qualification) + .846 MS(Income) - .529 MS(Qualification * Income) - .056 MS(Error)							
b. 716 MS(Qualification * Income) + .284 MS(Error)							
c. 625 MS(Qualification * Income) + .375 MS(Error)							
d. MS(Error)Source: *SPSS Output*							

Table 5. Effect of Monthly Income and Occupation on Awareness

Response Variable: Traders Awareness about the Commodity Futures Trading							
Source		Type III Sum of Squares	Degrees of Freedom	Mean Square	F	Sig.	Partial Eta Squared
Intercept	Hypothesis	1915.452	1	1915.45	675.91	.000	.993
	Error	12.694	4.479	2.834[a]			
Monthly Income	Hypothesis	11.943	4	2.986	3.495	.026	.414
	Error	16.913	19.796	.854[b]			
Occupation	Hypothesis	4.353	4	1.088	1.190	.334	.130
	Error	29.096	31.810	.915[c]			
Monthly Income * Occupation	Hypothesis	13.213	16	.826	.670	.822	.040
	Error	314.219	255	1.232[d]			
a. 817 MS(Income) + .972 MS(Occupation) - .760 MS(Income * Occupation) - .030 MS(Error)							
b. 930 MS(Income * Occupation) + .070 MS(Error)							
c. 781 MS(Income * Occupation) + .219 MS(Error)							
d. MS(Error)							
Source: *SPSS Output*							

Table 6. Effect of Awareness and Motivation on Interest to Trade in Commodity Futures

Response Variable: Traders Interest to Trade in Commodity Futures.					
Source	Type III Sum of Squares	Degrees of Freedom	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	232.482[a]	39	5.961	9.054	.000	.595
Intercept	1193.179	1	1193.17	1812.217	.000	.883
Awareness	168.719	4	42.180	64.063	.000	.516
Motivators	1.829	7	.261	.397	.904	.011
Awareness * Motivators	8.751	28	.313	.475	.990	.052
Error	158.018	240	.658			
Total	2508.000	280				
Corrected Total	390.500	279				
a. R^2 = .595 (Adj. R^2 = .530)						
Source: *SPSS Output.*						

The p-value of .993 tells us that the interaction effect between Education and Monthly Income (being random factors) is insignificant (0.993>0.05). An insignificant interaction effect means that one factor's effect does not depend on the level of the other factor. Hence, the impact of education level on traders' awareness score does not rely on their monthly income categories. The p-value of 0.321 indicates that the main effect of education on traders' awareness is insignificant (0.321>0.05). But, the p-value of 0.010 says that the main effect of the monthly income of the investors is significant (0.010<0.05). Also, the above table reveals the F-Statistic values and sizes of effect (in the column of "Partial Eta Squared") of the main and interaction effects. The above table shows that the F-statistic for interaction among education and monthly income categories is 0.338, and the effect size η^2 is = 0.021. It is interpreted that η^2 (partial eta squared) is a small effect (0.021), medium effect (0.064), and significant effect (0.991), so η^2 = 0.021 is a small effect. Hence, the null hypothesis (H_{01} *and* H_{03}) is accepted, and (H_{02}) is rejected.

categories. The p-value of 0.026 says that the main effect of the monthly income of the traders is significant (0.026<0.05). However, the p-value of 0.334 indicates that the main effect of occupation on traders' awareness is insignificant (0.334>0.05). In addition, the above table reveals the F-statistic values and sizes of effect (in the column of "Partial Eta Squared") of the main and interaction effects. The above table shows that the F-statistic for interaction among monthly income and occupation categories is 0.670, and the effect size η^2 is = 0.040. It is interpreted that η^2 (partial eta squared) is a small effect (0.040), medium effect (0.414), and significant effect (0.993), so η^2 = 0.040 is a small effect. Hence, the null hypothesis (H_{02} and H_{03}) is accepted, and (H_{01}) is rejected.

The Effect of Traders' *Awareness* and *Motivators* on their *Interest to Trade in Commodity Futures*: A fixed effect model is created to explain the direct and interactive effect of awareness and motivators on the traders' interest in commodity futures trading.

Table 7. Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.910	1208.821[b]	2.00	239.00	.000	.910
	Wilks' Lambda	.090	1208.821[b]	2.00	239.00	.000	.910
	Hotelling's Trace	10.116	1208.821[b]	2.00	239.00	.000	.910
	Roy's Largest Root	10.116	1208.821[b]	2.00	239.00	.000	.910
Motivators	Pillai's Trace	.057	1.011	14.00	480.00	.440	.029
	Wilks' Lambda	.943	1.009[b]	14.00	478.00	.443	.029
	Hotelling's Trace	.059	1.006	14.00	476.00	.446	.029
	Roy's Largest Root	.039	1.321[c]	7.00	240.00	.241	.037
Awareness	Pillai's Trace	.352	12.802	8.00	480.00	.000	.176
	Wilks' Lambda	.651	14.306[b]	8.00	478.00	.000	.193
	Hotelling's Trace	.532	15.830	8.00	476.00	.000	.210
	Roy's Largest Root	.524	31.460[c]	4.00	240.00	.000	.344
Motivators * Awareness	Pillai's Trace	.253	1.240	56.00	480.00	.123	.126
	Wilks' Lambda	.763	1.236[b]	56.00	478.00	.126	.127
	Hotelling's Trace	.290	1.233	56.00	476.00	.129	.127
	Roy's Largest Root	.168	1.436[c]	28.00	240.00	.079	.144
a. Design: Intercept + Motivators + Awareness + Motivators * Awareness							
b. Exact statistic							
c. The statistic is largest bound on F that yields smallest bound on the significance level.							
Source: *SPSS Output*							

Table 8. Multivariate Tests[a]

	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.896	1124.835[b]	2.000	262.000	.000	.896
	Wilks' Lambda	.104	1124.835[b]	2.000	262.000	.000	.896
	Hotelling's Trace	8.587	1124.835[b]	2.000	262.000	.000	.896
	Roy's Largest Root	8.587	1124.835[b]	2.000	262.000	.000	.896
Attitude	Pillai's Trace	.339	13.414	8.000	526.000	.000	.169
	Wilks' Lambda	.687	13.525[b]	8.000	524.000	.000	.171
	Hotelling's Trace	.418	13.635	8.000	522.000	.000	.173
	Roy's Largest Root	.286	18.829[c]	4.000	263.000	.000	.223
Perception	Pillai's Trace	.357	14.286	8.000	526.000	.000	.178
	Wilks' Lambda	.650	15.718[b]	8.000	524.000	.000	.194
	Hotelling's Trace	.526	17.166	8.000	522.000	.000	.208
	Roy's Largest Root	.504	33.112[c]	4.000	263.000	.000	.335
Attitude * Perception	Pillai's Trace	.261	4.924	16.000	526.000	.000	.130
	Wilks' Lambda	.754	4.954[b]	16.000	524.000	.000	.131
	Hotelling's Trace	.305	4.983	16.000	522.000	.000	.132
	Roy's Largest Root	.211	6.940[c]	8.000	263.000	.000	.174
a. Design: Intercept + Attitude + Perception + Attitude * Perception							
b. Exact statistic							
c. The statistic is largest bound on F that yields smallest bound on the significance level.							
Source: *SPSS Output*							

The Effect of Traders' Monthly Income and Occupation on Awareness about Commodity Futures Trading: Here, the traders' awareness level is affected by their income levels and occupations (categorical variables), as they are chosen randomly. Table No.5 shows the SPSS output. The p-value of .822 tells us that the interaction effect between Monthly Income and Occupation (being random factors) is insignificant (0.882>0.05). An insignificant interaction effect means that one factor's effect does not depend on the level of the other factor. Here, the effect of monthly income level on traders' awareness score does not rely on their occupation

It extracts the estimated fixed-effects coefficients from a fitted model. Here, it is essential to establish whether the interactive effect is significant before considering the main effects. Table No.6 shows the SPSS output. The p-value of .990 indicates that the interaction effect between awareness and motivators is insignificant (0.990>0.05). An insignificant interaction effect means that one factor's effect does not depend on the other factor. Here, the effect of awareness on traders' interest in trading in commodity futures does not rely on motivators. The p-value of 0.000 says that the main effect of awareness of the traders is significant (0.000<0.05). However, the p-value of 0.904

indicates that the main effect of motivators is insignificant (0.904>0.05). The above table also reveals the F-statistic values and the sizes of the effect (in the column of "Partial Eta Squared") of the main and interaction effects. The above table shows that the F-statistic for interaction among awareness and motivators is 0.475, and the effect size η^2 is = 0.052. It is interpreted that η^2 (partial eta squared) is a small effect (0.052), medium effect (0.516), and significant effect (0.595), so $\eta^2 = 0.052$ is a small effect. Hence, the null hypothesis (H_{02} and H_{03}) is accepted, and (H_{01}) is rejected.

The Effect of Traders' Awareness and Motivators on their decision to Trade in Commodity Futures and overall trading experience: A multivariate fixed effect model is created to determine the effect of traders' awareness and motivators on their decision to trade in commodity futures and overall trading experience. Multivariate fixed-effects model extracts the estimated fixed-effects coefficients from the fitted model. The SPSS output of MANOVA test statistic presented in Table No.7 discloses the results of diverse multivariate test statistics, viz., Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root, which can be used for testing the significant direct and interactive effects of the predictor variables viz., traders awareness and motivators. Each test statistic shows a different statistical significance value (i.e., p-value), creating confusion about which multivariate test statistic should be used for hypothesis testing. The most commonly recommended statistic is Wilks' Lambda (Λ), as it explains the strength of the relationship. The value ranges on the scale from 0 to 1. The ideal value of 0 means total discrimination, and 1 means no discrimination. The direct and interactive effect of the predictor variables, viz., motivators and awareness, on the super variable is the linear combination of two response variables, the investors' decision, and their overall trading experience. Using the Wilks' criterion p-value of 0.126 says that (Wilk's $\Lambda = 0.763$, F (56, 478) = 1.236, p = 0.126, partial $\eta^2 = 0.127$) there is no statistically significant interactive effect between motivators and awareness and hence the null hypothesis (H_{03}) is accepted. The p-value of 0.443 tells (Wilk's $\Lambda = 0.943$, F (14, 478) = 1.009, p = 0.443, partial $\eta^2 = 0.029$) that the main effect of motivators is insignificant and hence the null hypothesis (H_{01}) is accepted. But, the p-value of 0.000 says (Wilk's $\Lambda = 0.651$, F (8, 478) = 14.306, p = 0.000, partial $\eta^2 = 0.193$) that the main effect of awareness of the investors is significant and the null hypothesis (H_{02}) is rejected.

The Effect of Traders' *Attitude* and *Perception* on their *decision to Trade in Commodity Futures* and *overall trading experience*: A multivariate fixed effect model is created to explain the effect of traders' attitudes and perceptions on their decision to trade in commodity futures and overall trading experience. Multivariate fixed-effects model extracts the estimated fixed-effects coefficients from the fitted model. Table No.8 shows the SPSS output. The direct and interactive effect of the predictor variables, viz., attitude and perception on the super variable, is the linear combination of two response variables, the investors' decision and their overall trading experience. Using the Wilks' criterion p-value of 0.000 says that (Wilk's $\Lambda = 0.754$, F(16, 524) = 4.954, p = 0.000, partial $\eta^2 = 0.174$) there is a statistically significant interactive effect between attitude and perception and hence the null hypothesis (H_{03}) is rejected. The p-value of 0.000 (Wilk's $\Lambda = 0.687$, F(8, 524) = 13.525, p = 0.000, partial $\eta^2 = 0.171$) tells that the main effect of attitude is significant, and hence the null hypothesis (H_{01}) is rejected. Similarly, the p-value of 0.000 (Wilk's $\Lambda = 0.650$, F(8, 524) = 15.718, p = 0.000, partial $\eta^2 = 0.194$) says that the main effect of the perception of the investors is significant and the null hypothesis (H_{02}) is rejected.

CONCLUSION

In the current paper, the cause and effect analysis was carried out using the primary data collected from the traders who know the commodity futures market. The sample size was fixed by the model proposed by Krejcie and Morgan at a 95% confidence limit and a 5% margin of error (ME). Using multistage-cum-judgment sampling method, 392 traders who are aware of the commodity futures market

and trading with agricultural commodities were identified for the study. The reliability of the primary data has been tested with Cronbach Alpha (α = 0.884). The GLM Univariate fixed effect process exhibits that age and gender do not significantly interact or directly affect traders' awareness of commodity futures trading (p>0.05). The GLM Univariate, random effect process reveals that education qualifications and monthly income also do not significantly affect the trader's awareness (p>0.05). Still, the monthly income has dramatically affected the trader's awareness (p<0.05). At the same time, the traders' monthly income and occupation do not show a significant interactive effect on their awareness of commodity futures trading (p>0.05). Again, the GLM Univariate fixed effect process shows that the trader's awareness and factors motivating them to invest in commodity futures must demonstrate a significant interactive effect on their interest in trading (p>0.05). Still, the trader's awareness significantly affects their interest in trading in commodity futures (p<0.05). The multivariate fixed effects process reveals that the motivating factors and the investor's awareness of the commodity futures market do not significantly affect their decision to invest in commodity futures and overall trading experience (p>0.05). Still, the investor's awareness has shown a significant main effect (p<0.05). At the same time, the trader's attitude and perception towards commodity futures show significant interactive and main impact on their decision to invest in commodity futures and overall trading experience (p<0.05). Therefore, it is established from the study that the traders' monthly income has shown a significant main effect on their awareness, which in turn has shown a significant main effect on their interest in trading in commodity futures. Also, the traders' awareness has significantly affected their decision to invest in commodity futures and their overall trading experience. At the same time, the traders' attitudes and perceptions have also shown a significant interactive and main effect on their decisions and overall experience. Hence, the commodity exchanges in India should be committed to informing, educating, and training interested people to learn and engage in trading commodity futures. At the same time, the training and education departments of commodity derivatives exchanges should design customized training and awareness programmes and conduct them in mission mode by involving academicians, bankers, and other professionals, viz., chartered accountants, etc. Further, the government should realize the significance of imparting financial education among students, in addition to the courses in their regular curriculum.

Limitations and Scope for Further Research: The data collection work for the current study was carried out during the immediate post-COVID-19 epidemic. All through the epidemic period, the traders have witnessed many consequences, which may have affected their perceptions as well as the study results. Moreover, the current study has covered the traders in four (04) districts of the Rayalaseema region in Andhra Pradesh. Thus, extending the analysis by covering the traders from other areas of Andhra Pradesh is also essential. Further, the analysis may also be extended to measure the traders market information utilization index, the pattern of investment by the traders in the commodity futures market, the usefulness of hedging in the commodity futures market to decrease the traders' risk, traders' approaches towards handling the market risk and uncertainties, their risk tolerance and willingness to take part in the commodity futures market, etc.

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