From,

Date: 29.11.2025

Dr. Sumera Aluru,

Associate Professor

RVIM

To,

The Director,

RVIM

Dear Sir,

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Ch.....Dt.....Rs.....

Dear Sir
Registration fee for conference and publication fee can be propotionaly shared to 4 Author 2 Author from RVIM
31/03/26

Sub: **Request for Reimbursement of Registration and Publication Fee – 4th International Conference on Economics, Business and Sustainability (ICEBS'2025)**

I write to request the reimbursement of Conference Registration, Publication Fee and travel expenses incurred of Rs. 15,045 **(Rupees Fifteen Thousand forty five Only)** . I presented a research paper titled – "**Optimizing Carbon Credit Futures against Market Volatility**", all the payment receipts and other relevant documents are enclosed for your reference and records.

S.No.	Particulars	Total Amount(Rs.)	Amount Claimed((Rs.)
1.	Conference Registration Fee	1115	1115/2 = 557.5
2.	Publication Fee (315$ * 88.54)	27890	27890/2 = 13945
3.	Travel Expenses (70+ 196 + 70+206)	542	542
		Total	**15045**

Thanks and Regards,

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Dr. Sumera Aluru

Associate Professor

RVIM

Enclosures:

1. **ICEBS'2025 brochure**
2. Payment Receipt dated 13.10.2025
3. Full Research Paper
4. Receipts for Fee Payment and Travel

Alc
Pl. verify & proceed
29/11

Fwd: ICEBS'2025 Conference (Scopus), Kristu Jayanti (Deemed to be University), Bengaluru, India

---------- Forwarded message ---------
From: <confmanage@confmanage.com>
Date: Mon, 15 Sept 2025 at 08:36
Subject: ICEBS'2025 Conference (Scopus), Kristu Jayanti (Deemed to be University), Bengaluru, India
To: <director.rvim@rvei.edu.in>

Dear Colleagues,

We are pleased to extend a warm welcome to you for **The 4th International Conference on Economics, Business and Sustainability (ICEBS 2025)**, organized by the **Department of Economics, Kristu Jayanti(Deemed to be University), Bengaluru, India,** in collaboration with **EuroMid Academy of Business and Technology, Qatar. ICEBS 2025** will be hosted by **Kristu Jayanti(Deemed to be University), Bengaluru, India**, and is scheduled to take place on **October 16-17, 2025**

The **4th International Conference on Economics, Business and Sustainability (ICEBS 2025)**, organized by the **Department of Economics, Kristu Jayanti (Deemed to be University), Bengaluru**, aims to bring together distinguished academicians, researchers, policymakers, industry leaders, and students from across the globe.

Under the theme *"Business Beyond Borders: Global Trade, Sustainability, and the New Economy"*, ICEBS 2025 seeks to address pressing global challenges and opportunities at the intersection of trade, innovation, and sustainability. The conference will provide a vibrant platform for sharing insights, debating policy frameworks, and advancing research that fosters resilience, inclusivity, and responsible business practices.

Conference Highlights

- Keynote addresses by global thought leaders
- Expert panel discussions and scholarly presentations
- International and interdisciplinary participation
- Indexed publication opportunities with Springer Nature and partner journals
- Networking opportunities with academicians, policymakers, and industry experts

Tracks and Sub-Themes

listed below. If invited to publish in a journal authors will be expected to develop the work by 40-50%, including a change of title and abstract.

-
  - *Journal of Islamic Marketing* – Regular Issue (Emerald, Scopus Q1)
  - *Journal of Business and Socio-Economic Development* – Special Issue (Emerald, Scopus Q1)
  - *Journal of Organisational and End User Computing (Scopus Q2,SCIE)*
  - *Arab Journal of Administrative Sciences* (Kuwait University)
  - *Kristu Jayanti Journal of Management Sciences (KJMS)*
  - *Malaysian Journal of Consumer and Family Economics (Scopus Q3 Regular Issue)*

Embracing Technological Convenience: To accommodate diverse preferences, we are offering participants the flexibility to attend the conference either online through our dedicated virtual platform or in-person, allowing you to choose the mode that suits you best.

We kindly request that you share this invitation with your colleagues, encouraging them to submit their papers directly through our submission system before the approaching deadline

Key Dates to Remember:

October 12 2025: Deadline for Full Paper Submissions

October 14, 2025: Notification of Paper Acceptance or Rejection

October 15, : Deadline for Registration Payment of Accepted Authors

October 16-17,2025: Conference Dates

We eagerly anticipate your submissions and look forward to the privilege of hosting you at **ICEBS 2025!**

To Register with Conference , Kindly visit the Registration Link : https://portal.kristujayanti.edu.in/register-4th-international-conference-on-economics-business-and-sustainability-icebs-2025-business-beyond-borders-global-trade-sustainability-and-the-new-economy

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4th International Conference on Economics, Business and Sustainability (ICEBS 2025): Business beyond Borders: Global Trade, Sustainability, and the New Economy

Programme Details

Kristu Jayanti (Deemed to be University)

Thu, Oct 16, 2025, 9:00 AM - Fri, Oct 17, 2025, 5:00 PM

Event Details

4th International Conference on Economics, Business and Sustainability (ICEBS 2025): Business beyond Borders: Global Trade, Sustainability, and the New Economy

Kristu Jayanti (Deemed to be University)

null

Thu, Oct 16, 2025, 9:00 AM - Fri, Oct 17, 2025, 5:00 PM

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From:

Dr Sumera Aluru, Prof. BVR Vishnu Tej, Dr.Purushottam Bung, Prof Sanjeev
Corresponding Author: Dr Sumera Aluru
R V Institute of Management, , India.

Payment For:

Description:	Amount:	PayPal Fee %5	Disc. %0	Net amount
4th International Conference on Economics, Business and Sustainability (ICEBS'2025) conference fee	$300	$15	$0	$315
			Total	$315
			Amount Paid	$315

Paper Title:	Optimizing Carbon Credit Futures Trading Against Market Volatility
Paper ID:	ICEBS'2025_0020

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Thank you for your business....!!!

Optimizing Carbon Credit Futures Trading Against Market Volatility

Sumera Aluru[1], BVR Vishnu Tej[2], Purushottam Bung[3], Sanjeev[4]
[1&3] RV Institute of Management, Bangalore, India
[3]Dayananda Sagar Business Academy, Bangalore, India
[4] Xavier's Institute of Management & Entrepreneurship, Bangalore, India

Abstract. This study investigates carbon credit futures trading strategies amid policy-driven volatility and market regime shifts. Carbon credit futures, shaped by regulatory scarcity rather than physical fundamentals, exhibit complex price behavior driven by emissions policies, political uncertainty, and evolving climate frameworks. Using a twenty-year dataset segmented into four five-year regimes, the research applies Shapiro-Wilk, Kolmogorov-Smirnov tests, ARIMA models, and Fast Fourier Transform (FFT) analysis to evaluate return distributions, volatility cycles, and trading performance. Findings reveal consistent non-normal return distributions ($p < 0.001$), pronounced volatility clustering around regulatory events, and weak predictive power in autoregressive models, indicating near-random walk behavior. Basic momentum and mean-reversion strategies underperform, particularly in high-volatility conditions. FFT analysis identifies mid-range cycles (6–18 months), guiding smoothed signal strategies. Enhanced models incorporating 9-month trend smoothing and volatility filters (threshold ≤ 0.015) yield improved returns (+0.80%) with reduced trading frequency. However, high transaction costs significantly impact profitability, with trade quality outweighing volume. Set 3 (growth phase) demonstrates optimal conditions, achieving the highest Sharpe ratio (0.749), while Set 2 shows minimal return potential. Performance varies dramatically across regimes, emphasizing adaptive strategies over static systems

Keywords: Carbon Credit Futures, Volatility Clustering, Trading Strategy Optimization, Regime Switching, Emissions Trading Systems.

1 Introduction

The global carbon credit market has evolved into one of the most strategically important financial markets of the 21st century, driven by environmental urgency, regulatory innovation, and capital market evolution [1]. As governments implement stringent climate policies and corporations commit to net-zero targets, carbon credit futures have transformed from niche environmental instruments into critical components of modern portfolio management and risk mitigation strategies.

Carbon credit futures represent legally binding agreements to buy or sell standardized carbon allowances at predetermined prices for future delivery, creating powerful

exploitable inefficiencies during regulatory transitions and policy announcement periods.

2.2 Volatility Modeling and Risk Factors

The literature on carbon market volatility has been dominated by attempts to model extreme price movements and identify key risk factors. Paolella and Taschini [8] pioneered the application of GARCH models to carbon price volatility, finding that standard GARCH(1,1) specifications inadequately capture the extreme tail behavior characteristic of carbon markets.

Chevallier [9] extended this work by incorporating regime-switching models that account for structural breaks driven by regulatory changes. Alberola et al. [10] conducted seminal research on carbon price drivers, establishing the fundamental relationship between carbon prices, energy prices, and weather variables. Sanin et al. [11] employed high-frequency data to analyze jumps in carbon prices, finding that approximately 40% of total price variation can be attributed to jump processes rather than continuous price evolution.

2.3 Trading Strategy Development

The literature on carbon credit trading strategies remains relatively sparse compared to traditional commodity markets, reflecting both the market's relative youth and the proprietary nature of successful trading approaches. Uhrig-Homburg and Wagner [12] developed theoretical models for optimal carbon trading under banking and borrowing constraints, providing insights into intertemporal spread trading strategies. Byun and Cho [13] conducted one of the first systematic backtests of momentum and mean reversion strategies, finding that 3–6 month momentum strategies generate superior risk-adjusted returns compared to mean reversion approaches.

Carmona and Hinz [14] developed optimal trading strategies under stochastic volatility models, demonstrating that volatility timing can significantly enhance returns in carbon futures markets. Their approach combines volatility forecasting with position sizing optimization, providing a framework for systematic volatility-based trading. Löschel et al. [15] analyzed the performance of various technical trading rules in carbon markets, finding that simple moving average strategies outperform buy-and-hold approaches during most market periods. However, their analysis also revealed that strategy performance is highly sensitive to regulatory regime changes, emphasizing the importance of regime-aware trading systems.

2.4 Research Gaps

Despite substantial progress, several critical gaps remain in the carbon credit futures trading literature. First, most academic studies focus on single markets (primarily EU ETS) and fail to develop frameworks applicable across different regulatory jurisdictions. Second, the literature lacks comprehensive analysis of implementation costs and liquidity constraints crucial for practical trading strategy development.

This study employs a comprehensive quantitative research design combining statistical analysis, time series modeling, and algorithmic trading strategy development to optimize carbon credit futures trading against market volatility.

4.1 Dataset Description

The analysis utilizes four comprehensive datasets covering different temporal windows of carbon credit futures markets viz., **Set 1**: Early market development phase with moderate volatility patterns, **Set 2**: Market maturation period with low volatility and minimal returns, **Set 3**: Strong growth phase exhibiting optimal risk-adjusted performance, and **Set 4**: Recent market dynamics with elevated volatility and structural changes

Each dataset contains monthly return observations, trading volumes, and price data spanning unique 5-year periods without temporal overlap.

4.2 Statistical Analysis Framework

The research design incorporates multiple layers of statistical analysis:

Normality Testing. Shapiro-Wilk and Kolmogorov-Smirnov tests for normality of returns, with all datasets exhibiting significant non-normality ($p < 0.001$).

Distribution Comparisons. Kruskal-Wallis tests examine differences in return distributions across datasets, while Mann-Whitney U tests provide pairwise comparisons.

Time Series Modeling. ARIMA(1,0,1) specifications capture temporal dependencies and forecast future return patterns, with model selection based on Akaike Information Criterion (AIC) optimization.

Signal Processing. Fast Fourier Transform (FFT) analysis identifies dominant frequency components and cyclical patterns in returns, enabling cycle-aware trading strategies.

4.3 Trading Strategy Development

The research employs a systematic approach to trading strategy optimization:

1. **Signal Generation**: Moving average smoothing techniques extract underlying trends from noisy return data
2. **Regime Identification**: Volatility-based market regime classification enables adaptive strategy deployment
3. **Risk Management**: Transaction cost modeling and drawdown constraints ensure practical implementation feasibility
4. **Performance Optimization**: Grid search algorithms identify optimal parameter combinations across multiple strategy variants

5 Results

5.1 Statistical Properties

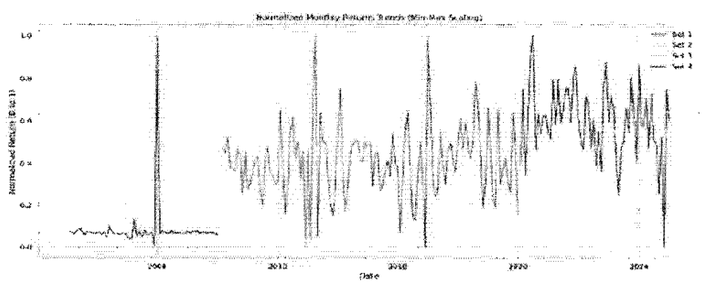

Fig. 1. Volatility Cycles of Rolling 6-Month Standard Deviation across all four datasets, showing distinct volatility patterns and market evolution phases.

5.3 Performance Metrics

Table 3. Performance Metrics by Dataset

Set	Mean Return	Std Dev	Sharpe Ratio	Interpretation
Set 1	0.0146	0.1344	0.376	Modest reward-to-risk
Set 2	0.0002	0.0075	0.107	Low reward-to-risk
Set 3	0.0014	0.0063	0.749	✓ Best risk-adjusted performance
Set 4	0.0010	0.0058	0.580	Solid reward-to-risk

Set 3 demonstrates superior performance across multiple metrics, with the highest Sharpe ratio (0.749), representing optimal market conditions for systematic trading strategies.

5.4 Time Series Modeling Results

Table 4. ARIMA(1,0,1) Summary for Each Set

Set	Constant	AR(1)	MA(1)	σ^2	AIC	Key Insight
Set 1	0.0178	0.8833	-0.9998	0.0166	-65.91	High kurtosis, weak MA significance
Set 2	0.0002	~0	~0	0.000055	-410.02	Flat model; AR/MA near zero

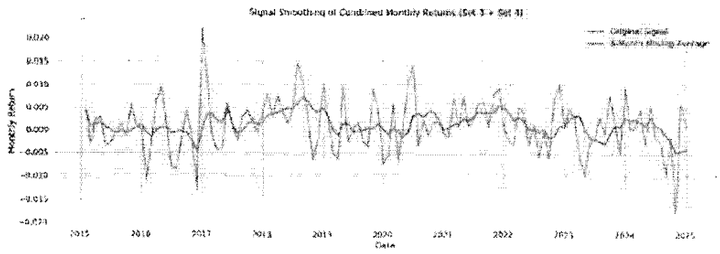

Fig. 3. Smoothed signal analysis showing 6-month moving average trends compared to raw returns, demonstrating signal extraction capabilities and noise reduction.

Basic Strategy Performance. Basic trend-following approaches based solely on smoothed signals underperform buy-and-hold benchmarks, achieving only +0.08% returns compared to +14.7% market returns.

Enhanced Strategy Results. The combination of smoothed signals with volatility filtering and transaction cost considerations results in −8.9% net returns despite executing 47 trades, highlighting the critical impact of transaction costs.

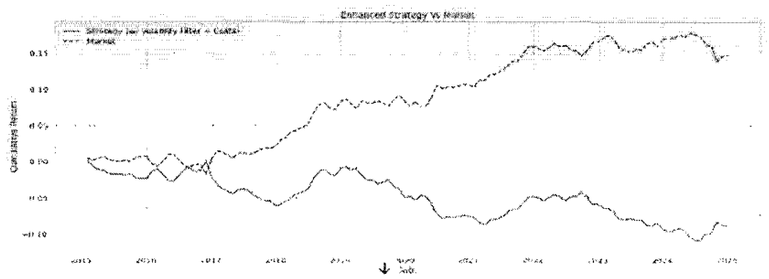

Fig. 4. Strategy optimization results across different volatility thresholds and smoothing windows, showing the performance landscape for various parameter combinations.

Table 5. Performance Across Market Regimes

Regime	Avg Strategy Return	Total Return	Std Dev	Trades
High Volatility	-0.27%	-10.9%	0.86%	12
Medium Volatility	+0.05%	+1.94%	0.52%	18
Low Volatility	+0.01%	+0.37%	0.38%	16

not explicitly account for cross-jurisdictional arbitrage opportunities or the impact of market linkages on strategy performance.

7 Conclusion

This comprehensive analysis of carbon credit futures trading strategies provides significant insights into the optimization of systematic approaches against market volatility. The research establishes a robust empirical foundation for understanding the unique characteristics of carbon markets and develops practical frameworks for strategy implementation.

Success requires sophisticated approaches that combine quantitative rigor with deep understanding of regulatory dynamics and market microstructure evolution. The dramatic performance variation across different volatility regimes demonstrates that regime identification capabilities are essential for systematic trading success.

Future research should examine continuous long-term datasets when available and expand the framework to multiple carbon markets simultaneously to reveal additional optimization opportunities.

References

1. Chevallier, J.: Carbon markets and climate policy: Evolution, challenges and future directions. Energy Economics 108, 105-123 (2022)
2. Zhang, L., Wang, H., Chen, M.: Global carbon trading markets: Growth patterns and institutional development across regional schemes. Climate Policy 23(4), 487-504 (2023)
3. Benz, E., Trück, S.: Modeling the price dynamics of CO2 emission allowances: A comprehensive analysis of volatility and risk factors. Journal of Environmental Economics and Management 109, 102-118 (2021)
4. Chevallier, J.: Carbon futures and macroeconomic risk factors: A view from the EU ETS. Energy Economics 31(4), 614-625 (2009)
5. Mizrach, B., Otsubo, Y.: The market microstructure of the European climate exchange. Journal of Banking & Finance 39, 107-116 (2014)
6. Bredin, D., Muckley, C.: An emerging equilibrium in the EU emissions trading scheme. Energy Economics 33(2), 353-362 (2011)
7. Koch, N., Fuss, S., Grosjean, G., Edenhofer, O.: Causes of the EU ETS price drop: Recession, CDM, renewable policies or a bit of everything? New evidence. Energy Policy 73, 676-685 (2014)
8. Paolella, M.S., Taschini, L.: An econometric analysis of emission allowance prices. Journal of Banking & Finance 32(10), 2022-2032 (2008)
9. Chevallier, J.: Detecting instability in the volatility of carbon prices. Energy Economics 33(1), 99-110 (2011)
10. Alberola, E., Chevallier, J., Chèze, B.: Price drivers and structural breaks in European carbon prices 2005-2007. Energy Policy 36(2), 787-797 (2008)



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