Chapter 8
Artificial Intelligence and Human Behavior in Cryptocurrency Markets: An Analysis of Herding Behavior

Havva Koç
https://orcid.org/0000-0002-0906-1438
Okan University, Turkey

ABSTRACT

Cryptocurrency markets, characterized by high volatility, limited regulation, and rapid digitalization, represent an area that requires in-depth analysis of investor behavior and market dynamics. In this context, herd behavior emerges as a phenomenon where investors follow collective movements instead of making individual decisions, leading to market anomalies. The dynamics of cryptocurrency markets differ from those of traditional financial markets, necessitating alternative analytical methods to understand irrational investment decisions within these markets. This study aims to investigate herd behavior in cryptocurrency markets and its impact on market volatility. It identifies that during periods of high market volatility, investors tend to exhibit more irrational movements, following herd behavior, which disturbs market equilibrium.

1. INTRODUCTION

Purpose: Cryptocurrency markets have experienced rapid growth and volatility in recent years, securing a significant position in financial markets. The aim of this study is to gain a deeper understanding of volatility in cryptocurrency markets and

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to examine the herding behavior of market participants. Specifically, by analyzing the relationship between market indicators and the daily returns of cryptocurrencies, we aim to investigate how the volatility structure of these markets evolves under different volatility regimes. This study seeks to contribute to the understanding of investor behavior in cryptocurrency markets and to the development of risk management strategies.

Background: The volatility of cryptocurrency markets presents both opportunities and significant risks for investors. The fact that these markets remain largely unregulated increases uncertainties and price fluctuations. This makes it challenging to understand how investors behave in the market and which strategies are more effective. The literature includes numerous studies on volatility and herding behavior in cryptocurrency markets; however, most of these studies focus on traditional financial markets and provide limited insights into the unique dynamics of cryptocurrencies. In this context, the question of how investors exhibit herding behavior during periods of high market volatility remains insufficiently addressed.

Problem Statement: The high volatility that characterizes cryptocurrency markets is known to have a significant impact on investors. During periods of high volatility, investors tend to exhibit greater herding behavior, often making similar decisions to other market participants. However, the structural characteristics of this behavior and the extent to which volatility regimes influence investor decision-making remain insufficiently understood. This study aims to address this gap by analyzing volatility metrics such as CSSD and CSAD to explore the underlying dynamics of herding behavior in cryptocurrency markets.

Objectives: The main objectives of this study are as follows:

- To analyze the CSSD and CSAD metrics used to measure volatility in cryptocurrency markets.
- To determine how herding behavior among market participants differs under high and low volatility regimes.
- To examine the factors influencing herding behavior using the Markov regime-switching model.
- To develop effective risk management strategies for investors.
- To contribute to the existing literature by providing new insights into volatility and investor behavior in cryptocurrency markets.

Structure Overview: This study consists of six main sections, followed by a glossary of key terms and definitions. The first section introduces the research by outlining its purpose, background, and key objectives, highlighting the significance of the topic. The second section provides a detailed explanation of the methodological approaches used and the dataset employed. Additionally, the analyses conducted and