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**Article**

# Effect of economic, politics and geopolitics crisis on herd behaviour in an emerging market : evidence from Borsa Istanbul

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# Effect of Economic, Politics and Geopolitics Crisis on Herd Behaviour in an Emerging Market: Evidence from Borsa Istanbul

*Durmuş YILDIRIM** – *Miraç EREN***

**Abstract**

*In this study, herd behaviour in Borsa Istanbul (Istanbul Stock Exchange) is discussed with various dimensions. The study covers the period between January 1993 and May 2019, and the general herd behaviour covering the entire period in Borsa Istanbul as well as the herd and asymmetric herd behaviours in the structural break periods calculated with the ICSS algorithm were examined. Moreover, herd behaviour during economic and local political/geopolitical crises and election periods in Turkey, which is a fragile economy, is also examined. According to the empirical results, it has been found that there is herd behaviour in Borsa Istanbul, and that herd behaviour is observed in both rising and falling markets, which is stronger especially in falling markets. It has also been observed in the research that herd behaviour is very evident in times of economic, local political and geopolitical crisis. In addition, the herd effect is also encountered before the elections in the coalition government periods characterized by political uncertainties.*

**Keywords:** *herd behaviour, emerging market, politics crisis, geopolitics crisis, structural breaks*

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## Introduction

Human beings have lived together for many years and influenced each other with their behaviours, attitudes, and predictions, as people are usually interested in the actions of others and derive information from these actions. When they are free to do what they want, they imitate each other (Hoffer, 1955). When we, human beings, buy a book that we see on the bestseller list, when we choose the crowded one out of two restaurants next to each other (Bikhchandani, Hirshleifer and Welch, 1992), when we add the most cited articles in the field to our reference list (Taleb, 2007), when we watch a video with high viewing figures, that is, in almost every aspect of our lives, we imitate the majority. This phenomenon, which is called herd behaviour, has been defined by social psychology as a scenario in which individuals follow the group they are a member of in their decisions and obey the group decision even if they perceive that these decisions are wrong (Christie and Huang, 1995; Rook, 2006). In the field of finance, this concept is defined as a situation when investors ignore their own beliefs and imitate the preferences or market movements of other investors (Bikhchandani and Sharma, 2000; Hwang and Salmon, 2004). Although such behaviour among investors can be driven by rational or irrational motives, it is clear that it can lead to market pressure by diverting asset prices out of their true values, thereby increasing market volatility (Blasco, Corredor and Ferreruela, 2012). When the history of finance is examined, it has been observed that herd behaviour deeply affects the market during economic crisis periods such as financial speculations and market bubbles (Chancellor, 1999).

In this study, herd behaviour is examined during periods of economic and political fragility in the Turkish stock market (Borsa Istanbul). Conducting research in Turkish markets is important in some respects. First of all, Turkey is a country that has attracted speculative capital inflows, known as "hot money", through portfolio investments and short-term loans since the 1990s due to the liberalization of capital flows. More than half of the investors in Borsa Istanbul are foreign corporate and individual investors. For this reason, the economic structure that grows when capital inflows increased, but enters in a crisis when capital inflows stopped or reversed, leaves Turkey with a 'triple deadlock'. That is, it makes it difficult to have an independent monetary policy and an exchange rate policy simultaneously (Orhangazi, 2019). The Turkish economy has faced sudden capital outflows from time to time in the last 30 years, which has increased the country's economic fragility. With the FED's termination of its expansion policy in May 2013, foreign portfolio investments in the Turkish economy decreased significantly, depreciation occurred in national currency and stock prices, and government bond market rates and CDS premiums increased significantly. In this period, Morgan Stanley

included Turkey among the fragile five emerging countries, which were more affected by the FED's decision. Secondly, one of the most important triggers of economic fragilities in the country is the periods of political instability. Between 1961 and 2002, Turkey was governed by coalition governments, and from 2002 to the present, there has been a single party ruling period. In the 1990s, reasons such as the inability to form governments and short-term coalitions had a negative impact on the economy and thus the stock market. Moreover, in addition to internal factors such as military coups, coup attempts, terrorist attacks, popular uprisings, and Turkey's strategically important geographical location, economically turbulent periods have been witnessed due to external factors such as problems experienced in neighbouring countries, wars, and conflicts of interest between countries. There for these reasons, examining the herd behaviour on Borsa Istanbul shows importance.

Our research makes a comprehensive contribution to the literature in different aspects. Firstly, it is observed that most of the studies on herding behaviour in Borsa Istanbul focus on the period after 2000 (Akçaalan, Dindaroğlu and Binatlı, 2019; Balcilar and Demirer, 2015; Cakan and Balagyozyan, 2014; Doğukanlı and Ergün, 2015; Tiniç, Iqbal and Mahmud, 2020; Tiniç and Savaser, 2020; Yasir and Önder, 2023) and at most 18 years of data (Adem and Sarıoğlu, 2020). Our study has a large data set covering the 25-year period from 1993, when computerised trading was introduced in Borsa Istanbul, to May 2019. This will allow us to more comprehensively analyse the changing herd behaviour of investors trading in Borsa Istanbul with the development of the stock market and technology.

The second contribution of our research is that it provides more comprehensive results by going from general to specific. When the studies on Borsa Istanbul are examined, it is seen that herd behaviour is investigated in rising and falling markets (Altay, 2008; Cakan and Balagyozyan, 2014; Kayalidere, 2012) and volatile markets (Adem and Sarıoğlu, 2020; Afşar, Akseki and Kisava, 2022; Akçaalan, Dindaroğlu and Binatlı, 2019; Balcilar and Demirer, 2015). In this study, we first focus on the big picture and investigate herding behaviour in rising and falling markets and volatile markets over a 25-year period, as well as the existence of herding behaviour in different structural break periods using the ICSS algorithm that detects breaks in variance.

The third prominent contribution of our study is that it provides in-depth and comprehensive analyses on herd behaviour in Borsa Istanbul during a wide range of economic crisis periods. While most of the previous studies focus specifically on the 2008 – 2009 Global Financial Crisis and the subsequent European Debt Crisis (Cakan and Balagyozyan, 2014; Durukan, Özsu and Ergun, 2017; Tiniç and Savaser, 2020; Afşar, Akseki and Kisava, 2022), our research goes beyond these crises and examines in detail the effects of other major local and global economic

shocks on investor behaviour in Borsa Istanbul. This comprehensive approach provides a richer and more diversified understanding of the impact of both local and global economic crises on herd behaviour in Borsa Istanbul, thus making an important contribution to the literature on the behavioural dynamics of financial markets during crisis periods.

Finally, our study makes an important contribution to the literature by examining the herd behaviour observed during geopolitical and local political crises as well as general election periods in the country. The literature review shows that there is a limited number of studies focusing on specific political crisis periods. For example, Indārs, Savin and Lublóy (2019) find that investors in the Moscow Stock Exchange exhibited herding behaviour during the annexation of Crimea, but this behaviour was not observed in the post-annexation period. Similarly, Tiniç and Savaser (2020) reported an increase in the trading volume of foreign investors in Borsa Istanbul after the Gezi Park events, while the trading volume of domestic investors decreased. Unlike these studies, our research examines herding behaviour in a much wider spectrum, including geopolitical and local political crises as well as general election periods. By providing an in-depth perspective on how herding behaviour is shaped in the context of various political events, our study makes a comprehensive contribution to the literature on investor behaviour.

The results of the empirical analysis have determined the existence of herd behaviour in Borsa Istanbul, that herd behaviour is observed in both rising and falling markets, and this effect is stronger especially in falling markets. It was also observed in the research that herd behaviour is clearly evident during economic, local political and geopolitical crisis periods. In addition, the herd effect was also encountered in the pre-election periods during the coalition governments with political uncertainties.

The remainder of the paper is organized as follows. Section 1 reviews the related literature, while Section 2 presents the methodology and data. Section 3 reports the empirical results and the last Section offers conclusions.

## 1. Literature Review

In the finance literature, herd behaviour is defined as the situation where investors ignore their own beliefs and blindly replicate the investment decisions of the people around them or the movements in the market (Banerjee, 1992; Bikhchandani and Sharma, 2000; Hwang and Salmon, 2004; Lakonishok, Shleifer and Vishny, 1992). However, Nofsinger and Sias (1999) and Chiang and Zheng (2010) took this behaviour in a broader perspective and expressed it as a pool of investors who trade in the same direction for a certain period of time.

Herd behaviour has been classified by researchers in two different dimensions as rational – irrational and spurious – intentional. Bikhchandani and Sharma (2000) stated that rational herd behaviour stems from information asymmetry, reputational concerns and compensation concerns, and stated that low-skilled managers deliberately imitate the actions of more senior investors in order to protect their capital. Studies by Scharfstein and Stein (1990), Devenow and Welch (1996) and Casavecchia (2016) emphasized that professional managers exhibit herd behaviour due to career concerns and the biggest trigger of this is the ' sharing-the-blame' effect. Devenow and Welch (1996), on the other hand, stated that irrational herd behaviour is due to psychological factors and that investors follow the crowd because of their sense of security. Having examined irrational herd behaviour, Christie and Huang (1995) stated that investors are more likely to exhibit herd behaviour during market stress because, when investors face uncertainty, the fear of making wrong decisions and losing will impair their ability to analyze rationally and investors will tend to follow the market to reduce their anxiety by adapting to others. Bikhchandani and Sharma (2000) defined spurious herding as investors taking similar actions after being exposed to the same information, and they stated that intentional herding is derived from investors' strong willingness to copy the actions of others in the market. In spurious herding, while economic actors act rationally as a result of the information in their possession, intentional herding can be rational or irrational (Indārs, Savin and Lublóy, 2019).

When the academic literature is examined, herd behaviour is generally discussed in two different dimensions. The first one explores herd behaviour on institutional investors using more specific and microdata (microdata or proprietary data) (Grinblatt, Titman and Wermers, 1995; Kim and Nofsinger, 2005; Lakonishok, Shleifer and Vishny, 1992; Li and Yung, 2004; Schmitt and Westerhoff, 2017; Wermers, 1999), whereas the other view examines herd behaviour through aggregate market data (Chang, Cheng and Khorana, 2000; Christie and Huang, 1995). Christie and Huang (1995) used the cross-sectional standard deviation of stock returns to detect herd behaviour regarding the general direction of the market. However, they did not find any evidence of herd behaviour in the US market. Chang, Cheng and Khorana (2000) expanded the study of Christie and Huang (1995) replacing cross-sectional standard deviations with cross-sectional absolute deviation, and tested herd behaviour on a non-linear model. According to the results of the study, no evidence of herd behaviour was found in the USA and Hong Kong, while significant herd behaviour was observed in South Korea and Taiwan, and partially in Japan. Contrary to previous studies, Hwang and Salmon (2004) attempted to explain herd behaviour based on CAPM theory. In the model they established, they aimed to differentiate the hidden herd behaviour that

emerges as a result of the investors' reaction to basic information. As a result of the study, it was found that herd behaviour cannot be explained by macroeconomic factors, but there is evidence for herd behaviour in rising and falling markets. Galariotis, Rong and Spyrou (2015) expanded Chang, Cheng and Khorana (2000) model by including Fama and French (1993; 1995) factors so as to control fundamental information. The authors divided into two the cross-sectional deviations of returns as deviations based on fundamental and non-fundamental information.

Numerous studies have followed this methodology to explore the nature and extent of herding behaviour in both developed and emerging markets (Balcilar and Demirer, 2015; Caparrelli, D'Arcangelis and Cassuto, 2004; Chiang and Zheng, 2010; Rıza Demirer and Kutan, 2006; Rıza Demirer, Kutan and Chen, 2010; Economou, Kostakis and Philippas, 2011; Espinosa-Méndez and Arias, 2021; Galariotis, Rong and Spyrou, 2015; Gębka and Wohar, 2013; Gleason, Mathur and Peterson, 2004; Indārs, Savin and Lublóy, 2019; Tan et al., 2008; Wu, Yang and Zhao, 2020; Zhou and Lai, 2009; Zhou et al., 2022). Although researchers have studied herd behaviour in the same and in different markets, they have obtained different results about the herding behaviour in the markets. Chang, Cheng and Khorana (2000) found no evidence of herding behaviour in the USA and Hong Kong, while significant herding behaviour was reported in South Korea and Taiwan, and partially in Japan. Hwang and Salmon (2004) found evidence of herding behaviour in rising and falling markets in the US and South Korean markets, whereas Galariotis, Rong and Spyrou (2015) did not find any evidence of herd movement based on fundamental and non-fundamental information from the US and UK markets. Demirer and Kutan (2006) found herd behaviour in their study covering China while Tan et al. (2008) presented evidence of herding behaviour for dual-listed stocks. Chiang and Zheng (2010), in their study of a sample of 18 developed and emerging economies, found no evidence of herding behaviour in the US and Latin American markets, while they found a certain degree of herding behaviour in both upstream and downstream Asian markets.

Some studies examined herd behaviour in different market conditions and crisis periods. While Gleason, Mathur and Peterson (2004) found no evidence for herd behaviour during periods of extreme market activity, Boyer, Kumagai and Yuan (2006), and Chiang, Jeon and Li (2007) stated that herd behaviour deepened market crisis due to contagion effect. Zhou and Lai (2009) found that in Hong Kong stock exchange, herd behaviour in falling markets is more effective than rising markets, and Klein (2013) identified that in European markets, especially in periods of high volatility, herd behaviour is witnessed. Galariotis, Rong and Spyrou (2015) found US investors tended to herd on the days when important macro data were released, as well as the with the spillover effect on herd behaviour

from the US to the UK during the Asian crisis and the bursting of the Dotcom bubble. Gong and Dai (2017) in their study examining whether the changes in interest and exchange rates in the Chinese stock market cause investors to herd, they found that the increase in interest rate and the depreciation of the country's currency cause herd behaviour.

Several studies have investigated the presence of herd behavior in the Borsa Istanbul (BIST). Altay (2008) examined herding behaviour with the CSAD method using daily stock returns in the services, finance, industry and investment trusts sectors in BIST between 1997 and 2008 and found that herding behaviour was observed during the upturns and downturns of the market. Using the same method, Kayalidere (2012) found that herding behaviour increased intensively in the 1997 – 2004 rising market period and then decreased in the 2005 – 2012 period, while Cakan and Balagyozyan (2014) found herding behaviour in bank stocks in BIST between 2007 and 2012 only in the rising market period. Balcilar and Demirer (2015) investigated the relationship between global risk factors and herding behaviour in BIST using a time-varying transition probability Markov-switching model for the period 2000 – 2012 and found evidence of herding behaviour in high and extreme volatility regimes, while risk factors related to the US market play an important role in driving herding behaviour. Doğukanlı and Ergün (2015) applied Hwang and Salmon's 2001 model by using daily, weekly and monthly data of 15 different sectors in their study covering the 2000 – 2011 period in BIST. They found that investors exhibit herding behaviour in some periods and that investors tend to exhibit herding behaviour more in financial sector stocks compared to real sector stocks. In a similar study, Akçaalan, Dindaroğlu and Binatlı (2019) found that herding behaviour strengthened as the trading volume of international investors increased and market volatility and political tensions encouraged herding behaviour in BIST during the 2001 – 2016 period. Tiniç and Savaser (2020) examined whether domestic and foreign investors had a comparative information advantage in BIST between 2007 and 2015 and found that foreign investors had an information advantage especially during the period of political instability that started with the Gezi Park protests in June 2013. Adem and Sarıoğlu (2020) investigated the herding behaviour of investors in BIST using CSSD and CSAD models between 2000 and 2018, and found that herding behaviour increased significantly during periods of high market volatility. Afşar, Akseki and Kisava (2022) investigated herding behaviour in BIST for the period 2005 – 2018 with the same methods. They found that herding behaviour does not occur in BIST except for special circumstances, but herding behaviour is observed in periods of low volatility, low trading volume and financial crises. Tiniç, Iqbal and Mahmud (2020) investigated the relationship between informed trading and herd behaviour

in BIST using intraday trading data of all stocks traded on BIST between 2005 – 2017 and found that informed trading increases herd behaviour and short selling restrictions strengthen this effect. Dalgıç, Ekinci and Ersan (2021) examined the daily and intraday herding behaviour of various investor groups trading in BIST between June 2013 and May 2014. The results of the study revealed that professional investors exhibit herding behaviour in small stocks, while non-professional investors exhibit herding behaviour in large stocks. Yasir and Önder (2023) investigated the spillover of herd behaviour in BRIC countries and Turkey during the 2006 – 2021 period, taking into account regime shifts. Their research findings identified the presence of herd behaviour in Turkey during the Covid-19 period. Additionally, there was a spillover of herd behavior from Turkey to Russia, China, and Brazil during the global financial crisis, the post-European debt crisis, and the COVID-19 periods, respectively.

Max Weber argued that it is impossible to isolate economic activity from political activity. In other words, economic changes bring about political changes. Developments such as changes in local governments, political turmoil, coups and terrorist attacks are expected to cause volatility in stock markets. However, when the literature is examined, there are no studies investigating the relationship between political developments and herd behaviour. Most of the studies in this field focus on the effects of periods of political uncertainty on stock markets, stocks and asset returns. In this context, Cutler, Poterba and Summers (1991), in their study of the impact of political news on the stock market, found no evidence of the impact of political news on the US stock market. However, researches conducted in different economies in the following periods revealed the effect of political tension on the stock market. Alexakis and Petrakis (1991), in their research on the Greek stock market, documented the link between the behaviour of the stock market index and political factors. Chan and Wei (1996), showed that positive political news has a positive effect and negative news has a negative effect on the stock market in Hong Kong. Perotti and Van Oijen (2001), in their study examining the effect of political shocks on stock markets in emerging economies, presented evidence that serious fluctuations in returns are observed due to an increase or decrease in political risk. Pástor and Veronesi (2013), in their study using the political uncertainty index, observed high volatility in stock prices during periods of high political uncertainty. Liu, Shu and Wei (2017), in a 2012 study investigating the impact of a political scandal in China, confirmed that political uncertainty has a negative impact on the stock price. Chesney, Reshetar and Karaman (2011), in their study examining the impact of terrorist attacks on the world economy using data from 25 countries where 77 terrorist attacks took place, found that there is a negative relationship between terrorist attacks and stock markets.

The impact of the turmoil in local politics on the country's economy and therefore on the stock markets is undeniable. In addition to the foregoing, election periods are also at the most important point of the changes that may occur in economic policies. The continuation of the current government in the country will send a signal to the investors that the current policies will be kept, while a change of government will give the opposite signal. Naturally, the direction and effect of this signal may vary depending on the satisfaction with the current economy and political administration. When the literature is examined, Niederhoffer, Gibbs and Bullock (1970), in the study they conducted in the USA during the period of 1900 – 1968, found that the stock returns changed depending on the winning party or candidate in the elections. Pantzalis, Stangeland and Turtle (2000), in their study examining the 1974 – 1995 period, observed that positive returns were obtained in stock returns on the days of the election. Santa-Clara and Valkanov (2003), in their study in the USA for the period 1927 – 1998, found that when the Democratic and Republican parties are compared, there may be changes according to the ruling party, and the stock returns are higher when the Democratic Party is in power. In the research conducted by Mandacı (2003) which examined the impact of four general elections held in Turkey between 1991 and 2002 on the stock market, it was found that there were no abnormal returns before the elections, while after the elections, negative abnormal returns were observed following the 1995 elections, and positive and significant abnormal returns were identified after the 2002 elections. The positive effect observed after 2002 was attributed to the expectation of economic stability resulting from single-party rule in the markets. Hudson, Keasey and Dempsey (1998) showed that the UK stock market outperformed a right-wing government under a left-wing government; however, Döpke and Pierdzioch (2006) indicated that German stock exchange was not sensitive to the ruling political party. Cahan et al. (2005) showed that the return on the New Zealand stock market was higher during the right-wing administrations from 1931 to 2003 than during the left-wing administrations during the same period, whereas Hung, Jiang and Chiu (2007) found that congressional elections had a negative effect on Taiwan stock returns. Białkowski, Gottschalk and Wisniewski (2008), examining 27 OECD countries, found that the country-specific portion of the stock index yield spread rose significantly during national election periods.

Recently, the impact of geopolitical risks on stock market returns and volatility has attracted the attention of researchers and policy makers. The geopolitical risks that the country's economies are exposed to are considered as one of the main determinants of investment decisions that have a significant impact on economic growth and the stability of financial markets. Geopolitical risk is defined as "the risk associated with wars, acts of terrorism and tensions between states that affect

the normal and peaceful course of international relations" (Caldara and Iacoviello, 2022). In their study, Rigobon and Sack (2005) found that in periods when geopolitical risks arise, investors move away from risky assets and turn to safer or more liquid alternatives, as in times of political turmoil, higher uncertainties usually prevail. Periods of high uncertainty are expected to cause herd behaviour. Under these conditions, investors follow the general trend of the market. Christie and Huang (1995), argue that herd formation is more likely in extreme market conditions characterized by excessive returns on the market portfolio. Major political upheavals, conflicts between countries, warfare and military actions cause stressed markets with abnormally large average price movements. In their research, Berkman, Jacobsen and Lee (2011) analysed 447 events that turned into international political crises. As a result of the study, they determined that in the absence of these crises, world stock returns would be 3.6% higher annually. Looking at the post-1987 period, Omar, Wisniewski and Nolte (2017) analysed the impact of 43 wars, which were defined as direct cross-border violence. They found that the stock markets were negatively affected in periods in the event windows where they observed the change in the 50 trading days before and after the outbreak of the war.

This study contributes originally to the field by addressing significant gaps in the literature on herd behavior in Borsa Istanbul. Firstly, by encompassing a broad timeframe from 1993 to 2019, it offers a long-term perspective that is absent in the majority of existing studies. It further bridges the literature's existing gaps regarding the understanding of market dynamics amid economic crises and political instability, not only by focusing on specific crisis periods but also by examining a wider array of herd behaviors associated with various local and global economic events. Additionally, by delivering a thorough analysis of how investor behavior is influenced during geopolitical and domestic political crises, as well as general elections, it introduces a novel viewpoint to the scarcely explored areas within the existing literature. In summary, this study addresses crucial gaps in the literature by providing a detailed and comprehensive approach to the analysis of herd behavior in Borsa Istanbul, considering different time periods, crisis intervals, and political events.

## 2. Data and Methodology

### 2.1. Data

The data set used in this study contains daily returns for 318 Turkish stocks traded on the Borsa İstanbul over the January 1993 – May 2019 period. While the number of companies used in the study was 91 in 1993, this number has reached

318 over the years. In the said period, the equally weighted portfolio returns of all companies were calculated and analyzes were made based on 6577-day observations. The data of the research was obtained from the serial FINNET database. Within the scope of the research, herd behaviours in structural break, economic crisis, local political crisis, geopolitical crisis and election periods were analyzed separately. In total, herd behaviour in 9 economic crises, 5 local political crises, 7 geopolitical crises and 16 election periods between 1993 – 2019 were analyzed. Detailed explanations regarding the selected crisis periods are presented in Table 1.

T a b l e 1

**Crisis Periods**

| Economic Crisis | Description |
|---|---|
| *The 1994 Currency Crisis in Turkey* (03/01/1994 – 01/12/1994) | The 1994 Turkish currency crisis, a significant financial turmoil for Turkey, started on January, and is notably marked by surging interest rates, a sharp decline in the Turkish Lira's value, and a deep economic recession. Key factors contributing to this crisis include high inflation, substantial budget deficits, overvalued exchange rates, and the state's unsustainable domestic and foreign debt levels. The crisis began to subside in the later part of 1994, with its conclusion assumed on December 1, 1994, influenced by the beginning of the Mexican Peso crisis. |
| *Peso Crisis* (02/12/1994 – 31/07/1995) | The Mexican Peso Crisis was a currency crisis triggered by the Mexican government's sudden devaluation of the peso against the US dollar in December 1994, and was one of the first international financial crises triggered by capital flight. Economic crisis's start and end dates are taken from the research by Galariotis, Rong, and Spyrou (2015). |
| *Asia Financial Crisis* (01/07/1997 – 31/03/1998) | The Asian financial crisis was a period of financial turmoil that affected much of East and Southeast Asia from July 1997 onwards. The crisis raised concerns of a global economic collapse due to financial contagion. Economic crisis's start and end dates are taken from the research by Galariotis, Rong, and Spyrou (2015). |
| *Russia Crisis* (03/08/1998 – 26/03/1999) | The Russian financial crisis hit Russia on 17 August 1998. It resulted in the Russian government and the Russian Central Bank devaluing the ruble and defaulting on its debt. The crisis had severe impacts on the economies of many neighboring countries. Economic crisis's start and end dates are taken from the research by Galariotis, Rong, and Spyrou (2015). |
| *Dotcom Buble* (04/01/2000 – 29/06/2000) | The Dotcom Bubble was an economic bubble that affected the prices of stocks related to the technology industry during the late 1990s and early 2000s in the United States. The event was triggered by the hype over the new Internet industry, media attention, and investors' speculation of profits by dotcom companies. Economic crisis's start and end dates are taken from the research by Galariotis, Rong, and Spyrou (2015). |
| *2001 Banking and Currency Crisis in Turkey* (02/10/2000 – 28/12/2001) | It is called a twin crisis. In November 2000, there was a severe liquidity crisis due to financial problems in some commercial banks. This crisis was overcome thanks to the additional reserve facility provided by the IMF. and the situation in the markets has returned to normal. However, this recovery did not last long, as a result of the public announcement of a political debate between the prime minister and the president on February 19, 2001, there was a serious loss of value against the Turkish Lira (TL), and the floating exchange rate regime was adopted in the following days. |
| *Mortgage Crisis (Global Financial Crisis)* (02/01/2008 – 30/12/2009) | The United States subprime mortgage crisis was a multinational financial crisis that occurred between 2007 and 2010 that contributed to the 2007 – 2008 global financial crisis. Economic crisis's start and end dates are taken from the research by Galariotis, Rong, and Spyrou (2015). |

| | |
|---|---|
| *Europe Debt Crisis* (04/01/2010 – 30/12/2011) | The European debt crisis is a period of financial distress that affected Eurozone countries after 2009. The crisis erupted due to excessive borrowing and the inability to control budget deficits. Greece, Ireland, Portugal, Spain, and Cyprus are among the most affected countries. It is difficult to specify an exact date for the European debt crisis. Therefore, our study has examined the period of 2010 – 2011, when the crisis was intensely felt. |
| *Exchange Rate Crisis in Turkey* (02/01/2018 – 07/05/2019) | The 2018 – 2019 Turkish currency and debt crisis is a financial and economic crisis in Turkey. It is characterized by a sharp decline in the value of the Turkish Lira, high inflation, rising borrowing costs, and a corresponding increase in loan default rates. Additionally, the detention of American pastor Andrew Brunson on espionage charges following the failed coup attempt in Turkey, followed by increased economic and political pressure from the Trump administration, has deepened this crisis. The crisis, which began to be felt from 2018, continues to have effects to this day. |
| | |
| **Local Political Crises** | **Description** |
| *Post-Modern Coup* (02/10/1996 – 18/06/1997) | The 3 October 1996 accident in Susurluk, which exposed the state-mafia relations, plunged Turkey into a period of political turmoil. The Susurluk scandal increased the pressure on the Welfare Party (RP) and its leader Necmettin Erbakan. On 28 February 1997, the Turkish Armed Forces (TSK) issued a memorandum demanding the closure of the RP on the grounds that it posed a threat to the secular order. After this memorandum, RP ministers resigned and Erbakan was put under intense pressure to resign. On 18 June 1997, Erbakan resigned. |
| *e-Memorandum* (12/04/2007 – 22/07/2007) | An e-memorandum is a declaration issued by the Turkish Armed Forces (TSK) on April 27, 2007 via its website. The memorandum contained a message that the presidential election should be held according to the constitutional amendment at the time. This was interpreted as a direct intervention of the Turkish Armed Forces in a political matter and caused great public outcry. The process started with the press conference of the Chief of the General Staff on April 12, 2007 and ended on July 22, 2007 when Erdoğan won the general election in Turkey. |
| *Gezi Park protests* (27/05/2013 – 16/06/2013) | The Gezi Park protests are the set of events that started with the police demolition of the tents set up by those protesting the cutting of trees in Taksim Gezi Park on May 28, 2013. In the following days, the protests spread throughout Turkey and turned into current anti-government protests with the support of opposition parties. The protests ended with the police evacuating Taksim Square on 16 June 2013. |
| *Judicial Coup Attempt* (17/11/2013 – 10/08/2014) | December 17 – 25 officially refers to the process called "Judicial Coup Attempt" and, according to dissident opinions, "Operation Corruption and Bribery". These are investigations in which some public institutions and organizations and public officials, including four ministers, are accused of misconduct and bribery. On the grounds that the members of the judiciary who initiated the investigation were members of the Fetullah Terrorist Organization, this process was named as the judicial coup attempt by the government. This process ended with the election of Recep Tayyip Erdoğan in the presidential election held on August 10, 2014. |
| *15 July coup attemp* (15/07/2016 – 31/12/2016*)* | The 15 July 2016 coup attempt was attempted in Turkey against state institutions, including the government and President Recep Tayyip Erdoğan. The initiative was carried out by a group organized as the Peace at Home Council, which infiltrated the Turkish Armed Forces from the Fetullah Terrorist Organization. However, the coup attempt failed due to the people's taking to the streets against the coup attempt at the call of the President and the intervention of the military and police force loyal to the state. Following this process, a State of Emergency (SoE) was declared in Turkey on July 20, 2016 for three months. The State of Emergency was extended 7 times for 3-month periods and continued for a total of 2 years. On July 18, 2018, the State of Emergency ended. In our study, we used this period until the end of the year. |

| Geopolitical Crises | Description |
|---|---|
| *11 September* (11/09/2001 – 28/12/2001) | On September 11, 2001, terrorist attacks organized by Al-Qaeda shook the United States. The Twin Towers of the World Trade Center in New York and the Pentagon were targeted, while a fourth plane was shot down in Pennsylvania. Nearly 3,000 people lost their lives in these attacks. The event marked the beginning of a new era in the global fight against terrorism. In our study, the last trading day of 2001 was taken as the end date. |
| *Irak War* (03/03/2003 – 13/12/2003) | The Iraq War began on March 20, 2003 when the United States and its allies intervened in Iraq, claiming that it possessed weapons of mass destruction. At the beginning of the Iraq War, Turkey played an important role because of its strategic location. Turkey faced domestic and foreign political pressures for military support to the war. On March 1, the Turkish Grand National Assembly rejected the US request for ground troops to enter Iraq through Turkey. This decision caused tension in Turkey-US relations. For this reason, the first working day following the rejection is taken as the beginning of the Iraq War in our research. The end date of the war was December 13, when Iraqi leader Saddam Hussein was captured by the US forces. |
| *Mavi Marmara attact (Gaza flotilla raid)* (31/05/2010 – 03/12/2010) | On May 31, 2010, the Mavi Marmara aid ship, which set sail from Turkey to break Israel's embargo on Gaza and meet the basic needs of the people of Gaza, was attacked by Israeli soldiers in international waters and 10 Turkish citizens lost their lives. This incident brought relations between Turkey and Israel to a breaking point. On December 3, 2010, the first positive contact between the two countries took place when Turkey assisted the forest fires that broke out in Israel. |
| *Syrian civil war* (15/03/2011 – 31/05/2011) | The Syrian protests against the Assad regime began on March 15, 2011, following the impact of the Arab Spring in the region. By April 2011, the protests had spread across the country, prompting the deployment of the Syrian Army to suppress them. Soldiers opened fire on protesters, leading to months of military siege. In June, the protests turned from civil resistance to armed resistance. Our study analyses the period of civil resistance. |
| *Fighter Jet Crisis in Turkish-Russian* (24/11/2015 – 09/08/2016) | On 24 November 2015, the Turkish Air Force shot down a Russian Su-24 aircraft for violating their border. This incident caused political and economic tensions between the two countries. The crisis was resolved on 8 August 2016 with a meeting between Putin and Erdoğan. |
| *Operation Euphrates Shield* (24/08/2016 – 29/03/2017) | On 24 August 2016, a military operation was launched to remove groups that Turkey considers terrorist organizations, including ISIS, YPG, and Syrian Armed Forces. The operation aimed to ensure border security, protect the people of the region, and eliminate the migration problem. On 29 March 2017, the government announced the successful completion of the operation. |
| *Operation Olive Branch* (20/01/2018 – 24/03/2018) | The Olive Branch Operation was launched by the Turkish Armed Forces (TSK) and the Syrian National Army (SNA) on January 20, 2018. The targeted areas were the Afrin district, as well as the towns of Azez and Tel Rifaat in Aleppo province, Syria. The operation aimed to eliminate terrorist organizations that were perceived as threats to Turkey's sovereignty, including the PKK, KCK, PYD-YPG, and ISIS. The military operation aimed to secure and control the border region and ensure the safety of the local population. It concluded on March 24, 2018, after 58 days, successfully bringing the city and district of Afrin under the control of the TSK and SNA. |

*Source*: Compiled by the author from various sources.

## 2.2. Methodology

The aim of this research is to test whether herding behaviours exist in Turkish stock markets in different periods and situations when there are structural changes in the BIST 100 index. For this purpose, To measure the herding behaviours, this

study employs a cross-sectional standard deviation of return (CSAD) (Chang, Cheng and Khorana, 2000) as a proxy variable. Because the rational asset pricing models specify that the equity return dispersions are predicted as a linear and increasing function of the market return.

According to Yao and Tangjitprom (2019) "If herding behaviour existing in stock market, the market participants tend to follow aggregate market behaviour and ignore their own priors during periods of large average price movements, then the linear and increasing relation between dispersion and market return will no longer hold." Therefore, if the relationship between the equity returns dispersions and the return on the aggregate market portfolio is nonlinear, the herding behaviours imply to existed in that stock market.

This study deals with herd behaviour in different periods and situations by gathering the daily market returns data of the Istanbul stock exchange market from January 1993 to May 2019. The cross-sectional absolute deviation of returns (CSAD), considered as a proxy variable for a measure of herd behaviour can be shown as follows (Chang, Cheng and Khorana, 2000).

$$CSAD_t = \frac{1}{N}\sum_{i=1}^{N}\left|R_{it} - R_{mt}\right| \tag{1}$$

where $R_{it}$ and $R_{mt}$ respectively mean the stock return of asset *i* at time *t* and the cross-sectional average of the *N* returns in the aggregate market portfolio at times *t.*

If the market participants tend to blindly follow aggregate market behaviour and ignore their own priors during periods of large average price movements even, they own different information, then in the stock market, the linear and increasing relation between market dispersion and market return will no longer hold. this case is called as the herding behaviour of the stock market. Instead, the relation can become non-linear (Yao and Tangjitprom, 2019). In the scope of the research, it is aimed to be determined at whether the herding behaviours existed in the BIST 100 stock market during periods when certain structural changes occur in those. So, the non-linear relationship between the equity returns dispersions and the return on the aggregate market portfolio in the period intervals where structural changes occur is examined as follows.

$$CSAD_t = \beta_0 + \beta_1\left|R_{m,t}\right| + \beta_2(R_{m,t})^2 + \varepsilon_t \tag{2}$$

where

$\beta_0$ – the constant term,

$\beta_1$, $\beta_2$ – the coefficients.

In addition, $\left|R_{m,t}\right|$ is the cross-sectional average of the $N$ returns in the aggregate market portfolio at time $t_p$, the squared market return $(R_{m,t})^2$ is used to capture the non-linearity in the relationship. According to the herding behaviour theory, if $\beta_2$ is not statistically significant, the linear relationship between the equity return dispersions and the return on aggregate market portfolio holds which is consistent with the rational asset pricing models. However, if the coefficient $\beta_2$ is significantly negative, it implies that the herding behaviour has presented in that stock market.

In order to further examine whether the return's dispersion behaves differently in an up or down market, in different periods of trading volume (high or low) and trading volatility (high or low), the equations generated, by making use of the way Chiang and Zheng (2010) and Economou, Kostakis and Philippas (2011) to express different market conditions with dummy variables, are as follows. In addition, all of these are carried out again during the interval of structural change periods.

$$CSAD_t = \beta_0 + \beta_1 D^{UP}\left|R_{m,t}\right| + \beta_2(1-D^{UP})\left|R_{m,t}\right| + \beta_3 D^{UP}(R_{m,t})^2 + \\ + \beta_4(1-D^{UP})(R_{m,t})^2 + \varepsilon_t \tag{3}$$

where $D^{UP}$ is dummy variable with a value of 1 for those days with positive market returns and 0 for those days with other conditions. According to parameters in Equation (3), If $\beta_1 > 0$ and $\beta_2 > 0$, it means that there are no herding effects in the stock market. In contrast, when we continue to check, if $\beta_3 < 0$ and $\beta_4 < 0$, we can conclude that herding effects are present in this stock market. even, if $\beta_3 < \beta_4$, we can conclude that the herding effect is more significant during the period with positive market returns.

The equation that shows the asymmetric behaviour of return dispersion with respect to market volatility is as follows:

$$CSAD_t = \beta_0 + \beta_1 D^{HVOL}\left|R_{m,t}\right| + \beta_2(1-D^{HVOL})\left|R_{m,t}\right| + \beta_3 D^{HVOL}(R_{m,t})^2 + \\ + \beta_4(1-D^{HVOL})(R_{m,t})^2 + \varepsilon_t \tag{4}$$

where $D^{HVOL}$ is dummy variable with a value of 1 for those days with high trading volume (higher than previous 30 days trading volume moving average) and 0 for those days with other conditions. Descriptions of other variables and parameters in equation (3) are as in equation (2).

The equation measuring herd behaviour during periods of economic, local-political and geopolitical crisis is presented below:

$$CSAD_t = \beta_0 + \beta_1 \left| R_{m,t} \right| + \beta_2 (R_{m,t})^2 + \beta_3 D^{CRISIS} (R_{m,t})^2 + \varepsilon_t \quad (5)$$

where $D^{CRISIS}$ is dummy variable with a value of 1 for those days economic, local-political and geopolitical crisis periods and 0 for those days with other conditions. According to parameters in Equation (5), a negative and statistically significant $\beta_3$ coefficient in regression reflects herding towards the during crisis periods.

In this study, herd behaviour during election periods was also measured with the following equation:

$$CSAD_t = \beta_0 + \beta_1 \left| R_{m,t} \right| + \beta_2 (R_{m,t})^2 + \beta_3 D^{BEFORE} (R_{m,t})^2 + \beta_4 D^{AFTER} (R_{m,t})^2 + \varepsilon_t \quad (6)$$

where $D^{BEFORE}$ is a dummy variable that takes a value of 1 in the 30-day period before the election and 0 otherwise. $D^{AFTER}$ on the other hand, is a dummy variable that takes a value of 1 in the 30-day post-election period and 0 otherwise. According to parameters in Equation (6), a negative and statistically significant coefficient shows the herd behaviour before the election periods, while the $\beta_4$ coefficient with similar characteristics shows the post-election herd behaviour.

## 3. Results

This study uses daily stock returns from BIST 100 from January 4, 1993, to May 7, 2019. As it is aimed to test whether herding behaviours in the Turkish stock market exist for situations in different period intervals when there are structural changes in the BIST 100 index, Firstly, we determined how many structural changes occurred for the BIST 100 index during that date range.

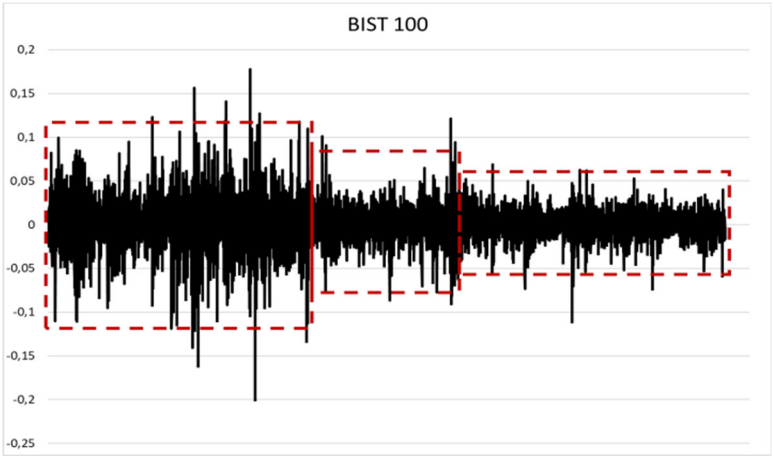
ICSS (Iterative Cumulative Sum of Squares) algorithm is a method used to detect structural breaks in time series. Inclan and Tiao (1994) developed it to detect sudden changes in volatility. The ICSS algorithm is based on the principle of iteratively calculating the cumulative sum of squares in the dataset. The algorithm identifies potential break points in the series, dividing the dataset into homogeneous subgroups. This allows for a better understanding and analysis of the time series' behavior in different periods. Aggarwal, Inclan and Leal (1999) study examined the use of the ICSS algorithm in developed and emerging markets. The study found that local events, such as the Mexican Peso Crisis, the hyperinflation period in Latin America, and the stock market scandal in India, coincided with structural breaks detected by the algorithm. Similarly, other studies in the context of emerging markets have been conducted by Kasman (2009), Todea and Petrescu (2012), and Çağli, Mandaci and Kahyaoğlu (2012). These studies have shown that structural breaks are concurrent with events of local and political importance, and that

the persistence of structural break volatility decreases with such events. These findings suggest that the ICSS algorithm is an effective tool for detecting events that signal significant changes in market dynamics. Therefore, in our research, we utilized the ICSS algorithm to detect structural breaks.

Figure 1 presents the volatility graph of the BIST 100 index and the structural break periods calculated using the ICSS algorithm. As a result of the analysis, two structural break periods were identified as 14 April 2003 and 8 June 2009. In addition, Cross Sectional Absolute Deviation of equally weighted portfolios is given in Figure 2.

F i g u r e 1

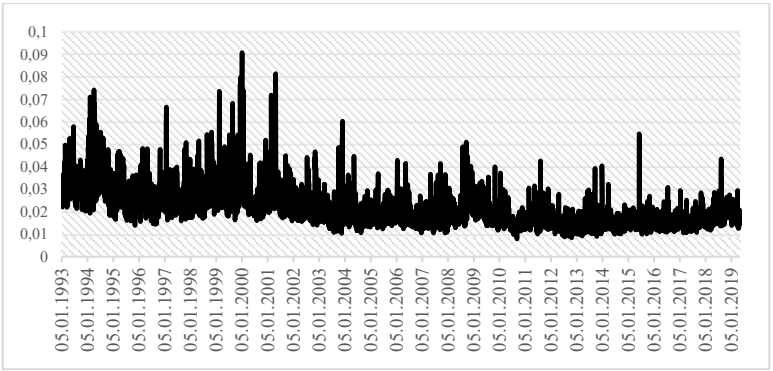
**The Volatility Graph of the BIST 100 Index and the Structural Break Periods Calculated According to the ICSS Algorithm**




*Source*: Author's estimations.

F i g u r e 2

**Cross Sectional Absolute Deviation (CSAD)**




*Source*: Author's estimations.

In both figures, it is remarkable that the fluctuations were at higher levels in the 90s which decreased over time. The first structural break period, 14 April 2003, covers the period when the coalitions ended with the elections that took place after the banking crisis in Turkey and the single party rule began. The second structural break in 8 June 2009 coincides with the recovery period of the markets after the 2008 global economic crisis. After this date, volatility in the Turkish market has decreased relatively. In Table 2, CSAD values for the entire sample and structural break periods and average market returns of equally weighted portfolios are presented.

T a b l e 2

**Descriptive Statistics**

| **Summary statistics** | **All period** | | **First period** | | **Second period** | | **Third period** | |
|---|---|---|---|---|---|---|---|---|
| | *CSAD* | $R_m$ | *CSAD* | $R_m$ | *CSAD* | $R_m$ | *CSAD* | $R_m$ |
| Mean | 0.021 | 0.016 | 0.028 | 0.024 | 0.018 | 0.015 | 0.015 | 0.010 |
| Median | 0.018 | 0.011 | 0.026 | 0.018 | 0.017 | 0.012 | 0.015 | 0.008 |
| Std. dev. | 0.008 | 0.017 | 0.008 | 0.022 | 0.005 | 0.013 | 0.003 | 0.009 |
| Skewness | 1.711 | 2.684 | 1.648 | 2.092 | 2.170 | 2.135 | 2.263 | 2.136 |
| Kurtosis | 7.726 | 15.090 | 7.892 | 10.090 | 11.541 | 11.589 | 14.461 | 11.675 |
| Observations | 6577 | | 2544 | | 1538 | | 2493 | |

*Notes*: This table reports descriptive statistics for the measure of daily cross-sectional absolute deviation (*CSAD*) of individual stock returns with respect to the market portfolio return and the market return ($R_m$).

*Source*: Author's estimations.

When Table 2 is examined, it is seen that the highest average market return was 0.024 in the first period (04/01/1993 – 13/04/2003), and the lowest average return was 0.01 in the third period (08/06/2009 – 07/05/2019). While CSAD values were 0.021 in the entire sample, it was 0.028 in the first period and 0.015 in the third period.

T a b l e 3

**Estimates of Herding Behaviour in the Full Sample and Structural Breaking Periods**

| **Breakdates** | **Constant** | $\beta_1$ | $\beta_2$ | **Adj. $R^2$** | **F-statistic** | **Obs** |
|---|---|---|---|---|---|---|
| *All period*<br>(04/01/1993 – 07/05/2019) | 0.0157<br>(62.78)*** | 0.3679<br>(21.67)*** | –11.053<br>(–5.41)*** | 0.34 | 1 705.4*** | 6 577 |
| *First period*<br>(04/01/1993 – 13/04/2003) | 0.0235<br>(55.75)*** | 0.2205<br>(9.96)*** | –0.5314<br>(–2.20)** | 0.21 | 319.7*** | 2 544 |
| *Second period*<br>(14/04/2003 – 07/06/2009) | 0.0152<br>(62.76)*** | 0.1838<br>(8.02)*** | 1.318<br>(2.82)*** | 0.48 | 716.1*** | 1 538 |
| *Third period*<br>(08/06/2009 – 07/05/2019) | 0.0136<br>(74.70)*** | 0.2014<br>(7.95)*** | 0.5381<br>–0.72 | 0.32 | 586.8*** | 2 493 |

*Notes*: This table reports the estimated coefficients for the benchmark model:

$CSAD_t = \beta_0 + \beta_1 \left| R_{m,t} \right| + \beta_2 (R_{m,t})^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for cross-sectional absolute deviation of stock returns with respect to the market portfolio return $R_{m,t}$ for each market *i*. *t*-Statistics are given in parentheses, calculated using Newey-West heteroscedasticity and autocorrelation consistent standard errors. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

*Source*: Author's estimations.

In Table 3, herd behaviour was explored with three different models in the entire sample and in the structural break periods separately. It is seen in Table 3 that the established models are significant and their adjusted $R^2$s are above 21%. When the model results are examined, it is seen that the CSAD coefficient is positive and significant in entire sample and structural break periods in Borsa Istanbul (BIST).

According to the table results, herd behaviour was detected in the entire sample (04/01/1993 – 07/05/2019) and at the first structural break period (04/01/1993 – 13/04/2003).

T a b l e 4

**Estimates of Herding Behaviour in Rising and Declining Markets**

| Breakdates | Constant | $\beta_1$ | $\beta_2$ | $\beta_3$ | $\beta_4$ | Adj. $R^2$ | F-statistic | Obs |
|---|---|---|---|---|---|---|---|---|
| *All period* (04/01/1993 – 07/05/2019) | 0.0157 (61.92)*** | 0.4035 (20.39)*** | 0.3354 (17.99)*** | –11.151 (–3.84)*** | –12.786 (–6.66)*** | 0.35 | 899.3*** | 6 577 |
| *First period* (04/01/1993 – 13/04/2003) | 0.0236 (55.56)*** | 0.2686 (10.93)*** | 0.1593 (5.98)*** | –0.6868 (–2.17)** | –0.396 (–1.46) | 0.23 | 189.84*** | 2 544 |
| *Second period* (14/04/2003 – 07/06/2009) | 0.0152 (63.35)*** | 0.2112 (8.57)*** | 0.1556 (5.92)*** | 11.578 (2.22)** | 14.545 (0.01)** | 0.48 | 368.6*** | 1 538 |
| *Third period* (08/06/2009 – 07/05/2019) | 0.0136 (80.84)*** | 0.1779 (6.59)*** | 0.196 (7.97)*** | 17.111 (1.74)* | 0.2932 (0.40). | 0.32 | 298.1*** | 2 493 |

*Notes*: This table reports the estimated coefficients for the model: $CSAD_t = \beta_0 + \beta_1 D^{UP} \left|R_{m,t}\right| + \beta_2 (1 - D^{UP}) \left|R_{m,t}\right| + \beta_3 D^{UP} (R_{m,t})^2 + \beta_4 (1 - D^{UP}) (R_{m,t})^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for cross-sectional absolute deviation of stock returns with respect to the market portfolio return $R_{m,t}$ for each market $i$ and $D^{UP}$ is a dummy variable that takes the value 1 on days with positive market returns and the value 0 otherwise. $t$-Statistics are given in parentheses, calculated using Newey-West heteroscedasticity and autocorrelation consistent standard errors. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

*Source*: Author's estimations.

Asymmetric herd behaviour results for all periods and structural break periods in rising and falling markets are presented in Table 4. When the model results are examined, $\beta_1$ and $\beta_2 > 0$ and significant in all models. When the $\beta_3$ and $\beta_4$ coefficients are examined, it is observed that the coefficients are negative in the entire sample covering the period 4 Jan 1993 – 7 May 2019, and the asymmetric herd behaviour is stronger especially during the falling market periods. When the structural break periods are analyzed, asymmetric herd behaviour is observed only on the days with positive market returns in the first period which covers 4 Jan 1993 – 13 Apr 2003.

T a b l e 5

**Estimates of Herding Behaviour on Days of High and Low Volatility**

| Breakdates | Constant | $\beta_1$ | $\beta_2$ | $\beta_3$ | $\beta_4$ | Adj. $R^2$ | F-statistic | Obs |
|---|---|---|---|---|---|---|---|---|
| *All period* (04/01/1993 – 07/05/2019) | 0.0157 (62.15)*** | 0.3668 (17.84)*** | 0.3721 (14.65)*** | –10.628 (–4.55)*** | –1.21 (–3.35)*** | 0.34 | 852.8*** | 6 577 |
| *First period* (04/01/1993 – 13/04/2003) | 0.0236 (55.72)*** | 0.2374 (8.95)*** | 0.2049 (6.46)*** | –0.6213 (–2.33)** | –0.5128 (–1.23) | 0.21 | 162.1*** | 2 544 |
| *Second period* (14/04/2003 – 07/06/2009) | 0.0155 (58.40)*** | 0.1821 (7.41)*** | 0.0873 (2.19)** | 12.085 (2.66)** | 40.182 (3.401)*** | 0.48 | 366.4*** | 1 538 |
| *Third period* (08/06/2009 – 07/05/2019) | 0.0137 (80.46)*** | 0.2187 (8.86)*** | 0.1323 (5.00)*** | 0.1258 –0.18 | 26.175 (2.68)*** | 0.32 | 301.2*** | 2 493 |

*Notes*: This table reports the estimated coefficients for the model: $CSAD_t = \beta_0 + \beta_1 D^{HVOL} |R_{m,t}| + \beta_2 (1 - D^{HVOL}) |R_{m,t}| + \beta_3 D^{HVOL} (R_{m,t})^2 + \beta_4 (1 - D^{HVOL})(R_{m,t})^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for cross-sectional absolute deviation of stock returns with respect to the market portfolio return $R_{m,t}$ for each market $i$ and $D^{HVOL}$ is a dummy variable that takes the value 1 on days with positive market returns and the value 0 otherwise. $t$-Statistics are given in parentheses, calculated using Newey-West heteroscedasticity and autocorrelation consistent standard errors. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

*Source*: Author's estimations.

Table 5 presents the results of asymmetric herd behaviour during periods of high and low volatility. When the table results are examined, herd behaviour is observed in both high and low volatility days in the entire sample period.

However, it is seen that the herd behaviour is stronger in low volatility periods. Besides, asymmetric herd behaviour was detected only during the first structural break period (4 Jan 1993 – 13 Apr 2003) when the market was highly volatile. Up to this stage, herd behaviour and asymmetry in Borsa Istanbul have been examined for the entire sample and structural break periods. As a result, it has been determined that all models include herd behaviour for the period 4 Jan 1993 – 7 May 2019.

However, while there was herd behaviour and asymmetry only in the first period during structural break periods, no herd behaviour was observed in other periods. Since Turkey is an economically and politically fragile country, in this section, the sample has been narrowed down to investigate the impact of more specific events and crises, and herd behaviour in times of crisis has been analyzed.

In this framework, firstly, using equation 5, economic, geopolitical and local political crisis periods were determined. Dummy variables were assigned to the days when there was a crisis and its effect lasted, and 0 was assigned to the other days; thus the impact of each event was examined separately.

T a b l e 6

**Estimates of Herding Behaviour during Economic Crisis Period**

| Economic crisis period | Constant | $\beta_1$ | $\beta_2$ | $\beta_3$ | Adj. $R^2$ | F-statistic |
|---|---|---|---|---|---|---|
| *The 1994 Currency Crisis in Turkey* (03/01/1994 – 01/12/1994) | 0.0158 (62.94)*** | 0.3616 (21.92)*** | –11.109 (–5.63)*** | 0.9143 –1.61 | 0.342 | 1 148.4*** |
| *Peso Crisis* (02/12/1994 – 31/07/1995) | 0.0158 (62.86)*** | 0.3645 (21.59)*** | –10.951 (–5.42)*** | 16.181 (2.47)** | 0.341 | 1 145.1*** |
| *Asia Financial Crisis* (01/07/1997 – 31/03/1998) | 0.0157 (62.63)*** | 0.3686 (21.40)*** | –10.918 (–5.21)*** | –0.4383 (–1.69)* | 0.340 | 1 138.5*** |
| *Russia Crisis* (03/08/1998 – 26/03/1999) | 0.0157 (62.63)*** | 0.368 (21.29)*** | –11.068 (–4.93)*** | 0.0065 –0.02 | 0.341 | 1 136.7*** |
| *Dotcom Buble* (04/01/2000 – 29/06/2000) | 0.0157 (63.12)*** | 0.3682 (21.77)*** | –11.532 (–5.68)*** | 0.8758 (2.06)** | 0.341 | 1 144.4*** |
| *2001 Banking and Currency Crisis in Turkey* (02/10/2000 – 28/12/2001) | 0.0158 (109.37)*** | 0.3620 (35.73)*** | –0.9782 (–7.75)*** | –0.2016 (–1.816)* | 0.340 | 1 138.3*** |
| *Mortgage Crisis* (02/01/2008 – 30/12/2009) | 0.0157 (62.59)*** | 0.3693 (21.36)*** | –11.011 (–5.28)*** | –0.4366 (–1.37)* | 0.341 | 1 138.4*** |
| *Europe Debt Crisis* (04/01/2010 – 30/12/2011) | 0.0157 (62.80)*** | 0.3762 (22.16)*** | 1.163 (–5.75)*** | –42.563 (–3.81)*** | 0.347 | 1 165.9*** |
| *Exchange Rate Crisis in Turkey* (02/01/2018 – 07/05/2019) | 0.0157 (62.79)*** | 0.3708 (21.83)*** | –11.294 (–5.56)*** | –35.882 (–4.13)*** | 0.342 | 1 143.4*** |

*Notes*: This table reports the estimated coefficients for the model:

$CSAD_t = \beta_0 + \beta_1 \left| R_{m,t} \right| + \beta_2 (R_{m,t})^2 + \beta_3 D^{CRISIS} (R_{m,t})^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for cross-sectional absolute deviation of stock returns with respect to the market portfolio return $R_{m,t}$ for each market $i$ and $D^{CRISIS}$ is a dummy variable that takes the value 1 on days with economic crisis period and the value 0 otherwise. The analysis has been conducted over the entire sample (number of observations: 6577), with dummy variables assigned to crisis dates. *t*-Statistics are given in parentheses, calculated using Newey-West heteroscedasticity and autocorrelation consistent standard errors. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

*Source*: Author's estimations.

Table 6 offers results related to the impact of herd behaviour in different economic crisis periods that occurred at global and local scale. A total of 9 economic crisis periods were identified within the sample period, 6 of which were global while 3 were local. When the table results are examined, it has been found out that herd behaviour is observed in Borsa Istanbul during the Asia Financial Crisis, Mortgage Crisis and Europe Debt Crisis periods. In addition, herd behaviour was observed in the 2001 Banking Crisis and 2018 Exchange Rate Crisis, which represent the local economic crisis periods in the country's stock market.

Table 7 presents the results regarding the herd behaviour during periods of significant local political crisis in Turkey. Four of these local political crises are coup attempts, and one is a popular uprising.

When the results of Table 7 are compared with the benchmark model (Table 3), herd behaviour was not found in the second and third structural break periods, but

when local political crises are considered alone, the herd behaviour effect is highly visible. When the table results are examined, herd behaviour has been determined in all local political crisis periods, except for the Post-Modern Coup (02/10/1996 – 18/06/1997). In Gezi Park protests and Judicial Coup Attempt events, this relationship is significant at the 1% level while it is at the 5% significance level in the 15 July coup attempt.

T a b l e 7

**Estimates of Herding Behaviour during Local Political Crises Period**

| Local political crises | Constant | $\beta_1$ | $\beta_2$ | $\beta_3$ | Adj. $R^2$ | F-statistic |
|---|---|---|---|---|---|---|
| *Post-Modern Coup* (02/10/1996 – 18/06/1997) | 0.0157 (63.22)*** | 0.3676 (22.26)*** | –11.314 (–5.870)*** | 0.7681 (2.765)*** | 0.34 | 1 141.3*** |
| *e-Memorandum* (12/04/2007 – 22/07/2007) | 0.0157 (62.78)*** | 0.3688 (21.70)*** | –11.124 (–5.45)*** | –34.829 (–1.65)* | 0.34 | 1 138.1*** |
| *Gezi Park Protests* (27/05/2013 – 16/06/2013) | 0.0157 (62.53)*** | 0.3687 (21.49)*** | –10.955 (–5.25)*** | –19.745 (–4.28)*** | 0.34 | 1 143.7*** |
| *Judicial Coup Attempt* (17/11/2013 – 10/08/2014) | 0.0157 (62.76)*** | 0.37 (21.85)*** | –11.263 (–5.53)*** | –50.925 (–3.570)*** | 0.34 | 1 149.3*** |
| *15 July Coup Attempt* (15/07/2016 – 31/12/2016) | 0.0157 (62.72)*** | 0.369 (21.70)*** | –11.105 (–5.43)*** | –35.598 (–1.956)** | 0.34 | 1 141.6*** |

*Notes*: This table reports the estimated coefficients for the model:

$CSAD_t = \beta_0 + \beta_1 \left| R_{m,t} \right| + \beta_2 (R_{m,t})^2 + \beta_3 D^{CRISIS} (R_{m,t})^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for cross-sectional absolute deviation of stock returns with respect to the market portfolio return $R_{m,t}$ for each market $i$ and $D^{CRISIS}$ is a dummy variable that takes the value 1 on days with economic crisis period and the value 0 otherwise. The analysis has been conducted over the entire sample (number of observations: 6577), with dummy variables assigned to crisis dates. *t*-Statistics are given in parentheses, calculated using Newey-West heteroscedasticity and autocorrelation consistent standard errors. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

*Source*: Author's estimations.

Table 8 presents the results of the herd behaviour in periods of geopolitical crisis. When the results are analyzed, herd behaviour can be observed in all geopolitical crisis periods, except the September 11 crisis.

The relationship found is significant at 1% significance level in all geopolitical crisis periods. The geopolitical crisis, in which the herd behaviour was most effective, emerged after the attack of the Israeli military forces on the Mavi Marmara ship ($\beta_3$ = –27,457).

When the results of Tables 6, 7 and 8 are evaluated together with the benchmark model, although herd behaviour is not observed during the relevant structural break periods, the herd behaviour effect is observed in some economic, local political and geopolitical crisis periods. In these crisis periods, it is observed that geopolitical crises have a more pronounced effect on herd behaviour than economic and local political crises.

T a b l e 8

**Estimates of Herding Behaviour during Geopolitical Crises Period**

| Geopolitical crises | Constant | $\beta_1$ | $\beta_2$ | $\beta_3$ | Adj. $R^2$ | F-statistic |
|---|---|---|---|---|---|---|
| *11 September* (11/09/2001 – 28/12/2001) | 0.0157 (62.77)*** | 0.3684 (21.57)*** | –11.069 (–5.41)*** | –0.292 –0.97 | 0.34 | 1136.9*** |
| *Irak War* (03/03/2003 – 13/12/2003) | 0.0157 (62.10)*** | 0.3666 (20.77)*** | –10.542 (–4.83)*** | –12.009 (–7.51)*** | 0.34 | 1145.7*** |
| *Mavi Marmara Attact (Gaza Flotilla Raid)* (31/05/2010 – 03/12/2010) | 0.0157 (62.82)*** | 0.3681 (21.71)*** | –11.083 (–5.43)*** | –274.576 (–6.43)*** | 0.34 | 1141.6*** |
| *Syrian Civil War* (15/03/2011 – 31/05/2011) | 0.0157 (62.78)*** | 0.3686 (21.75)*** | –11.123 (–5.46)*** | –76.215 (–8.36)*** | 0.34 | 1139.7*** |
| *Fighter Jet Crisis in Turkish-Russian* (24/11/2015 – 09/08/2016) | 0.0157 (62.79)*** | 0.3699 (21.85)*** | –11.224 (–5.53)*** | –91.332 (–6.12)*** | 0.34 | 1147.5*** |
| *Operation Euphrates Shield* (24/08/2016 – 29/03/2017) | 0.0158 (62.84)*** | 0.3691 (21.78)*** | –11.166 (–5.49)*** | –90.467 (–2.97)*** | 0.34 | 1144.7*** |
| *Operation Olive Branch* (20/01/2018 – 24/03/2018) | 0.0157 (62.78)*** | 0.3682 (21.71)*** | –11.088 (–5.43)*** | –132.679 (–5.71)*** | 0.341 | 1138.4*** |

*Notes*: This table reports the estimated coefficients for the model:

$CSAD_t = \beta_0 + \beta_1 \left|R_{m,t}\right| + \beta_2 (R_{m,t})^2 + \beta_3 D^{CRISIS} (R_{m,t})^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for cross-sectional absolute deviation of stock returns with respect to the market portfolio return $R_{m,t}$ for each market $i$ and $D^{CRISIS}$ is a dummy variable that takes the value 1 on days with economic crisis period and the value 0 otherwise. The analysis has been conducted over the entire sample (number of observations: 6577), with dummy variables assigned to crisis dates. *t*-Statistics are given in parentheses, calculated using Newey-West heteroscedasticity and autocorrelation consistent standard errors. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

*Source*: Author's estimations.

Finally, the herd behaviour before and after the election periods was examined. Election periods can have positive or negative effects on investors as they cause economic and political policy changes that may occur after a possible change in power. While analyzing this effect in Turkey, first of all, the entire sample period was examined.

Afterwards, the election periods when coalition governments were formed and the periods when one-party government was formed were discussed separately. Coalition periods pose more risks for investors due to problems such as the formation or failure of governments, the dissolution of the coalition, and the holding of early elections. On the contrary, periods of single-party rule lead to positive expectations in the markets, at least for a certain period of time. In this framework, according to the model results in Table 9, no pre-election and post-election herd behaviour was found in our model covering all election periods (04/01/1993 – 07/05/2019). However, it was observed that herd behaviour emerged before the elections, especially during the coalition governments (04/01/1993 – 14/04/2003).

T a b l e 9

**Estimates of Herding Behaviour during Election Period**

| Election Periods | Constant | $\beta_1$ | $\beta_2$ | $\beta_3$ | $\beta_4$ | Adj. $R^2$ | F Statistic |
|---|---|---|---|---|---|---|---|
| *All elections* (04/01/1993 – 07/05/2019) | 0.0157 (62.99)*** | 0.3688 (21.74)*** | –11.028 (–5.35)*** | –0.4087 (–1.53) | 0.1294 –0.32 | 0.34 | 853.6*** |
| *Coalition periods* (04/01/1993 – 13/04/2003) | 0.0238 (54.54)*** | 0.2231 (9.67)*** | –0.5365 (–2.11)** | –0.4161 (–1.87)* | 0.333 (0.46) | 0.20 | 152.1*** |
| *Single-party rule periods* (14/04/2003 – 07/05/2019) | 0.0141 (93.21)*** | 0.1934 (11.83)*** | 10.982 (2.83)*** | 15.779 (2.41)** | 12.215 (1.84)* | 0.43 | 759.2*** |

*Notes*: This table reports the estimated coefficients for the model: $CSAD_{t_p} = \beta_0 + \beta_1 \left|R_{m,t_p}\right| + \beta_2 (R_{m,t_p})^2 + \beta_3 D^{BEFORE} (R_{m,t_p})^2 + \beta_4 D^{AFTER} (R_{m,t_p})^2 + \varepsilon_{t_p}$, where $CSAD_{i,t}$ stands for cross-sectional absolute deviation of stock returns with respect to the market portfolio return $R_{m,t}$ for each market $i$ and $D^{BEFORE}$ is a dummy variable that takes a value of 1 in the 30-day period before the election and 0 otherwise. $D^{AFTER}$ on the other hand, is a dummy variable that takes a value of 1 in the 30-day post-election period and 0 otherwise. $t$-Statistics are given in parentheses, calculated using Newey-West heteroscedasticity and autocorrelation consistent standard errors. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

*Source*: Author's estimations.

## Conclusion

In this study, herd behaviour in the Turkish stock market (Borsa Istanbul) has been extensively investigated. The study makes an important contribution to the existing literature due to the different dimensions it contains. First of all, this research has a large sample covering the period from 4 January 1993 to 7 May 2019. In addition, it is important both to see the general framework of herd behaviour in all periods and to determine the herd and asymmetrical herd behaviour of this sample in different structural break periods. In addition to the herd behaviour in periods of economic crisis, which has been discussed in different studies before, the most important contribution of this research to the literature is the herd behaviour during local political and geopolitical crisis periods and election periods.

According to the results of the study, it was concluded that there was herd behaviour in Borsa Istanbul in the entire sample covering the period from 4 January 1993 to 7 May 2019. In addition, it has been found that such herd behaviour is observed in both rising and falling markets, and this effect is stronger especially in falling markets. This outcome is consistent with the studies by Altay (2008) and Kayalidere (2012), which indicate that herd behaviour is observed in both bull and bear markets. Particularly, the finding that herd behaviour is stronger in bear markets suggests that investors tend to exhibit more herd behaviour during periods of uncertainty and that investors have a tendency to avoid risk. In addition, while herd behaviour is observed on high and low volatility days, it is seen that herd

behaviour is stronger on low volatility days. This finding establishes an indirect connection with the herd behaviour observed in high and extreme volatility regimes by Balcilar and Demirer (2015), demonstrating the diversity of volatility's impact on herd behaviour. Simultaneously, the observation of herd behaviour in low volatility situations by Afşar, Akseki and Kisava (2022) directly supports our findings.

In the study, two structural break periods, namely April 14, 2003 and June 7, 2009, were determined in the Borsa Istanbul (BIST 100) index by using the ICSS algorithm. With these structural break dates, our sample was divided into three structural break periods, and herd and asymmetric herd behaviour were examined. According to the results of the study, herd behaviour was detected in all models only in the first structural break period covering the 4 Jan 1993 – 13 Apr 2003 interval. In addition, asymmetric herd behaviour was observed on days with positive market returns and high volatility. At the same time, this situation emphasizes the significant and differentiated impact of market conditions on investor behaviours. These findings align with the results of the studies by Yasir and Önder (2023) and Doğukanlı and Ergün (2015), shedding light on the asymmetric effects of structural breaks and market dynamics on herd behaviour.

In the study, herd behaviour was examined for economic, local-political and geopolitical crisis periods in some crisis periods within the entire sample period by going into a little more detail. According to the results of the study, it has been determined that herd behaviour has been observed in all economic crises since the Asian crisis and especially since 2001 (2001 Banking and Currency Crisis in Turkey, Mortgage Crisis, Europe Debt Crisis, Exchange Rate Crisis in Turkey). In the Borsa Istanbul, Altay (2008) during the 2001 Banking and Currency Crisis in Turkey, as well as Demir, Mahmud and Solakoglu (2014), and Balcilar and Demirer (2015), have found similar findings for the 2001 and 2008 crises.

Likewise, according to the results, local-political instabilities such as e-Memorandum, Gezi Park protests, Judicial Coup Attempt, and 15 July coup attempt, with the exception of the Post-Modern Coup, were seen to cause herd behaviour. This result supports the argument of Perotti and Van Oijen (2001) and Pástor and Veronesi (2013) that "returns are subject to serious fluctuations due to an increase or decrease in political risk". During the Gezi Park protests, Akçaalan, Dindaroğlu and Binatlı (2019) found that the herd behaviour index reached its highest level, while Tiniç and Savaser (2020) identified an increase in the sales-oriented foreign transaction volume. In addition, it was concluded that geopolitical crises in and around Turkey such as Iraq War, Mavi Marmara attack, Syrian civil war, Fighter Jet Crisis in Turkish-Russian, Operation Euphrates Shield and Operation Olive Branch, with the exception of September 11, caused herd behaviour on Borsa

Istanbul. This result supports the findings of Indārs, Savin and Lublóy (2019) in the Moscow Stock Exchange and confirms the thesis of Rigobon and Sack (2005) that "in the periods when geopolitical risks arise, investors move away from risky assets". This is due to the fact that, in times of political turmoil, higher uncertainties usually prevail and investors tend to turn to more liquid assets. When the effects of economic, local-political and geopolitical crises are evaluated together, it can be claimed that geopolitical crises affect herd behaviour more than local-political and economic crises.

Finally, the herd behaviour before and after the election periods was examined. When all election periods were evaluated together, no pre-election and post-election herd behaviour was found. However, when the sample is analyzed by dividing into two periods, namely the period of coalition governments and the period of one-party government, evidence for the existence of herd behaviour was found before the elections in the period of coalition governments (04/01/1993 – 13/04/2003). These findings are in contradiction with Mandacı (2003), who identified no significant differences in abnormal returns during pre-election periods. This result shows that uncertainty is higher in the elections in the coalition periods compared to the single-party governments and that the investors leave the stock market in the pre-election periods.

The primary limitation of the study is the occasional intertwinement of economic, local political, and geopolitical crisis periods. This entanglement complicates the differentiation of the effects of various events on each other during a specific period, particularly their impacts on herd behaviour.

The results of the research provide important benefits for both corporate and individual investors and policy makers. Turkish economy has a fragile structure, and especially economic, political and geopolitical instabilities affect Borsa Istanbul negatively. Therefore, in order to reduce portfolio risk, investors should reduce their risks by adding investment instruments other than stocks to their portfolios and, if possible, through international diversification. In addition, policy makers can generate early warning signals from herd behaviour and take the necessary actions before the crisis deepens, in case the herd effect in the markets intensifies and turns into an economic crisis. In future studies, a more comprehensive comparative analysis of the market-wide behaviour of foreign and domestic investors, especially during local political and geopolitical crisis periods, can fill a major gap in the literature. In addition, there is a need for detailed studies that examine herding behaviour in Borsa Istanbul according to fundamental and non-fundamental factors. This will help us to understand how investors process information in their market decisions and under which conditions herding behaviour becomes more pronounced.

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