



HERD BEHAVIOR IN BANK LENDING: EVIDENCE FROM PARTICIPATION BANKS IN TURKEY

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Abstract

This paper aims to examine participation banks' herd behavior in their lending decisions in Turkey. Herding was analyzed by using the Lakonishock, Shleifer and Vishny (LSV) and Frey, Herbst and Walter (FHW) herding measures during the period from 2010 to 2020. The study allows to calculate the LSV and FHW measures for loans outstanding to eight different industries, as well. The results provided an evidence of significant herding in participation banks' lending decisions during the entire sample. On the other hand, banks' lending decisions tend to be affected more, in particular, during fluctuations in the market. Wholesale trade&brokerage and construction industries are dominant borrowers under these uncertain conditions. Consistently, banks do not prefer to herd in their lending decisions to industries which small sized businesses mostly operate in due to the fact that gathering information is much more difficult.

Keywords: Participation Banks, Herd Behavior, LSV Measure, FHW Measure.

JEL Classification: G21, G29, G40.

BANKA FİNANSMANINDA SÜRÜ DAVRANIŞI: TÜRKİYE'DE KATILIM BANKALARI ÜZERİNE BİR ARAŞTIRMA

Öz

Bu çalışma Türkiye'de katılım bankalarının finansman kararlarındaki sürü davranışlarını incelemeyi amaçlamaktadır. Sürü davranışı, 2010-2020 dönemleri arasında Lakonishock, Shleifer ve Vishny (LSV) ve Frey, Herbst ve Walter (FHW) ölçümleri kullanılarak analiz edilmiştir. Bununla birlikte, bu çalışma sekiz farklı sektöre verilen finansman için LSV ve FHW değerlerinin hesaplanmasına olanak sağlamaktadır. Sonuçlar, katılım bankalarının finansman kararlarında sürü davranışında bulduklarını göstermektedir. Öte yandan, bankalar, özellikle piyasadaki dalgalanmalar sırasında daha fazla finansman desteği verme eğilimindedirler. Bu belirsiz koşullar altında toptan ticaret ve komisyonculuk ile inşaat sektörleri piyasayı domine eden sektörler arasında yer almaktadır. Aynı zamanda, bankalar bilgiye ulaşmanın daha zor olması sebebiyle, çoğunlukla küçük işletmelerin faaliyet gösterdikleri sektörlerde finansman desteği verirken sürü davranışında bulunmayı tercih etmemektedirler.

Anahtar Kelimeler: Katılım Bankaları, Sürü Davranışı, LSV Ölçümü, FHW Ölçümü.

JEL Sınıflandırması: G21, G29, G40.

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1. Introduction

Participation banking system receives funds based on the principle of participation to profit and loss. They utilize lending activities according to the interest-free financing principles through methods such as leasing, partnership and trading (Sayım and Alakel, 2011; Karapınar and Dogan 2015). All the specific activities make participation banking unique in banking field. The interest-free banking system has developed not only in Islamic countries but also in the ones such as the UK and the USA as a result of the integration in the global financial markets. In Turkey, Private Finance Institutions which were laid in 1983 were renamed as Participation Bank with the legislative change in 2005. Participation banks have shown great progress in the last decade in Turkey and have reached to the capability to compete with other banks.

One of the issues to be discussed is whether participation banks are irrational in Turkey. Inefficiency of these financial institutions has been evaluated as evidence for the irrationality, in particular, under uncertain and risky market conditions. One of the anomaly regarding the irrationality is considered as herd behavior that refers to the cases of making same or similar decisions (Liu, 2014). Herding can be observed either when banks share the same information and face similar circumstances rationally, or when intentionally imitating the lending behavior of each other (Liu, 2014). For instance, banks tend to herd when making decision to lend money to borrower firms if they do not have enough information on the profitability of them. In other words, they follow the other banks' lending activities because they believe that the decisions of them appear to indicate the profitability of firms. This behavior sometimes leads them to misallocate financial resources due to providing loans to unprofitable borrowers. On the other hand, if the firms chosen by other banks are profitable, banks tend to imitate them to allocate financial resources efficiently (Nakagawa et al., 2012). Banks may also herd in response to changes in macroeconomic conditions or changes in regulatory environment or characteristics of banks. These changes induce them to exhibit correlated behaviors and imitate each other, spuriously (Liu, 2014).

While most of the empirical studies place the focus on the motivations behind the herd behavior in the stock markets, there have been only a few studies examining the extent that herd behavior exists in banks' lending decisions. Within this context, this paper fills the gap and detects Turkish participation banks' herd behavior during the period from 2010 to 2020. The methodologies of Lakonishock, Shleifer and Vishny (LSV) and Frey, Herbst and Walter (FHW) are utilized for measurement.

This study gives a detailed explanation on herd behavior, at first. The literature review is summarized, the data and methodology is presented and the results are reported, then. At last, the paper is concluded.

2. Herd Behavior

Herding is a hot topic that has been widely studied in the behavioral finance literature over the past decade. In case of herding, investors suppress their own information and beliefs, and decide based on actions of other investors who trade in the market, even if they disagree with their predictions (Christie and Huang, 1995). Nofsinger and Sias (1999) also define herding as "a group of investors trading in the same direction over a period of time". There have been recently attempts to explain the reasons behind herding. The notion of similarity alone is insufficient. It may be due to various reasons and not all of them may be irrational (Frömmel, 2013). Herding may emerge as a result of not only irrational but also rational investor behavior.

Chang et. al. (2000) states that a herd arises when investors tend to imitate each other without disregard to their own beliefs. This behavior can be explained by either rational forces or investor psychology which is associated with the social pressure. Social pressure affects the investment decisions of the agents and keep them from decision making based on their own judgment (Döm, 2003, Kucuksille, 2004, Coban, 2009).

Herding is not directly an indicator of irrational behavior. Individuals can alter their behavior and act in a similar way with the others due to rational reasons (Oehler and Chao, 2000). Such herding may occur randomly, or individuals interpret information similarly because they have access to the same information (Erdogan, 2021b). Alternatively, pioneered in Banerjee (1992) and Bikchandani et al. (1992), such herding occurs where people observe the collective actions of the market, derive information from them, and then follow the market trend disregarding their own information (Park and Sgroi, 2009). Scharfstein and Stein (1990), DeLong et al. (1990), Banerjee (1992), Rajan (1994) and Bikchandani and Sharma (2001) have studied rational view of herding. Although it is difficult to distinguish, Bikchandani and Sharma (2001) divided rational herding into two types; spurious herding and intentional herding.

Bichchandani and Sharma (2001) defines herding as investors imitating the behavior of other investors. However, spurious herd behavior should be differentiated from intentional herding where investors facing similar decision choices and information sets make similar decisions (Erdogan, 2021a). For instance, when interest rates increase, investors act in the same way as a reaction to this commonly known public information. This is not consistent with the definition of herding, because investors do not alter their decisions after observing others, instead they make decisions in the same way because of changes in interest rates. "Spurious herding", known as "unintentional herding" in Lakonishok et al. (1992), is referred to all investors reacting identically to the same piece of news. Spurious herding may reflect either the reaction of investors to commonly known public information or different opportunity sets faced by investors. Particularly in crisis periods, investors acting as a herd may only reflect their perception of identical fundamental information of firms (Zhou and Lai, 2009).

The issue is to separate informed investors from uninformed ones to know whether herding is spurious or intentional. Intentional herding based on the behavior of others is a rational decision when other investors are better informed (Blasco et al., 2009). This type of herding itself can again be linked to several potential reasons leading to information-based herding, reputation-based herding and compensation-based herding (Frömmel, 2013). That is, investors' reputation, compensation payoffs and their peers' information are most basic motivations for them to herd intentionally (Gavriilidis et al., 2013).

3. Literature Review

The LSV measure is one of the methodologies focusing to measure herd behavior and has been conducted to examine herd behavior in different contexts by a great number of studies. Most of the empirical studies have used LSV measure to test herd behavior among managers and investors in different stock markets. LSV measure developed by Lakonishok, Shleifer and Vishny (1992) is used to detect herd behavior based on the number of shares held rather than stock returns. This method aims to evaluate not only herding but also positive feedback trading among pension fund managers. Herding which is the first dimension of the analysis is defined in their study as buying (selling) the same stocks as others buy (sell). The second dimension, positive feedback trading, relies on the past performances of the stocks. Managers buy the stocks which are past winners and sell the stocks which are past losers. Bikchandani and Sharma (2000) explain LSV herding measurement as "the average tendency of a group of money managers to buy (sell) particular stocks at the same time, relative to what could be expected if money managers traded independently". The other explanation for herding is "the excess proportion of money managers buying (selling) a given stock in a given quarter. This excess is computed referring to the normal proportion of buyers (sellers) of all market stocks between fund managers (Bellando, 2010). As seen, this methodology measures the herding activity with regard to number of buyers and sellers to compute the proportion of stock holdings. Lakonishok et al. (1992), in their study, have investigated the effect of trading on stock prices by using the holdings of 769 pension funds from the first quarter of 1985 to the last quarter of 1989 in US market. The

results indicate that while there is no significant herding among pension fund managers, they tend to herd more in small stocks in comparison with large stocks based on stocks' past prices.

Wylie (2005) has investigated the accuracy of LSV herding measure by using the portfolio holdings of 268 equity mutual funds in UK. The results indicate the existence of herding among the UK mutual fund managers, especially for the smallest and the largest stocks. Moreover, he has argued that the methodology suggested by Lakonishok et al. (1992) is suitable to measure herd behavior. Merli and Roger (2013) have conducted an analysis on French individual investors between 1999 and 2006 to test the existence of herd behavior. It is found that individuals show the persistence of herding over time. Furthermore, the relation between the past performance and herd behavior exists. Investors gather information of the past performance of others to decide whether they herd or not. If they had negative performance in the past, they prefer to decide based on his own information and predict herding for the next period. It can be also concluded that sophisticated investors are less inclined to herd behavior. Investors who take more risk, do not follow the others and have extreme returns. Wermers (1999) has tested the presence of trading activity of the mutual fund managers. LSV measure has been utilized to evaluate the behaviors of fund managers between the periods of 1975 and 1994 in United States. The impact of herding on stock prices is observed among small stocks, consistent with the results of Lakonishok et al. (1992). Wermers (1999) has also emphasized the effect of positive feedback trading strategy that managers buy the stock if its past return is high, and sell if its past return is low. Choe et al. (1999) have investigated the existence of herd behavior between foreign investors in Korea covering the period from November 30, 1996 to the end of 1997. They have found that foreign investors follow the crowd before Korea's crisis, but crisis period is the turning point and herding level decreases during this period. This result is consistent with the assumptions of Hwang and Salmon (2004) who argue that investors turn to their fundamentals rather than herding during the crisis periods, because of the uncertain information. Grinblatt et al. (1995) have investigated whether US mutual fund managers exhibit herd behavior and positive feedback trading. Quarterly portfolio holdings for 274 mutual funds have been used for testing. As a result, while a weaker evidence of herding is observed, mutual fund managers tend to buy past winner stocks and sell past loser ones, as found by Wermers (1999). Nofsinger and Sias (1999) have evaluated the impact of herding and positive feedback trading activity on stock returns in US stock market. Monthly stock returns, annual market capitalization and annual proportion of shareholdings of investors have been used from 1977 to 1996. It can be concluded that the evidence of herding is supported at much higher levels for institutional investors than individuals. Institutional investors also indicate stronger positive feedback trading on stock returns.

One of the limited studies detecting herd behavior on Turkish stock market through LSV measure is a dissertation which is written by Gökdemir (2010). He has studied the presence of herding and positive feedback trading among foreign investors by using LSV measure developed by Lakonishok et al. (1992). Net purchases and net sales including 297 stocks, obtained from Borsa Istanbul, have been utilized for the period from January 1997 through December 2006. His findings suggest that foreign investors exhibit weaker evidence of herding. Moreover, the findings of the study imply that foreign investors decide based on the past performance of the stocks, indicating tendency with positive feedback strategy. Another study that is conducted on Turkish stock market is studied by Durukan et al. (2017). They used LSV measure to detect herd behavior of foreign investors by comparing the whole period and crisis period between 2006 and 2015 and found less herding by foreign investors during the crisis period.

Although many studies have focused on stock markets, there have been only a few studies specifically focusing on herding behavior in banks' lending decisions. Liu (2014) conducted LSV and FHW measures to detect herd behavior in banks' domestic lending decisions. He tested the existence of herd behavior among U.S. commercial banks across five loan categories between the years of 1976 and 2010. Market and economic variables were also included into the analysis to

examine whether there is an additional effect on herd behavior. Herd behavior was observed among banks even after controlling for macroeconomic conditions and big banks tend to herd more than the small ones, according to the results. Additionally, herd behavior has a tendency to increase, in particular, during global financial crisis. Uchida and Nakagawa (2007) tested the existence of herd behavior in the domestic loan market in the 1975-2002 period in Japan. They focused on two types of commercial banks such as regional banks and city banks and used loans outstanding by eleven industries to detect herding. The results supported that regional banks exhibited irrational herd behavior, while city banks herd only during the bubble period toward the end of 1980s. Uchida and Nakagawa (2007) also applied Lakonishok, Shleifer, and Vishny measure and investigated whether Japanese banks herd in the domestic loan market from 1975 to 2000. They obtained evidence of herding based on the data from loans outstanding to different types of borrowers. Nakagawa and Uchida (2011) provided the existence of inefficient herding among Japanese banks during the bubble period in the 1980s, as well. Nakagawa et al. (2012) measured inefficient herd behavior of Japanese domestic loan market during the period from 1975 to 1999. They found that loans causing inefficient herd behavior destabilized the economy, while ordinary loans exhibited a positive impact.

To sum up, herd behavior was tested in different stock markets, at most. However, there is a gap in the literature that measures herding in the loan markets. Based on the earlier studies, herd behavior is observed in both stock and loan markets especially during fluctation periods. Furthermore, FHW method emerges as a new method in herding studies.

4. Data and Methodology

To examine the changes in participation banks' lending behavior and the presence of bank herding over the sample period, a weighted mean of the Lakonishok, Shleifer and Vishny (LSV) and Frey, Herbst and Walter (FHW) measures in each quarter were determined, in this study. The study allows to calculate the LSV and FHW measures for loans outstanding to eight different industries. The industries were determined based on the amount of loans outstanding. Maritime industry and financial institutions were excluded. Therefore, the industries of the food, beverages&tobacco, construction, metal&mining, textile, wholesale trade&brokerage, tourism, agriculture&fishing and energy were included to the analysis. The data was obtained from Banking Regulation and Supervision Agency official website.

The LSV measure detects herding activity by computing the proportion of banks that increased or decreased banks' loans outstanding to different industries. From this point of view, excess demand on bank loans is utilized and measured by the equations of (1) and (2) in this study as in Lakonishok et al. (1992):

$$LSV_{jt} = |p_{jt} - E[p_{jt}]| - E|p_{jt} - E[p_{jt}]| \quad (1)$$

$$= \left| \frac{X_{jt}}{N_{jt}} - \frac{\sum_{j=1}^J X_{jt}}{\sum_{j=1}^J N_{jt}} \right| - E \left[\left| \frac{X_{jt}}{N_{jt}} - p_t \right| ; X_{jt} \sim B(p_t, N_{jt}) \right] \quad (2)$$

where p_{jt} is the proportion of banks that increased loan outstanding to industry j at quarter t , X_{jt} is the number of banks that increased loans outstanding to industry j at quarter t , N_{jt} is the number of banks that were active in industry j at quarter t .

$E[p_{jt}]$ is the expected proportion of banks who increase their loans outstanding in quarter t , which is computed as a mean of all the observed p_{jt} in the quarter. This can be considered as banks' overall lending policy. Thus, LSV measure determines the extent to which banks' lending policies to industry j in quarter t deviates from the overall lending policy in quarter t , $E[p_{jt}]$.

It is expected that the observed value of p_{jt} will be close to $E[p_{jt}]$ and the first term will become zero, when banks do not collectively decrease (or increase) its loans outstanding to industry j in quarter t with probability $E[p_{jt}]$ (or $1 - E[p_{jt}]$). On the contrary, the observed value

of p_{jt} will deviate from $E[p_{jt}]$. Under the circumstances, the last term, $E|p_{jt} - E[p_{jt}]|$, is subtracted to normalize the measure and make its mean zero. Therefore, statistically significant positive values of the LSV measure that differ significantly from zero exhibit presence of herd behavior. The higher the LSV measure is found, the more the herd behavior is observed (Liu, 2014).

Then, to examine changes in the overall herding behavior, a weighted mean of LSV measure of all eight industries was computed for each quarter, as in Equation (3):

$$LSV_t = \sum_{j=1}^8 w_{jt} LSV_{jt} \quad (3)$$

where w_{jt} is the weight of loans outstanding to industry j at quarter t over total loans.

Frey et al. (2007) have suggested an alternative herding measure called as FHW indicator by criticizing LSV measure's statistically biased structure. The FHW herding measure is derived from LSV measure and expressed as:

$$FHW_{jt} = (p_{jt} - p_t)^2 - E[(p_{jt} - p_t)^2] \frac{N_{jt}}{(N_{jt}-1)} = \frac{(p_{jt}-p_t)^2 - p_t(1-p_t)/N_{jt}}{(N_{jt}-1)/N_{jt}} \quad (4)$$

$$\text{where } p_{jt} = \frac{x_{jt}}{N_{jt}}; p_t \equiv \frac{\sum_{j=1}^J x_{jt}}{\sum_{j=1}^J N_{jt}}$$

The FHW_{jt} equation is calculated by subtracting the empirical variance from the expected variance of a binomial distribution with parameters N_{jt} and p_t , as in Equation (4).

Based on the values obtained from FHW indicator, the weighted mean of FHW measure of all eight industries was computed for each quarter, as in Equation (5):

$$FHW_t = \sum_{j=1}^8 w_{jt} FHW_{jt} \quad (5)$$

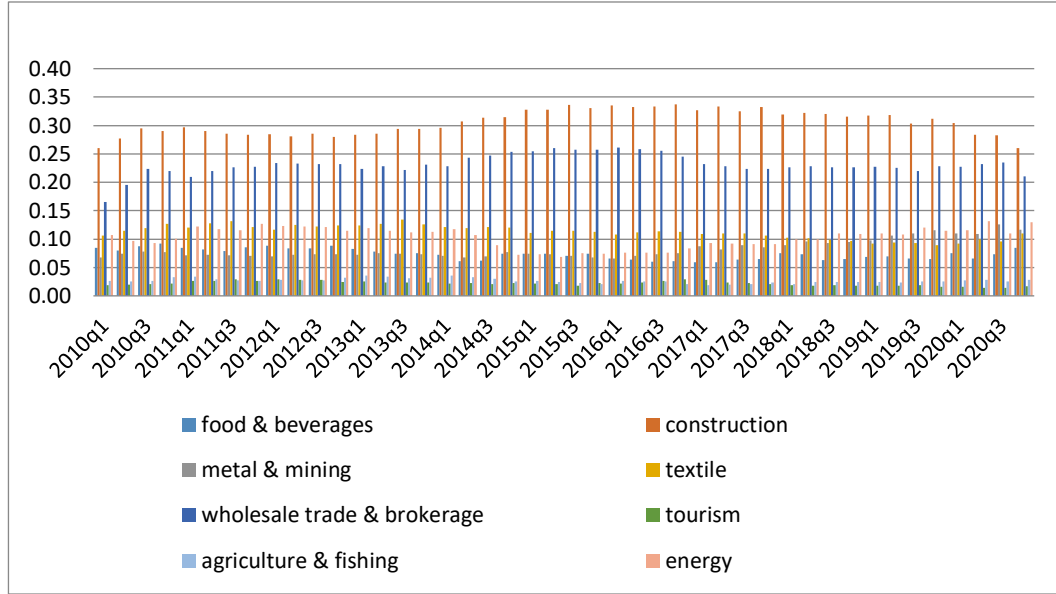
5. Empirical Findings

Figure 1 depicts the transition of loan share of each industry given by participation banks. As seen from the figure, construction and wholesale&brokerage industries are dominant borrowers for banks in Turkey. While construction industry has the highest percentages ranging between 0.26 and 0.34, wholesale&brokerage ranges between 0.16 and 0.26. The reason behind their dominance may be that they are industries with a long history containing large businesses which had raised a lot of funds.

On the other hand, tourism industry has the lowest percentages ranging between 0.01 and 0.03. Loans given by participation banks to agriculture&fishing industry follow the tourism. Figure 1 also exhibits that the ratios of loans outstanding to food&beverages, metal&mining, and textile industries have been almost unchanged. The ratios of the energy sector began to decrease from the first quarter of 2014 and continues until the last quarter of 2017. Loans given by participation banks to that industry decreased to the level around 7% during that period. The energy sector were heavily affected by the changes in exchange rates in 2014 in Turkey due to the fact that most of the investments were realized based on imported technologies, loans borrowed within the scope of investment activities were in foreign currency and sales revenues were in Turkish Liras (<https://www.kap.org.tr/en/>).

Table 1 exhibits number of banks, total loans outstanding, the percentage of loan increases, weighted mean LSV herding measure, weighted mean FHW herding measure and the interpretation of LSV measure in each quarter.

Figure 1: Loan Share of Each Category (%)



Accordingly, both the LSV measure and FHW measure support the existence of significant herding in banks' lending decisions during the entire sample. Thus, weighted means of the herding measures indicate that participation banks dependently increase or decrease their loans outstanding in each quarter. Moreover, LSV measures determine the extent to which an increase or decrease in loans outstanding by banks was caused by herding behavior. For instance, the LSV of 7.84% in the 3rd quarter of 2010 indicates that herding behavior was observed because of 41 banks' lending decisions among all 517 banks in that quarter. In other words, an increase or decrease in loans outstanding by 41 banks (7.84% of around 517 banks) was caused by herding behavior.

It can be concluded based on high LSV measures that banks' lending decisions tend to be affected more during crisis periods, consistent with Nakagawa and Uchida (2011) and Liu (2014). For example, a significant magnitude of LSV with the value of 32.61% was observed at the 4th quarter of 2018. It was the period of the Turkish currency and debt crisis of 2018. That crisis was caused by high inflation, high borrowing costs, and thus rising loan defaults.

Following that, a significant magnitude of herding in banks' lending decisions with the LSV measure of 22.93% was also found at the 3rd quarter of 2016. This may be because of the *sharp* reduction in the number of participation banks (from 1,125 to 941) that has occurred in the mid 2016s due to Turkish coup attempt of July 15. Banks faced more uncertainties and had difficulties evaluating borrowers under these uncertain conditions.

The weighted mean LSV measure was also around 18.3% at the 2nd quarter of 2014, indicating that an increase or decrease in loans outstanding by 177 banks (18.3% of around 979 banks) was caused by herding behavior. This may be consistent with the increased interest rates in the mid 2014s. However, dependently increased lending behavior may lead to the spurious herding defined as acting in the same way as a reaction to this commonly known public information such as interest rates increases (Bikhchandani and Sharma, 2001). As seen from the Table 1, lending behaviors of participation banks draw special attention during fluctuation periods.

Table 1 also exhibits a negative relationship between total loans outstanding and herding levels. In other words, after the fluctuation periods that banks tend to herd more, total loans outstanding dropped rapidly and the percentage of loan increases was computed as negative. Thus, loans given by participations banks decreased to the level around 4.47 percent, 3.19

percent and 15.73 percent after the increased interest rates in the mid 2014s, the Turkish coup attempt of July 15, and the Turkish currency and debt crisis of 2018, respectively. Decreased loan demand from participation banks may end up with herding because of market stress.

Table 1: **Weighted Mean LSV Measure and Weighted Mean FHW Measure**

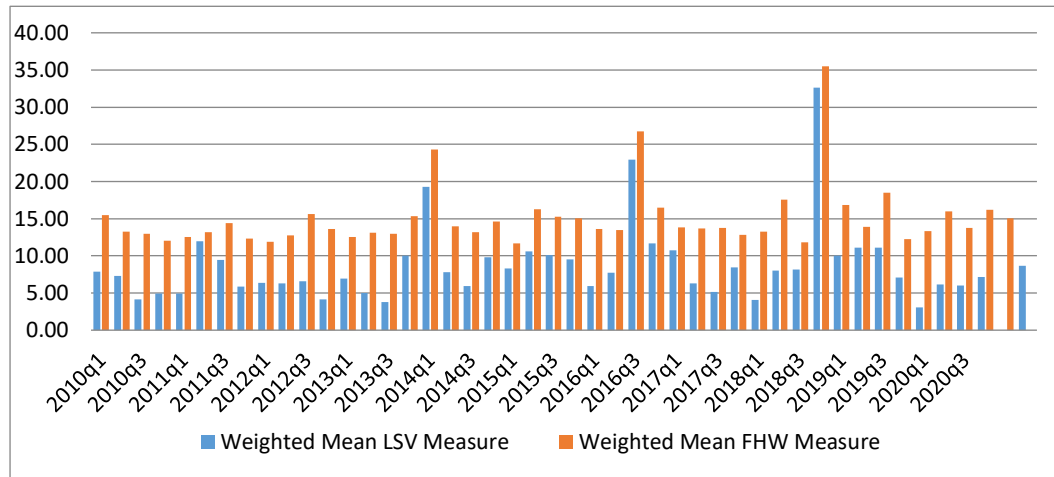
Period	Number of Banks	Total loans outstanding	% of increase	LSV (%)	Interpretation from LSV	FHW (%)	
2010	Q1	517	13.874.974	N	7.84***	41	15,45***
	Q2	521	14.376.113	3,61	7.30***	38	13,23***
	Q3	539	14.968.070	4,12	4.15***	22	12,97***
	Q4	605	17.044.347	13,87	4.92***	30	12,05***
2011	Q1	631	17.819.742	4,55	4.92***	31	12,56***
	Q2	640	18.220.865	2,25	11.95***	76	13,22***
	Q3	659	19.017.027	4,37	9.48***	62	14,43***
	Q4	682	20.183.386	6,13	5.84***	40	12,31***
2012	Q1	693	21.209.179	5,08	6.34***	44	11,90***
	Q2	738	22.505.933	6,11	6.28***	46	12,77***
	Q3	776	23.444.711	4,17	9.10***	71	15,63***
	Q4	826	24.350.838	3,86	4.14***	34	13,64***
2013	Q1	833	25.249.860	3,69	6.94***	58	12,52***
	Q2	886	27.764.530	9,96	4.99***	44	13,13***
	Q3	936	30.156.150	8,61	3.80***	36	12,97***
	Q4	964	32.153.409	6,62	8.74***	84	15,30***
2014	Q1	979	30.715.849	-4,47	18.03***	177	24,28***
	Q2	1.003	31.164.898	1,46	7.83***	79	13,99***
	Q3	1.042	31.699.584	1,72	5.93***	62	13,20***
	Q4	988	32.610.969	2,88	9.77***	97	14,64***
2015	Q1	1.008	33.524.206	2,80	8.32***	84	11,65***
	Q2	1.026	34.312.569	2,35	10.61***	109	16,28***
	Q3	1.051	35.306.399	2,90	10.06***	106	15,27***
	Q4	1.078	36.503.864	3,39	9.49***	102	15,05***
2016	Q1	1.093	37.744.615	3,40	5.91***	65	13,60***
	Q2	1.125	38.756.100	2,68	7.70***	87	13,50***
	Q3	941	37.519.950	-3,19	22.93***	216	26,77***
	Q4	958	39.857.434	6,23	11.71***	112	16,51***
2017	Q1	972	41.408.554	3,89	10.73***	104	13,81***
	Q2	989	43.875.384	5,96	6.27***	62	13,67***
	Q3	1.000	47.887.212	9,14	5.16***	52	13,75***
	Q4	1.031	52.126.798	8,85	8.45***	87	12,80***
2018	Q1	1.039	55.105.718	5,71	4.09***	42	13,28***
	Q2	1.064	59.740.973	8,41	13.01***	138	17,54***
	Q3	1.092	66.612.749	11,50	8.15***	89	11,82***
	Q4	1.121	74.377.709	11,66	32.61***	366	35,51***
2019	Q1	1.127	62.677.686	-15,73	10.03***	113	16,87***
	Q2	1.137	62.645.944	-0,05	11.11***	126	13,89***
	Q3	1.150	67.246.871	7,34	11.13***	128	18,52***
	Q4	1.177	73.749.263	9,67	7.09***	83	12,22***
2020	Q1	1.186	88.809.134	20,42	3.05***	36	13,32***
	Q2	1.192	109.911.790	23,76	6.14***	73	15,98***
	Q3	1.223	106.641.250	-2,98	6.04***	74	13,73***
	Q4	1.256	110.929.618	4,02	7.18***	90	16,23***
Mean			42.859.141		8,76		15,04

*** indicate that the null hypothesis of no herding is rejected at a 1% significance level.

Figure 2 also exhibits the transition of weighted mean LSV herding measure and weighted mean FHW herding measure. It is seen from the figure that both herding measures have almost the same trends and the FHW measure overestimates the level of herding by comparison with

LSV measure during the whole period. This is consistent with Frey et al. (2007) indicating that FHW measure overestimates the level of herding. As stated by Bellando (2010), the level of herding is expected to be between LSV and FHW values.

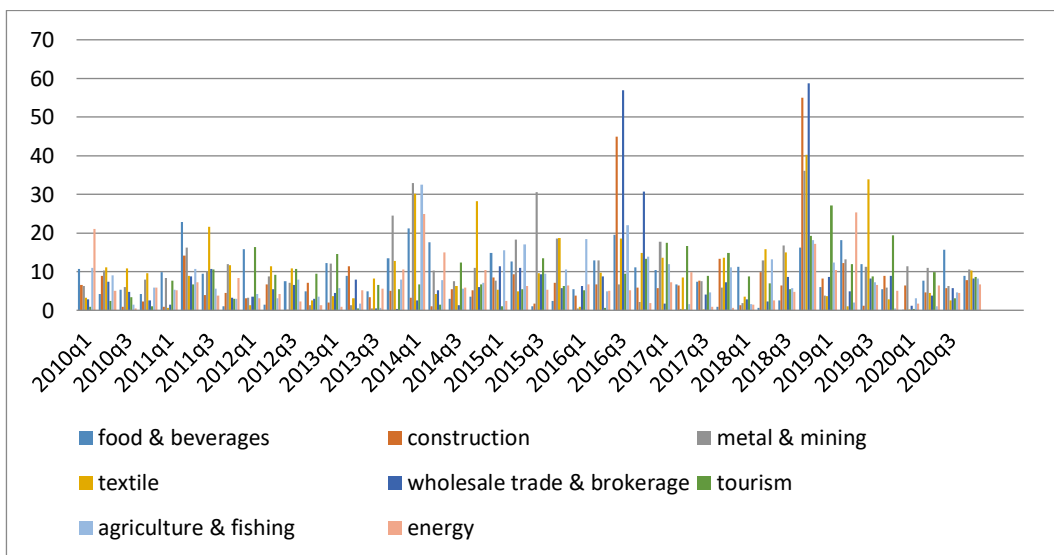
Figure 2: **Weighted Mean LSV Measure and Weighted Mean FHW Measure**



After determining weighted mean LSV and weighted mean FHW measures, separate analyses were conducted for each industry to examine herding effects within participation banks in Turkey and the results are presented on Figure 3 and Figure 4. The data includes quarterly loans outstanding from 2010 to 2020. This allows to investigate whether bank herding is also observed for industry level, in particular, during fluctuation periods. Both LSV and FHW measures follow similar trends at industry level, as well.

First of all, it includes the Turkish currency and debt crisis of 2018 in which inflation, borrowing costs and loan defaults inflated, as stated earlier. During the period, wholesale trade&brokerage, construction, metal&mining and textile industries were dominant in banks' lending decisions.

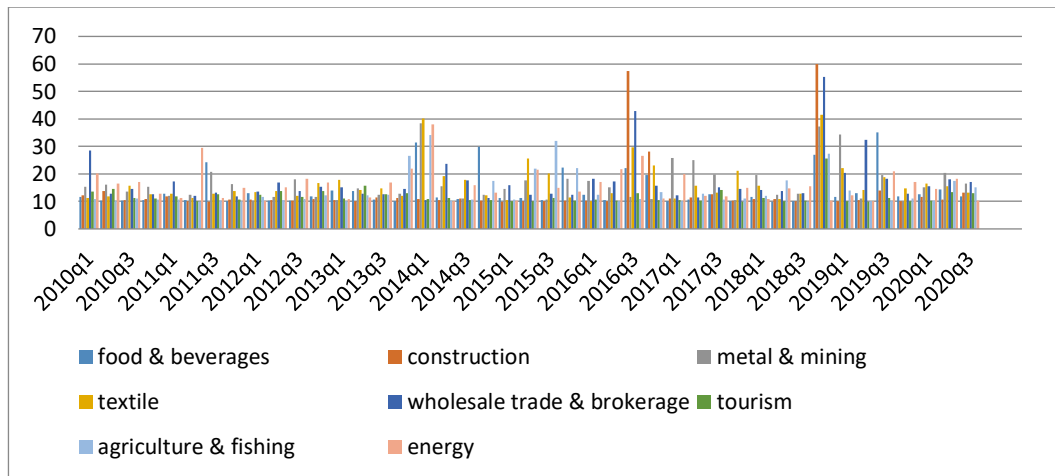
Figure 3: **LSV Measure of Each Category**



Finally, the results of LSV and FHW measures indicate that loans outstanding to the industries of textile, metal&mining, agriculture&fishing, energy and food&beverages were dominant when

the interest rates increased in the mid 2014s. Thus, loans given by participation banks to these industries lead to herding on their lending behaviors, as seen on Figure 3 and Figure 4.

Figure 4: FHW Measure of Each Category



6. Conclusion

This study aimed to examine participation banks' herding behavior in their domestic lending decisions in Turkey. The methodologies of Lakonishok, Shleifer and Vishny (LSV) and Frey, Herbst and Walter (FHW) were utilized by using data on loans outstanding during the period from 2010 to 2020. The results of the study indicate that both the LSV measure and FHW measure support the presence of significant herd behavior in participation banks' lending decisions during the entire sample. It can also be concluded based on high LSV measures that banks' lending decisions tend to be affected more during Turkish currency and debt crisis of 2018, Turkish coup attempt of July 15 and the increased interest rates in the mid 2014s. Banks may tend to follow the consensus under these uncertain conditions that they had to make a decision on lending to borrowers who do not have much information, instead of lending to traditional borrowers and searching for new borrowers (Nakagawa and Uchida, 2003).

Bank herding was also investigated for industry level, especially, in fluctuation periods. Accordingly, loans outstanding to the industries of textile, metal&mining, agriculture&fishing, energy and food&beverages were dominant during the period when the increased interest rates in the mid 2014s. While loans given by participation banks' to the industries of wholesale trade&brokerage and construction were decisive after the Turkish coup attempt of July 15, wholesale trade&brokerage, construction, metal&mining and textile industries were dominant during the the Turkish currency and debt crisis of 2018 period. The irrational behaviors of participation banks which lend money, especially to wholesale trade&brokerage, construction industries could have had much effect on the Turkish economy. In addition, increased loan demand from these industries makes them more important borrowers for participation banks in Turkey.

This study is important as being the first attempt to measure Turkish participation banks' herd behavior in Turkey. This study also contributes to the international literature in the field of behavioral finance and strengthens their theoretical and empirical frameworks. As stated earlier, herding is observed either when banks share the same information and face similar circumstances rationally, or when banks intentionally imitate the lending behavior of each other (Liu, 2014). Therefore, it would be suggested to include macroeconomic variables into the analysis, for further studies. This provides to examine how herding changes in response to changes in macroeconomic conditions and to detect whether exhibited herding is intentional or

not. Moreover, herd behavior in lending decisions can be investigated and compared in terms of public and private banks or domestic and foreign banks operating in Turkey.

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