

Chapter

Indicators of Banking Fragility of Participation Banks in Turkey

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Abstract

This study examines the significant variables of banking fragility of participation banks in Turkey. For this aim, a model is constructed by employing probit model over the time period 2008 and 2018. The results suggest that asset growth, capital adequacy ratio, financing to total deposits ratio (FDR), return on asset and cost to income ratio are significant banking level indicators of the banking fragility of participation banks in Turkey.

Keywords: banking sector fragility, participation banks, banking crises, Probit model, Islamic finance

1. Introduction

With the increasing integration and interaction of the financial markets, the number of financial crises has considerably increased especially since 1990s. With the contagion effect, on the other hand, the impacts and consequences of the financial crises go beyond the national level by causing significant international costs. In this context, an important part of those crisis is stem from the problems experienced in the banking sector, which is one of the leading sectors that have significant impact on the world economy.

As the importance of the banking sector on economies increases, the risk factors that has to managed by the sector has also increased considerably. Laeven and Valencia [1] emphasized that there were 151 banking crises worldwide between 1970 and 2017 where the duration of these crises is different with respect to the income levels of the countries. Accordingly, while the banking crises in high-income countries are considerably consistent and continue for 5 years or more, in low- and middle-income countries, banking crises continue for 4 years or less. In term of its outcomes, on the other hand, banking crises have devastating effects such as persistent output losses, economic activity, welfare, asset prices, unemployment, government debt, tax revenue [1–4].

As one of the fastest growing sectors of the global financial industry, participation banking sector accelerated its development especially as of the 1990s and become an important part of the banking sector for significant number of countries worldwide. Furthermore, the financial crisis experienced in 2008 shed doubts on the conventional banking system and draw attention to participation banking. The financial crisis of 2008 is considered to be the second most serious breakdown since

the 1930s. The crisis, started in the USA, spread to many other countries in a short time and turned to a global crisis. As a consequence, the banking sector in those countries has adversely affected. In this regard, the interest in participation banks has increased, as they were more resistant to the financial crisis compared to conventional banks in terms of profitability, liquidity and asset quality [5, 6].

The breakdown of 2008 also triggered the efforts to investigate the impact of banking crisis on participation banks. However, most of these efforts aim to compare the impact of the crisis on participation banks and conventional banks, or investigate the performance of participation banks before/during/after the global financial crisis [7–10]. Despite those attempts, there is no prior study investigates the early warning indicators of banking fragilities of participation banks. Early warning indicators are crucial since they provide opportunity to detect the fragilities of the banking system and take precautions against a forthcoming banking crisis. In this regard, although there are number of studies in the literature on the significant indicators of banking crisis in Turkey, there have been no attempts to examine the indicators of banking fragilities of the participation banks. For instance, Tosuner [11] developed an early warning system to investigate the banking crisis in Turkey. The author reveals that domestic credit, M2, international reserves, real exchange rate and international trade are leading indicators of banking crisis of Turkey. To identify the causes of bank crises and determine the crisis indicators, Tunay [12] develop an early warning model for Turkey. The results show that exchange rate position, terms of trade, capital adequacy, interest rate risk and market risk are important factors of the banking crisis in Turkey. In addition, Cergibozan and Arı [13] develops a model specific to Turkey to examine the determinants of banking crisis over the time period 1990 and 2013. According to the results, increasing inflation and interest rate, depreciation rate, excessive fiscal deficit, increasing bank loans and bank short positions, liquidity mismatch and decreasing bank reserves are important determinants of banking crisis of Turkey. Furthermore, research on the subject on the participation banks and crisis has been mostly restricted to analyzing the financial performance of participation banks or limited comparisons of the financial performance of conventional banks and participation banks [14–16].

Motivated by the literature, this study constructs a model specific to participation banks in Turkey to identify the leading indicators fragility towards banking crisis. In addition, apart from the existing literature, this study considers banking level explanatory variables over a recent time period 2008 and 2018. This paper has been divided into five sections. The first part of this study gives the introduction. The second section presents an overview of the Islamic financial system and development of participation banks in Turkey. The third part highlights the key concepts of banking sector fragility. The fourth section is concerned with the data and methodology employed for this study. The fifth section presents the results of the study and the last section concludes the study.

2. Overview of the Islamic financial system

The Islamic financial system is constructed on the basis of Shari'ah principles (Islamic Law). In other words, Islamic financial system can be defined as a system in which all financial activities and transactions are carried out within the framework of Islamic rules. The main motive behind the emergence of Islamic financial system is the demand for a system that are based on Islamic principles. In other words, Islamic financial system has primarily arisen to stimulate the unused funds of Muslims with high religious sensitivity to evaluate their investments and further

enabling the capital movements between countries. The fundamental resources of Islamic Law are the Holly Qur'an and Sunnah. One of the most important features of Islamic finance is the control of commercial activities and financial transactions with certain standards, moral principles and prohibitions in order to avoid injustice and unjust enrichment. The main prohibitions of Islamic finance can be given as follows:

- Prohibition of Riba (Interest)
- Prohibition of Gharar (Uncertainty)
- Prohibition of Maysir (Gambling)

One of the key principles of Islamic religion is the prohibition of riba. According to majority of Muslim jurist, all forms of interest is forbidden by Islam [17]. According to Islamic terminology, riba arises in two forms as riba on loans (Riba al-nasiah) and Riba al-fadl (riba on sales). In this regard, riba al nasiah addresses to "riba in money to money exchanges, where the exchange is delayed or deferred and gives rise to an additional charge" that also called as Riba al-Jahiliyyah [18]. According to Qur'an, riba al nasiah is strictly forbidden. According to Özsoy [19], riba al-Fadl, on the other hand, is involved in a transaction through the combination of the followings:

- An exchange of goods and money in cash.
- Exchange between two goods or money of the same kind.
- The goods are among the interest classes mentioned in the hadith or belonging to these classes although they are not included in the hadith.
- Excess of one of the goods compared to the other.

Most of the Muslim scholars argue that there is not a specific definition of riba in Qur'an. They support the idea that there is only a certain type of riba, Riba al-Jahiliyyah, in the period when the Qur'an was revealed. The riba, which is forbidden in a very harsh manner in the Quran, is based on an exorbitant increase in nature, and the jahiliyya riba, in which the principal is folded many times. Moreover, the supporters of this view argue that, it is not riba if an addition is made to the original amount in return for maturity from the very beginning of lending. Therefore, it is supported that the prohibited riba, riba-Jahiliyah, is different from the loan with interest transactions that stipulates the increase from the very beginning [19]. In this context, Rahman [20] explains that riba is the increase in capital, which raises the principle amount several folds by continuing redoubling. As stated, it is initially a situation that a part of wealth is loaned on interest for a certain period of time. If this loan cannot be paid on the expiration date then the extension of maturity leads to high increase in the principle amount where big sums involved. This situation ends up with the debtor pays the interest alone in installment but they cannot pay the usury interest nor the principle amount [21]. From this point of view, they differentiate the interest in current economic transactions with the interest prohibited by the Qur'an. They claimed that what is meant in the verse of the Qur'an is exorbitant interest, thus, the current interest practices are legitimate since these transactions are different from the interest prohibited in the verses and hadiths. They argue that the interest given by banks is not unlawful and should be excluded from the scope of riba.

Accordingly, they claim *riba*, which is forbidden in the Quran, is the usury rather than interest. For instance, Metwally [22] states that *riba* is closely related with usury. The author explains usury is interpreted as *riba* and it can be defined as the excess or addition over the principal capital lent. In other words, among some scholars and jurists, *riba* and usury is used for different terms where usury does not refer to interest [23]. Moreover, Ahmad and Hassan [24] argue that *riba* is involved in loan transactions that is used for consumption purposes. However, it is not prohibited by Islamic law if it is used for production purposes or the empowerment of micro and small enterprises [20]. Nevertheless, the majority of Islamic scholars state that there are no differences in the meaning and the scope of *riba* and any transaction that involves a predetermined return is *riba* and strictly prohibited by Islamic law [19].

Maysir means gamble or game of chance in Arabic. It can be explained as taking risk for increasing wealth by chance. Furthermore, *maysir* is also seen as speculation and price manipulation [25]. According to Mihajat [26], the activities are considered as gambling if the following three elements are in question:

- The existence of betting subject matter/asset from both sides of the gambler.
- The existence of the game that use to determine who is the winner and who is loser.
- The winner will take the property that being bet, while the loser will lose his bet property.

In games of chance, the win is one-sided. Namely, the gain of one party depends on the loss of the others. *Maysir* includes all gambling, speculative and chance contracts and it also contains the obligations and benefits that were not fully disclosed by either party at the time the contract was concluded [27]. If the risk involved in a game is not controllable and none of the players can affect the probability of the money paid back, such a game is a game of chance. In *maysir*, all deviations in actual earnings versus expected earnings are a result of the luck element and is prohibited by Islam [28]. In Islamic finance, *maysir* means “any transaction conducted by the two parties to possess the ownership of a particular asset or service which obtain benefit to one party and harm to others by linking a particular transaction with an act or event.” [26]. According to Kamali [29], *maysir* is prohibited since it causes an unclean and immoral inducement with a hope of making profit by the loss of the others.

The second fundamental principle of Islamic finance is the prohibition of *gharar* in mutual contracts. Iqbal and Molyneux [30] states that *gharar* is one of the most challenging issue in the Islamic law. The types of *gharar* is divided into excessive, medium and minor *gharar* by The Accounting and Auditing Organization for Islamic Financial Institutions [30, 31]. In this regard, excessive *gharar* is existed in a transaction if:

- a. it is involved in an exchange-based contract or any contract of that nature.
- b. If it is excessive in degree.
- c. If it relates to the primary subject matter of the contract.
- d. If it is not justified by a Shari’ah-recognizable necessity.

The principles of *gharar* as can be categorized as follows [32]:

- Gharar in the terms and essence of the contract includes:
 - Two sales in one.
 - Downpayment ('Arbun) sale.
 - "pebble", "touch" and "toss" sales.
 - Suspended (Mu'allaq) sale.
 - Future sale.
- Gharar in the object of the contract includes:
 - Ignorance about the genus.
 - Ignorance about the species.
 - Ignorance about attributes.
 - Ignorance about the quantity of the object.
 - Ignorance about the specific identity of the object.
 - Ignorance about the time of payment in deferred sales.
 - Explicit or probable inability to deliver the object.
 - Contracting on a nonexistent object.
 - Not seeing the object.

When the historical development of Islamic finance is examined, it is seen that although the first practices of interest-free banking dates back to antient times, the foundations of modern Islamic banking began to emerge in the mid-1940s with the establishment of the Patni Cooperative Credit Society and the Muslim Fund Tanda Bavli in India. However, it was only at the end of the 1960s that interest-free banks emerged in a comprehensive manner by establishment of Mit Ghamr Savings Bank in Egypt. Following this, Nasser Social Bank, established in Egypt in 1971, is the first interest-free commercial bank based on Islamic laws. With the 1970s, there has been an increase in the number of institutions providing banking services that have adopted Islamic rules in many countries. For instance, in 1975 Dubai Islamic Bank is established in United Arab Emirates. In the same year, Islamic Development Bank (IsDB) is established in order to support the economic and social development of member countries and Muslim minorities within the framework of Islamic rules. In addition, the first academic meeting in the field of Islamic economics, the International Conference on Islamic Economics, was held in Mecca in 1976. In 1977, Kuwait Finance House, The Faisal Islamic Bank of Egypt, Establishment of The Faisal Islamic Bank of Sudan are established. In addition, to promote the coordination between Islamic banks, International Association of Islamic Banks is established in the same year. In 1978, the first attempt towards establishment an Islamic bank in Europe is occurred with the Islamic Finance House established in Luxembourg. These developments have also triggered the spread of Islamic banking in other

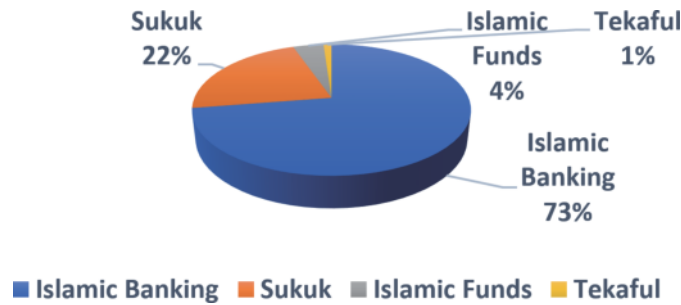


Figure 1.
Islamic finance industry, 2019 [33].

countries and between 1975 and 1990, Islamic finance gained rapid global momentum and spread to many countries such as UK, US and Switzerland. As a result of the increasing volume and growth of the Islamic finance industry, it has brought with it the need to establish and regulate standards in the field of Islamic finance. For this reason, Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) is established in 1990. In 2000s, Islamic finance continue its growth globally and spread to countries such as Thailand, Singapore, Kazakhstan, Umman and Germany.

As of 2019, the global Islamic finance assets reach US\$2.88 trillion by 14% increase with respect to 2018 [33]. **Figure 1** represents the segmental composition of the Islamic finance industry. According to the figure, the Islamic finance industry is comprised of Islamic banking, Sukuk, Islamic funds and Tekaful.

According to the figure, the Islamic banking is accounted for 72.4% of the industry and has the largest component of the Islamic finance industry. The total Islamic banking assets in 2019 reach US\$ 2 trillion and there exist 526 Islamic banks globally [33]. According to IFSI [34], in 2019 the global Islamic banking assets increase by 13% compared to 2018. According to the report, the main reason of the increase in the Islamic banking assets in the GCC region with the considerable mergers of the Islamic banks. Sukuk,¹ on the other hand, account for 22% of the global Islamic finance industry and is the second largest component of the sector. In 2019, the total sukuk outstanding value reach to US\$538 billion with a 15% increase compared to 2018. In 2019, there are 308 murabaha, 293 ijara, 235 mudaraba, 229 other sukuk, 225 hybrid sukuk and 156 salam is issued globally. The value of total Islamic funds outstanding is US\$140 billion in 2019. It is comprised of mutual funds (US\$1555), pension funds (US\$86), insurance funds (US\$76) and exchange traded funds (US\$29). Global Tekaful assets² increase by 10% and account for US\$51 billion. In 2019, Turkey is the fastest growing market in tekaful assets [33].

3. The development of participation banks in Turkey

In line with the global developments, for the purposes of merging the idle funds into the economy and providing funds to the country, participation banks³ have

¹ Sukuk is the “certificates of equal value representing undivided shares in ownership of tangible assets, usufruct and services or (in the ownership of) the assets of particular projects or special investment activity” ([31], p. 468).

² Islamic insurance.

³ In Turkey hosts dual banking system where both conventional banking and Islamic banking operate in the same banking sector. The banks that adopt Islamic banking practices are called as “participation banks”. The term participation is chosen to emphasize the profit and loss sharing principle of the banks.

begun to established in Turkey by considering the needs of those who oppose the conventional banking system that operate based on interest. The financial liberalization process experienced in the 1980s has a significant role in terms of improving the efficiency of the Turkish banking system and encouraging the competition in the sector. With this process, the legal, structural and institutional arrangements made significant contributions to the development of the Turkish banking sector. In this respect, interest rates and exchange rates were liberalized, new entrances to the banking system were allowed and various arrangements were made for foreign banks to come to Turkey or open branches. Foreign banks were allowed to operate and open branches in Turkey. **Table 1** presents the historical development of the participation banks in Turkey. In this regard, the first attempt towards establishing a participation banking is made with by introduction of the Special Finance Houses (SFHs) in 1983. The operations of SFHs started in 1985 by providing financial products and services within the framework of Islamic principles and prohibitions. Following those arrangements, Albaraka Turk Special Finance House and Faisal Finance Special Finance House Were established in 1984 and 1985 respectively. Additionally, Kuveyt Turk Special Finance House in 1989, Anadolu Special Finance House in 1991, İhlas Special Finance House in 1995, Asya Finance Inc. in 1996 were established and stated their operations in the sector. By the Law no. 5411 article 3, SFHs was replaced with “Participation Banks” in 2005. In 2015, the government was attempted to participate in participation banking with the establishment of Ziraat Participation Bank, Vakıf Participation Bank and Emlak Participation Bank were introduced into industry between 2015 and 2019. As of 2021, Turkey is hosting a dual banking system, where both Islamic and conventional banks operate in the banking sector, with six participation banks as Kuveyt Turk Participation Bank Inc., Albaraka Turk Participation Bank Inc., Turkiye Finance Participation Bank Inc., Turkey’s Ziraat Participation Bank Inc., Vakıf Participation Bank Inc. and Emlak Participation Bank (**Table 1**).⁴

Table 2 presents the share of total assets of participation banking in total banking assets. According to the table, while the share of participation banking in total banking system is 6.3% in 2019, it reached to 7.1 in 2020. Furthermore, the annual

1983	Establishment of Special Finance Houses (SFHs)
1984	Establishment of Albaraka Turk Special Finance House
1985	Establishment of Faisal Finance Special Finance House
1989	Establishment of Kuveyt Turk Special Finance House
1991	Establishment of Anadolu Special Finance House
1995	Establishment of İhlas Special Finance House
1996	Establishment of Asya Finance Inc.
2005	Establishment of Turkiye Finance Participation Bank
2015	Establishment of Ziraat Participation Bank
2016	Establishment of Vakıf Participation Bank
2019	Establishment of Emlak Participation Bank

Table 1.
The historical development of the participation banks in Turkey.

⁴ As 2021, there are 54 banks operating in Turkish Banking Sector as deposit banks (34), development and investment banks (14), participation banks (6).

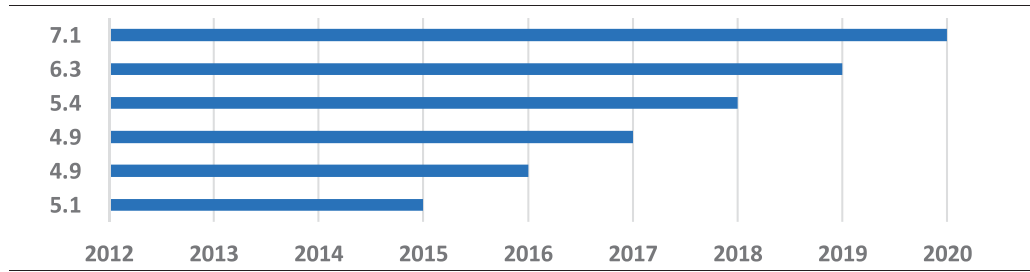


Table 2.
Share of total assets of participation banking in total banking assets.

	2019	2020	Change, %
Funds Collected	215.983	322.017	49.1
Funds Collected TL	91.145	102.620	12.6
Funds Collected FC	106.533	149.513	40.3
Precious Metals FC	18.305	69.884	281.8
Funds Allocated	149.475	240.133	60.7
Total Assets	284.45	437.092	53.7
Shareholder's Equity	21.762	27.603	26.8
Net Profit	2.433	3.716	52.4

Table 3.
Main indicators of the participation banks, TL million [30].

compound growth rate (CAGR) of the participation banking sector assets are 24.0% between 2015 and 2019.

The main indicators of the participation banks that operate in Turkey is presented in **Table 3**. According to the table, the funds collected in the participation banking sector in 2020 is increased by 49% compared to previous year. Furthermore, the total assets grew by 54% compared to 2019 and reached to TL 437 billion in 2020. The net profit of participation banks increased by 52.4% from TL 2.4 billion in 2019 to TL 3.7 billion in 2020. Total shareholders' equity, on the other hand, increased by 26.8% to TL 27.6 billion.

According to TKBB report, Kuveyt Turk Participation Bank has the highest net profit among participation banks in 2020, with TL 1400.3 million [30, 35]. In this context, Kuveyt Türk Participation Bank was followed by Türkiye Finance Participation Bank with 675.7 million TL, Vakıf Participation Bank with 666.9 million TL, Ziraat Participation with 638.6 million TL, Albaraka Turk Participation Bank with 255 million TL and Emlak Participation Bank with 80 million TL [30] (**Table 4**).

In 2020, the total number of domestic and international branches of 6 participation banks operating in Turkey is 1.255 which constitutes more than 10% of the total branch network of the banking sector. The total number of branches of participation banks increased by 83% in 2020 and reached to 1.255 compared to 2011. Accordingly, while the total number of employees in the participation banks in Turkey is 13.851 in 2011, it increased to 16.849 in 2020 with an increase of 22%.

4. Banking sector fragility

The banks are one of the leading financial institutions in Turkey. Therefore, the problems that may arise in the banking system have the potential to cause

Year	Total number of branches	Total number of employees
2011	685	13.851
2012	828	15.356
2013	966	16.763
2014	990	16.270
2015	1.080	16.554
2016	959	14.467
2017	1.032	15.029
2018	1.122	15.645
2019	1.179	16.040
2020	1.255	16.849

Table 4.
 Total number of branches and employees of the participation banks in Turkey [36].

destructive social, economic, political and cultural outcomes. For this reason, the attempts towards revealing the vulnerabilities in the financial system to prevent to the costs of those crises or overcoming with the minimum cost where the crisis is inevitable, has gain considerable attention. Accordingly, banking sector fragility index (BSFI) is developed to detect the fragilities and vulnerabilities in the banking system, which is firstly introduced by Kibritçioğlu [37]. According to Kibritçioğlu [37], although banks are exposed to various risk factors, massive bank runs and withdrawals, huge amount of lending booms and increasing unhedged foreign liabilities of banks are the main banking crisis indicators. Accordingly, to monitor the fragilities of the banking sector, the author constructs a BSFI based on liquidity risk, credit risk and exchange rate risk. In this index, bank deposits (DEP), foreign liabilities of banks and credits the domestic private sector are considered as a measure of liquidity, exchange rate and credit risks respectively. The BSFI can be given as follows:

$$BSFI_{i,t} = \frac{\left(\frac{[(CPS_t - CPS_{t-1})/CPS_{t-1}] - \mu_{CPS}}{\sigma_{CPS}}\right) + \left(\frac{[(FL_t - FL_{t-1})/FL_{t-1}] - \mu_{FL}}{\sigma_{FL}}\right) + \left(\frac{[(DEP_t - DEP_{t-1})/DEP_{t-1}] - \mu_{DEP}}{\sigma_{DEP}}\right)}{3} \quad (1)$$

In Eq. (1), the BSFI is the average of standardized values of CPS, FL and DEP, where μ and σ are the mean and standard deviation of the variables. Regarding the BSFI, the fragility episodes of the countries are divided into three as tranquil, medium and high fragility episodes. In this respect, the banking system is in tranquil episode if the index approaches the sample period average. The banking sector of the country is in medium fragility episode where BSFI is between 0 and -0.5 . A high fragility episode is experiencing by the countries if BSFI is equal or lower than -0.5 . In addition to this index, to investigate whether bank runs play a crucial role in triggering the banking crisis, Kibritçioğlu [37] also constructs an alternative index by excluding the liquidity risk factor:

$$BSFI_{i,t} = \frac{\left(\frac{[(CPS_t - CPS_{t-1})/CPS_{t-1}] - \mu_{CPS}}{\sigma_{CPS}}\right) + \left(\frac{[(FL_t - FL_{t-1})/FL_{t-1}] - \mu_{FL}}{\sigma_{FL}}\right)}{2} \quad (2)$$

According to the results, both indices reveal the similar results. This implies bank runs do not have a prominent role in explaining the banking crises in majority of the sample countries. Furthermore, to investigate the fragilities of Indian banks, Singh [38] developed a monthly BSFI following Kibritçioğlu [37]. The index is the weighted average of annual growth in real time deposits, real non-food credits, real investments in approved and non-SLR securities, real foreign currency assets and liabilities and the real net reserves of commercial banks. The author also constructs an alternative index, by excluding the bank deposits from the index, to show bank runs do not play a significant role for the fragility episodes of Indian banks.

By using the BSFI, Ahmad and Mazlan [39] aimed to monitor the trend and determinants of fragilities of locally and foreign-based commercial banks operating in Malaysia. Although the scholars consider BSFI of Kibritçioğlu [37], different proxies are employed to measure the liquidity, credit and exchange rate risks. The BSFI can be given as follows:

$$BSFI_{i,t} = \frac{\left(\frac{[(NPL_t - NPL_{t-1})/NPL_{t-1}] - \mu_{NPL}}{\sigma_{NPL}} \right) + \left(\frac{[(tier_t - tier_{t-1})/tier_{t-1}] - \mu_{tier}}{\sigma_{FL}} \right) + \left(\frac{[(DEP_t - DEP_{t-1}) - \mu_{DEP}]}{\sigma_{DEP}} \right)}{3} \quad (3)$$

As seen from the above equation, the credit risk factor is measure by using non-performing loans (NPL) and exchange rate/market risk is proxied by time-interest-earned ratio (tier). According to the results, bank specific variables and macroeconomic variables do not have any effect on the fragility of the foreign-based banks. Furthermore, asset quality, management quality and size of the bank asset are significant indicators for the bank fragility of local-based banks in Malaysia.

In addition to those efforts to investigate the fragilities of conventional banks, the BSFI index is also applied to Islamic banking to determine the banking fragilities as well. For instance, Kusuma and Asif [40] use the BSFI of Kibritçioğlu [37] to identify the fragility episodes of Indonesian Islamic banks by considering bank deposits and domestic credit proxies. The authors use the only macroeconomic variables such as ratio of M2 to reserve growth, credit growth, inflation rate and real effective exchange rate as explanatory variables of their model.

Wiranatakusuma and Duasa [41] constructs a monthly Islamic banking resilience index (IBRI) to examine the signaling macroeconomic indicators towards the resilience of Indonesian Islamic banks. The IBRI is constructed based on liquidity risk and credit risk factors. To measure liquidity risk, the authors use bank deposits. Furthermore, the credit risk factor is proxied by financing variable which is the various kinds of financings of Islamic banks. In the study, four macroeconomic variables, the ratio of M2 to international reserves, inflation rate, real effective exchange rate and credit growth, are investigated. The results of the study suggest that all of those macroeconomic variables are capable of explaining the vulnerabilities of Indonesian Islamic banks against the adverse external shocks.

5. Data and methodology

By year 2021, six participation banks are operating in Turkey. These banks are Kuveyt Turk Participation Bank, Albaraka Turk Participation Bank, Türkiye Finance Participation Bank, Turkey's Ziraat Participation Bank, Vakıf Participation Bank and Emlak Participation Bank. As explained in Section 1.2, Ziraat Participation Bank Inc., Vakıf Participation Bank Inc. and Emlak Participation Bank are established in 2015,

2016 and 2019 respectively. For this reason, regarding data availability and reliability, the analysis is conducted by considering the banks that are established before 2008. Therefore, Kuveyt Turk Participation Bank, Albaraka Turk Participation Bank, Turkiye Finance Participation Bank are included into the regression which represent 70% of the participation banking system in Turkey. Considering the fact that the origin of each banking crisis is stem from different reasons and vulnerabilities, there is lack of a standard number or list of explanatory variables in the literature. Nevertheless, there is some variables that are frequently used and found as statistically significant in the literature. Therefore, in this study, the banking level indicators are determined regarding the leading indicators of banking crisis literature.⁵ Accordingly, the indicators of the fragility of participation banks towards a banking crisis are investigated by considering banking level variables:

Capital Adequacy: capital adequacy ratio, shareholders' equity to asset ratio.

Asset Quality: growth of total assets, the ratio of fixed assets to total assets.

Earning: Return on assets, return on equity.

Management: Cost to income ratio, total operating expenses.

Liquidity: Financing to total deposits ratio (FDR).

Sensitivity: the ratio of net open position in foreign currency assets to total regulatory capital, the ratio of total securities to total assets.

Namely, in this study it is investigated if capital adequacy, asset quality, management quality, earning ability, liquidity and sensibility to market risk variables are significant to explain the banking sector fragility of participation banks in Turkey.⁶ The final data set covers the period between 2008 and 2018. The banking sector data is extracted from Bankscope, Fitchconnect and Datastream databases.

In this study, probit model is employed to investigate the significant indicators of fragilities of participation banks in Turkey. Probit model, as a binomial choice model, is seen one of the most powerful method regarding the early warning system literature [47–49]. In probit model, the dependent variable is a binary choice model and takes the values 0 and 1 with respect the occurrence of the certain event. Accordingly, in this study, the dependent variable, $Y_{(i,t)}$, refers to the fragility episode (FE) of the participation banks in Turkey. In this study, the medium and high fragility episodes are considered as fragility episode. In this respect, FE take the value 1 if the participation banks are medium or high fragile to banking crisis. It takes the value 0 referring that the banks are experiencing a tranquil episode.

$FE_{i,t} = 0$, if the participation banks are in a tranquil episode at time t .

$FE_{i,t} = 1$, if the participation banks are in a medium/high fragility episode at time t .

The $FE_{i,t}$ relies on latent variable $y_{i,t}^* = X_j\beta + \varepsilon$ where $\varepsilon \sim N(0, 1)$. The regression equation to examine the relationship between the explanatory variables and the probability of fragility towards banking crisis can be given as:

$$\Pr(Y_{i,t} = 1|X_{i,t}) = \varphi(X'_{i,t}\beta) + \varepsilon_{i,t} \quad (4)$$

Where $X_{(i,t)}$ is the set of explanatory variables, β is the is a vector of the coefficients and φ is the cumulative distribution. Pr denotes the probability of experiencing fragility episode at time t . The binary dependent variable, $Y_{(i,t)}$ is regressed by using explanatory variables, banking level sector variables between the time period 2008 and 2018 by employing probit model.

⁵ See Masood et al. [42]; Saeed et al. [43]; Paulet and Mavoori [44].

⁶ To be able to specify the superior explanatory variable set regarding the statistical significances of the variables, they alternately included into analysis and various combinations of the variables are examined [45, 46].

Following Kibritçioğlu [37], the BSFI is constructed for identifying the indicators of fragilities of participation banks in Turkey. The index is comprised of credit risk, liquidity risk and exchange rate risk. In this regard, non-performing financing (NPF), bank deposits (DEP) and times interest earned ratio (tier) are used to measure credit risk, liquidity risk and exchange rate risk respectively. The BSFI can be given as:

$$BSFI1_{i,t} = \frac{\left(\frac{[(NPF_t - NPF_{t-1})/NPF_{t-1}] - \mu_{NPF}}{\sigma_{NPF}}\right) + \left(\frac{[(tier_t - tier_{t-1})/tier_{t-1}] - \mu_{tier}}{\sigma_{tier}}\right) + \left(\frac{[(DEP_t - DEP_{t-1}) - \mu_{DEP}]}{\sigma_{DEP}}\right)}{3} \quad (5)$$

The BSFI is transformed into a binary variable FE, defining the fragility episode. The participation banks in Turkey experiences three stages as high fragility, medium fragility and tranquil episodes with respect to the level of BSFI. Accordingly, banking system is experiencing a high fragility period if BSFI is less than -0.5 . This states that Islamic banks at time t are highly fragile to banking crises. The system is in medium fragility episode if BSFI is between -0.5 and 0 . On the other hand, an episode is classified as tranquil period if the BSFI exceeds 0 . μ_{NPF} , μ_{tier} and μ_{DEP} represent the arithmetic mean of non-performing financings, foreign liabilities of banks and bank deposits respectively. In addition, σ_{NPF} , σ_{tier} and σ_{DEP} are the standard deviation of each of the variable. To investigate whether bank runs are crucial for the fragilities of participation banks in Turkey, an alternative index, BSFI2, is constructed as:

$$BSFI2_{i,t} = \frac{\left(\frac{[(NPF_t - NPF_{t-1})/NPF_{t-1}] - \mu_{NPF}}{\sigma_{NPF}}\right) + \left(\frac{[(tier_t - tier_{t-1})/tier_{t-1}] - \mu_{tier}}{\sigma_{tier}}\right)}{2} \quad (6)$$

As can be seen from Eq. (6), the alternative BSFI is designed by excluding bank deposits variable from the BSFI1. In this regard, defining and detecting the fragile and tranquil episodes towards banking crisis by observing the index value is crucial as the index reveals detailed information on the business cycles within the banking system.

6. Results

To examine the significant banking level indicators of fragility of participation banks in Turkey, first the BSFI is constructed. In this regard, the fragile and tranquil episodes are determined based on the index. **Table 5** presents the fragility and tranquil episodes in Turkey between 2008 and 2018. According to the table, the participation banks in Turkey experiences 20 fragility periods and 16 tranquil periods between 2008 and 2018.⁷ It is observed that, majority of participation banks in Turkey experienced fragility episode in 2007, the year before the financial crisis. Furthermore, although it is argued that the participation banks are more resistant and perform better during the financial crisis in terms of profitability compared to conventional banks [15], the participation banks are in fragility episode in 2009 and 2010, in the following two years of the financial crisis. As the effects of the financial crisis spread rapidly to other developed and developing countries and took over the banking sectors in those countries, it is seen that participation banks in Turkey also

⁷ Since the movement paths of BSFI1 and BSFI2 are similar, the crisis dates are the same for both of the indices.

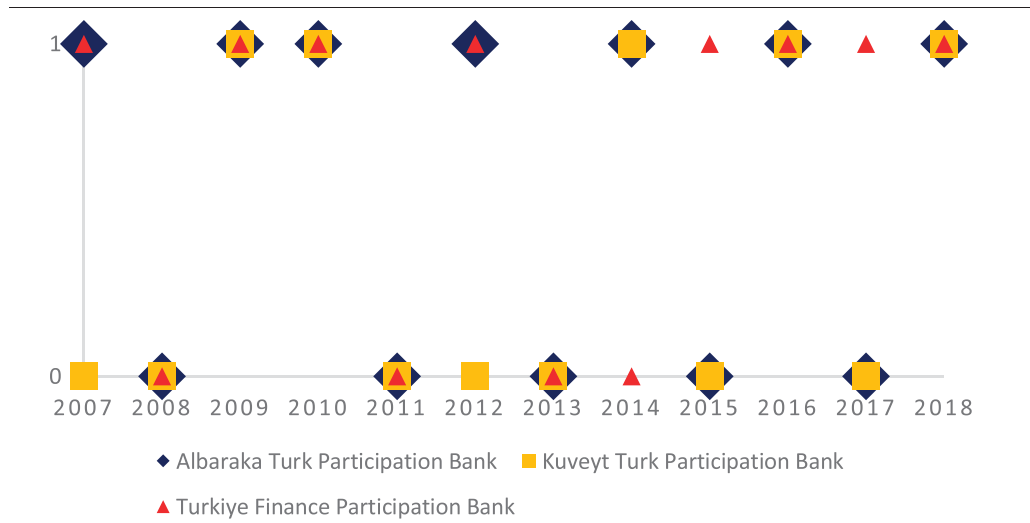


Table 5.
Fragile and tranquil episodes of the participation banks.

be affected by the outcomes of the crisis. In this regard, according to Hasan and Dridi [7], while the business models of the participation banks prevent the destructive outcomes of the 2008 crisis, the participation banks suffer from greater decline in profitability after 2009 because of their weak risk management practices. As the impact of the global financial crisis on the world economy continued in 2012, most of the countries such as USA and developed economies in the eurozone, have not been able to fully recover and overcome the negative outcomes of the crisis. With the deepened eurozone recession, debt ratios and unemployment increased in those countries. The slowdown in the global economy also affected Turkey. The GDP growth of Turkey slowed down. Furthermore, the external balance of the Turkish economy has deteriorated and the ratio of current account deficit to GDP reached 10%. In line with the global slowdown and deterioration of the Turkish economy, it is seen that the participation banking sector is adversely affected and majority of the banks in the sector experiences a fragile period in 2012. In 2014, developments such as the rapid decline in oil and natural gas prices, the inability of the European economy to recover from the recession, the slowdown in the Chinese economy and the uncertainties in the Middle East caused slowdown in the global economy. Parallel to these global developments and its continuing current account deficit problem, the Turkish economy also grow lower than expected. Accordingly, participation banking sector in Turkey experiences fragility episode in 2014. The political developments (i.e., Brexit, US Presidential elections) and concerns in the global economy (i.e., fluctuations in energy prices, uncertainty in global interest rate, exchange rate depreciations) affect the financial markets worldwide in 2016. In this regard, the growth of the Islamic finance assets has also decreased. In this regard, the main reason of the slowdown is shown as the depreciation of exchange rate in Turkey, Indonesia, Malaysia and Iran [50]. Accordingly, the table show that in 2016, the participation banks in Turkey has experienced fragility episode in line with those global and domestic developments. In this regard, when the return on assets of the participation banks in Turkey are examined, it is seen that its value decreased by 11% on average in 2016 compared to 2015. Furthermore, since the global uncertainties and the impact of the foreign exchange risks become effectual in the global scale, the improvement of the Islamic finance sector slowed down in 2018 compared to 2017. As in 2016, the return on assets ratio of participation banks in Turkey decrease on average by 15% compared to previous year.

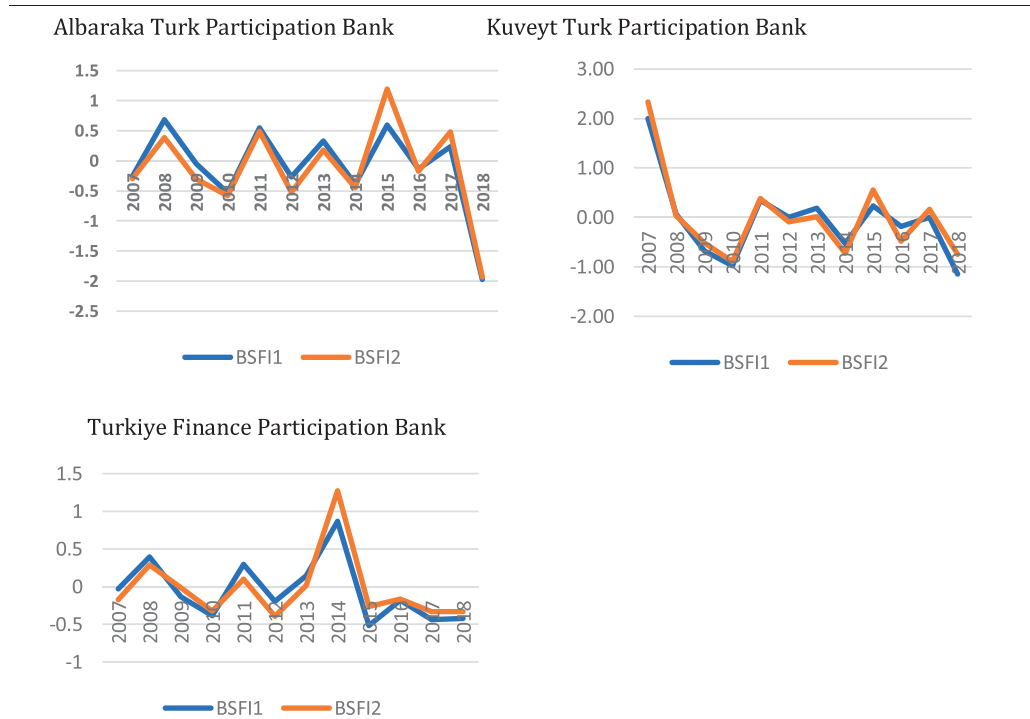


Table 6.
Banking sector fragility indices.

Table 6 present the BSFI1 and BSFI2 for the participation banks in Turkey. Accordingly, when the movement paths of the BSFI1 and BSFI2 are compared in **Table 6**, it is observed that both indices follow a similar path. In this respect, bank deposits do not play a significant role in explaining the fragility episodes in Turkish participation banks as in conventional banks [37]. As Laeven and Valencia [4] suggest, the impact of bank runs on banking crises has decreased with the savings deposit insurance.⁸

To investigate the significant indicators of fragilities of participation banks in Turkey, probit model is employed over the time period of 2008 and 2018. To remedy a possible endogeneity, the explanatory variables of the regression of the fragility of Turkish participation banks are lagged one year. The final explanatory variable set for the analysis of the significant indicators of fragility of Turkish participation banks towards banking crisis is determined by following several steps. Firstly, to indicate the significances of the variables, each independent variable is analyzed separately. Secondly, those significant variables are divided into the categories with respect to CAMELS classification. Thirdly, probit model is conducted with respect to those groups. Finally, the explanatory variables that are significant in each step constitute the final explanatory variable set. Accordingly, the final explanatory variable set is comprised of capital adequacy ratio, return on assets, net interest margin, cost to income ratio and FDR. The dependent variable is the binary fragility variable that is regressed on the lagged variables by employing panel regression.

Table 7 presents the estimation results of the probit regression. According to the table, among capital adequacy indicators, the capital adequacy ratio has

⁸ In Turkey, Savings Deposit Insurance Fund (SDIF) is a public legal entity and established to protect the rights of the account owners by compensating their losses.

Variables	Coefficient	Std. error	Z-stat.	Prob.
Capital adequacy ratio	-0.041	0.10	-3.03	0.002**
Asset growth	-0.021	0.008	-2.66	0.008**
Cost to income ratio	0.023	0.006	3.63	0.000***
FDR	-0.023	0.007	-3.31	0.001**
Return on assets	-0.035	0.007	-3.51	0.001***

* $p < 0.1$
 ** $p < 0.05$
 *** $p < 0.01$

Table 7.
 Results of the probit regression.

significantly and negatively correlated with the probability of the fragility of participation banks in Turkey. The capital adequacy ratio, which is the ratio of the total regulatory capital to risk weighted assets, is considered as one of the most crucial indicators for the safe and stable banking system by indicating the financial strength [50]. In other words, the ratio shows whether the bank's capital is sufficient against the calculated risks that the bank may be exposed to during its operations. The ratio is related to banking crisis since it mirrors the risky assets and indicates financial health and stability of the banks. To prevent possible banking crises and ensure the healthy functioning banking system, various restrictions have been imposed on the risks taken by banks. In this context, the capital adequacy ratio constitutes an important part of the Basel Criteria. According to the Basel criteria, the minimum capital adequacy ratio must be higher than 8%. In addition to the standard level of 8%, the minimum ratio of 12% is set for the Turkish banks in 2006. It has been seen as one of the most effective measures to prevent Turkish banks from experiencing capital shortages during the financial crisis [38]. According to the TKBB [36], while the capital adequacy ratio of the participation banks in Turkey is 16% in 2018, the level increases to 18% in 2019 and 2020 based on the low non-performing financings ratio and high asset quality of the banks. In line with the related literature,⁹ the results of the probit regression show that capital adequacy ratio is a significant indicator of the fragility of the Turkish participation banks to banking crisis.

Return on assets is a profitability ratio which is an important indicator for the financial performance of banks. The ratio shows the bank's ability to generate profit from its assets. In line with the related literature, the results of the analysis show that return on assets is significant indicator of the fragility of the participation banks [53]. Put differently, increasing return on assets reflects the strength and efficiency of participation banks and decreases the likelihood of experiencing a fragility towards banking crisis. Since the conventional banks operate based on interest, they have a fixed rate of return. However, as interest is prohibited by the Islamic law, the investments are based on mark-up and equity in participation banks. Furthermore, the pre-agreed return on deposits do not allowed, there is higher risks and uncertainties of return on investments [54]. For this reason, return on assets is crucial for the participation banks in Turkey.

According to the estimation results, cost to income ratio, which is measured as the operating expense as a percent of operating income, has significant impact on

⁹ See Klomp and de Haan [51]; Korkmaz et al. [52].

the fragility of the participation banks. The indicator is frequently used in the literature to measure management efficiency [55]. Furthermore, low cost efficiency is an essential factor of low profitability of banks [56, 57]. In line with the literature, the estimation results suggest that lower values of cost to income ratio, increases the likelihood of participation banks to experience banking crisis. The cost to income ratio is crucial especially for participation banks since they are found as less cost efficient than conventional banks in the countries where both banks operates in the same banking sector [58].¹⁰

Asset growth is found as statistically significant indicator and decreasing value of this variable increases the fragility of the participation banks. As Al-Kayed et al. [59] investigate, optimal asset growth has a positive impact on the performance of the participation banks. In this regard, since the asset growth is originated from TPF, those funds should be allocated to public to obtain optimal margin income and revenue sharing [60].

As conventional banks and participation banks are different in terms of financing, the loan to deposit ratio in Shari'ah banking calculated as financing to deposit ratio (FDR) [61–63]. FDR indicates the ability of participation banks to repay funds withdrawn by customers, based on financing as a source of liquidity [64]. In other words, it is the ratio of financings outstanding to third party funds (TPF) [65]. According to the results, FDR is found as negatively correlated with the fragility of participation banks in Turkey. As Kinanti [66] states, FDR has a positive impact on the profitability of participation banks. Furthermore, increasing FDR ratio increases the bank's ability to channel financing, therefore, makes participation banks less prone to banking crisis. In addition, according to Widiwati and Rusli [67], since FDR demonstrates that the bank is able to adjust the amount of funds received and the murabahah financing distributed it has also positively related with the murabahah financing. Furthermore, TPF has also has a positive impact on murabahah financing as banks accept high amount of funds, the distribution of murabahah financing increases.

The estimation results reveal that, among banking level indicators, return on assets, FDR, capital adequacy ratio, asset growth and cost to income ratio are the leading indicators of banking sector fragility of participation banks in Turkey. In this respect, return on assets, FDR, capital adequacy ratio and asset growth are found as negatively related with the fragility of participation banks. Accordingly, increasing return on assets, FDR, capital adequacy ratio and asset growth make participation banks less prone to experiencing a banking crisis. Cost to income ratio, on the other hand is also found as statically significant and positively related with the banking sector fragility of the participation banks. Therefore, increasing cost to income ratio increases the likelihood of the participation banks in Turkey to experience banking crisis.

7. Conclusion

Turkish banking sector hosts dual banking system where both conventional banking and Islamic banking operate in the same banking sector. Furthermore, the banks that operates based on Islamic banking practices are called as “participation banks”. Although the literature on the banking sector fragility indicators of conventional banks is vast, there are limited number of studies that focus on participation banks. For this reason, in this study, the significant banking level indicators of participation

¹⁰ Islamic vs. Conventional Banking.

banks towards banking crisis is investigated. The estimation is employed by conducting probit model over the time period 2008 and 2018. According to the estimation results, asset growth, capital adequacy ratio, FDR, return on asset and cost to income ratio are significant banking level indicators of the banking fragility of participation banks in Turkey. Accordingly, increasing return on assets, FDR, capital adequacy ratio and asset growth decreases the likelihood of experiencing banking crisis. On the other hand, the results suggest that increasing cost to income ratio increases the probability of banking sector fragility of participation banks.

Following Kibritçiöğlü [37], the BSFIs are constructed in order to investigate whether bank deposits are essential role in determining the banking sector fragility of the participation banks in Turkey. It is important to examine the role of bank runs in Turkish participation banking sector since they play a crucial role in majority of the banking crisis as Asian crisis and Argentina crisis in 1989 [4, 67]. However, it is found that both of the indices follow the same pattern, revealing that bank deposit are not crucial in determining the fragility of the participation banks. In line with the existing literature, with the adoption of deposit insurance, the role of bank runs in banking crisis become less effective [4, 68]. Although conventional banks and participation banks share similar objectives, they perform their functions in different manners which make their risk exposure idiosyncratic in terms of their funding methods, principles and prohibitions. As one of the fastest growing sectors of financial industry, participation banking has developed rapidly on a global scale. In addition to its rapid growth and its share in the banking sector, it attracted special attention with the financial crisis experienced in 2008. Although the participation banks are considered as they performed better compared to conventional banks during the financial crisis of 2008, a considerable amount of literature has been published after the crisis reveal that they have also experienced negative outcomes of the crisis, therefore, they are not completely safe against banking crisis [69, 70]. Furthermore, according to the results of this study, although the participation banking sector in Turkey experiencing a tranquil episode in 2008, the sector was in fragility episode in 2009, 2010 and also majority of the banks in 2007. Accordingly, by revealing the leading indicators of the banking sector fragility for participation banks, the results of this study are crucial and beneficial since policymakers may prevent potential future banking crises and take early precautions to minimize the losses by utilizing the results of this study.

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