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The contribution of participation banks in the development of the mixed banking system: The case of Turkish Republic

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Abstract. In this paper, we examine the impact of participation banks on the development of the hybrid banking system in the Turkish Republic, through an empirical study of independent variables that represent the development of participation banks such as allocated funds, raised funds and net profits, and the development of the mixed banking system that is represented by total assets and this is during the period of December 2011 to July 2018, it's about 80 observations. First, we will start with the unit root test such as ADF, PP and KPSS tests to verify the stationarity of all variables, then we will apply the Johansen cointegration test for the long-term relationship to verify if there is a long-term co-integration relationship between the dependent variable and the independent ones. The results showed that all variables are stationary at the same level (2nd difference), so they are integrated in the same order (I1), while the Johansen test found that there are three long-term cointegration relationships between the variables involved. So, we concluded that participation banks contribute in the long term to the development of the mixed banking system of the Turkish Republic.

Keywords. Participation banks, Mixed banking system, Turkey, Unit root test, Cointegration test.
JEL. D39, E49, F69, F69, G21.

1. Introduction

The empirical analysis of this study about the contribution of participation banks on the development of the mixed banking system in Turkey, uses exogenous variables that represent the development of participation banks, and endogenous variables that represent the development of the hybrid banking system. These include the rate of change in total assets of the banking system as a dependent variable, and for independent ones, we use the change's rate of collected funds, the change's rate of allocated funds, and the change's rate of net profits. The

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data are observed monthly and come from databases by the official website of the association of Turkish participatory banks covering the period between December 2011 and July 2018, that is 80 observations. The data representing all the variables of our study, are monthly data based on the rate of change calculated on the basis of the last month of the previous year.

After calculating the rate of change of the data for each variable, we obtain the indicators for the rate of change of total assets of the banking system which represent the dependent variable in our study, it is the monthly change of the total assets on the Turkish banking system, we also find the rate of change of the collected funds which is the first independent variable that reflects the monthly change for the collected funds in the Turkish participation banks, there is also the rate of change of the allocated funds which is the second independent variable measuring the monthly rate of change of the allocated funds from the participation banks in the Turkish banking system and the rate of change of the net profits which is the third independent and therefore represents the change in the net profits of the Islamic banks. All the results at the level of stationarity or in term of the long-term relationship are significant, since all the study variables are stationary at the same level, that's mean that they are integrated in the same order (I1), and this was confirmed by ADF, PP and KPSS tests of stationarity. Then we found that there are three long-term cointegration relationships between the independent variables of the participation development banks and the dependent one of the developments of the mixed banking system of the Turkish republic, this is was tested by Johansen's cointegration test of the ling term relationship using the EViews software 10.

2. Literature review

Based on a reading of several articles and other research about the relationship between Islamic banks in Turkey, the literature review of this study can be summarized in the following paragraphs:

Arslan & Ergec (2010) analyzed in an article titled "The Efficiency of Participation and Conventional Banks in Turkey: Using Data Envelopment Analysis", the efficiency of 26 conventional banks and four Islamic banks between 2006 and 2009 through the data envelopment method, their results show that while three out of ten islamic banks identified ineffective practices in 2006, 2009 and only one out of 11 banks identified as ineffective, it was also an Islamic one.

Macit (2012) examined the specific and macro-economic determinants of profitability of participatory banks in the mixed banking system of Turkey, which was based on two different indicators of profitability: ROA (Return on Assets) and ROE (Return on Equity). The author found that in terms of specific determinants of bank profitability, the ratio of unperformance of funds allocated to total credits and the log of real assets are largely significant, since the first ratio has a negative effect on profitability. The second has a positive impact on the profitability of participatory banks. The

ROE on total assets is largely significant for both indicators, but has different effects on the ROA and ROE. At the level of macroeconomic determinants of profitability, the exchange rate and the real interest rate are significant and will have a positive impact on profitability in the Islamic banks.

An article was published by Ammar, Slama, & Saidane (2013), entitled "The current practice of Islamic banks promotes growth", the authors examined the involvement of Islamic finance as an engine of growth, based on a sample of 15 countries, observed over five successive four-year periods from 1990 to 2009, and estimated the dynamic panel model under the Arellano & Bover (1995) and Blundell & Bond (1998) approach, their results do not validate, and the assumption that Islamic practice is the engine of growth in the sense of Schumper finance. This effect is limited as it can be a consequence of the low maturity of the Islamic financial system.

Abedifar (2013), demonstrated in his thesis the impact of Islamic banks on the economic development of 22 Muslim countries with mixed banking systems, during the period 1999-2009. It was based on the ratio of bank deposits to GDP represents bank deposits, the ratio of private credits to GDP represents private credits, appropriations allocated to the government sector and the annual growth rate which represents economic development. He believes there is a positive relationship between Islamic banks and economic development in some countries with a mixed banking system.

Akinci, Matousek, Radic & Stewart (2013) have analysed the development of the Turkish banking system over the past twenty-eight years (1991-2007), and analysed the impact of monetary policy on the development of banks in Turkey. On the basis of independent and dependent variables representing the development of the Turkish banking system and those representing the different monetary policies of the country. The results show that monetary policy has a direct impact on the Turkish banking system, especially at the credit level, so bank credits in Turkey depend on the characteristics of banks in particular in terms of liquidity and capital, not to mention that the liberalisation of banks and the restructuring of processes between 1990 and 2001 have a significant impact on the Turkish banking system.

Gheeraert & Weill (2014), studied the impact of the Islamic bank on the development of the banking system, in an article that circumvents the lack of data thanks to a complete and newly built database, "IFIRST", covering Islamic commercial banks worldwide over the period 2000-2005. It finds strong and consistent empirical evidence that the development of the Islamic bank leads to a faster development of the banking sector measured by the amount of private credit or bank deposits adjusted to GDP. This effect occurs through the development of a new banking sector in line with sharia law, which doesn't prevent the conventional banking system. In addition, it provides evidence that the Islamic banking system is a banking sector that complements traditional banking activities in Muslim countries,

when systems coexist, and the Islamic sector reaches an average total penetration of the banking sector.

Hafnida, Maamor & Abdullah (2015) studied the influence of Islamic banks on economic development. The development of Islamic banks is calculated by liquid liabilities, private sector credits and some Islamic banking products (Murabaha, Mudharaba, Musharaka, Ijara, Istisnaa), and economic development is measured by Islamic financial intermediation. This applies to Malaysia, Indonesia and Jordan. The authors used linear regression to test the relationship between independent variables and the dependent ones during the period 2001-2010. Their results show that Islamic financing methods have a significant impact on economic development, but private sector credits and liquid liabilities do not influence economic development.

Ali (2015), published a chapter in the Global Report of Islamic Finance, about the impact of Islamic banks on the development of the banking system in Muslim and non-Muslim countries, he used as an independent variable representing the development of Islamic banks, the volume of private sector Islamic bank loans allocated to the private sector divided on gross domestic product (GDP), and as a dependent one, the share of private sector funds allocated from commercial banks in gross domestic product, which represents the development of the banking system during the period of 1990 and 2010. The results show that Islamic banks contribute to the development of the banking system, so they grow faster than their conventional counterparts in hybrid banking systems.

Yilmaz & Güneş (2015) evaluated the effectiveness of the Turkish banking sector in terms of Islamic banks and deposit banks, using data from four Islamic banks and twenty-eight deposit banks during the 2007-2013 period. They used as variables: inputs from banks including total deposits and capital, and at the output level: total credits, income and investment, by using the JRC (Charnes, Cooper, & Rhodes, 1978) models and BCC (Banker, Charnes & Cooper, 1984). The result show that Islamic banks can produce the same amount of production using only 84,5% of the amount of contributions they used in Turkey. Similarly, deposit banks reported an average technical efficiency of 81.6%, which also suggests that DBS may have produced the same amount of output using only 81.6% of the amount of contributions they used.

Jouti (2015) studied in his thesis the relationship between Islamic banks and economic growth, based on data collected by the central bank of Republic of Iran and Malaysia, in order to find out what Islamic banks contribute to the achievement of economic objectives in Islam, the indicators used are: The share of investment-oriented financing, share of financing granted through profit sharing formulas and Compulsory Reserve Rate. The results show that Islamic banks only partially achieve Islam's economic objectives, due to the sometimes positive and sometimes negative pressures exerted by changing contexts.

Imam & Kpodar (2015), studied the relationship between Islamic banking development and economic growth, using a sample of 52 countries with data covering the period 1990-2010. Their results show that, despite its relatively small size relative to the economy and the overall size of the financial situation, the Islamic banking system is positively associated with economic growth, even after taking into account various determinants of growth. Capital accumulation and improved financial inclusion, including improved access to deposits, are the main channels of transmission. They also show that low-growth Islamic countries should further develop this segment of their banking sector, by modernizing laws, regulations, and also the infrastructure environment. Similarly, non-Islamic countries that adopt certain Islamic banking practices in their banking regulations can also contribute to stimulating growth.

Abdedifar, Hasan & Tarazi (2016) examine in their paper the relative importance of Islamic banks, alongside their conventional counterparts, in relation to banking and financial development as well as economic well-being. They used a sample of 22 Muslim countries with mixed banking systems, during the period 1999-2011, their work yielded some significant positive relationship between the market share of Islamic banks and the development of financial intermediation, financial circuits and economic well-being, particularly in low income or predominantly Muslim countries and countries with a comparatively higher uncertainty avoidance index. In addition, the results show that a greater market share of Islamic banks is associated with the higher efficiency of conventional banks.

Önder, Damar & Hekimoğlu, (2016) published an article entitled "Macro Stress Testing and an Application on Turkish Banking Sector", this article aims to analyse the profitability ahead looking and the adequacy to the capitals of the Turkish banking system under stress scenarios and the basic line. The results showed that economic growth and changes in interest rates have significant effects on the funds allocated, while the unemployment rate also has a significant effect on the funds allocated in detail. In addition, economic growth, exchange rates and unemployment rates had significant impacts on non-performing funds, while only economic growth and unemployment rates had a significant impact on non-performing retail funds.

Batir, Volkman, & Güngör (2017), examined the technical, allocative and economic efficiency of conventional and participatory banks in Turkey with the DEA (Data Envelopment Analysis) method. After finding technical, allocation and cost-effectiveness results through the Intermediation Method (AED), they used the censored regression model to determine the factors influencing effectiveness. The main objective is to analyse the effectiveness of the Turkish banking system and to compare the effectiveness of participatory banks and conventional banks. Their results from the DEA indicate that participatory banks are more effective than conventional banks. With respect to the analysis of censored regression, expenditures and loan quality have a significantly negative relationship to

the efficiency of conventional banks, but they have a positive relationship with the efficiency of Islamic banks. Although total loans have a very positive relationship, external variables have a significantly negative relationship with efficiency of both types of banks.

Boukhatem & Moussa (2018) published an article entitled "The effect of Islamic banks on GDP growth: Some evidence from selected MENA countries", their goal was twofold, they sought to establish a coherent theoretical framework for the relationship between Islamic finance and economic growth, second, they attempted to empirically assess the impact of Islamic bank funds on the economic growth of 13 developing countries in the MENA region for the period 2000-2014. They found that the development of the financial system stimulated economic growth in selected MENA countries. In addition, they found that while Islamic financial development can stimulate economic growth, this positive effect is hampered by underdeveloped institutional frameworks. The results suggest that governments consider implementing proactive and supportive economic and institutional policies that are oriented towards Islamic finance.

Aysan, & Ozturk (2018) and February examined loan models in the Turkish mixed banking system over economic cycles. They found that, like conventional banks, Islamic banks in Turkey exhibit a model of pro-cyclical lending. They also found that the funds allocated from Islamic banks don't differ significantly from the funds allocated from conventional banks by highlighting effective regulatory changes over the past decade on Islamic banks could prompt these banks to lend procyclically. To test the validity of this conjecture, they examine empirically how the state of competition in the Turkish banking system affects bank credit through economic cycles by unraveling the effects separately for Islamic and conventional banks. The results suggest that the degree of competition stimulates the procyclically lending bank to the same extent, confirming the convergence between Islamic and conventional banks in their lending models.

3. Methodology and data

The validation of our research model involves the validation of each of the relationships listed above. To do this, we will adopt a quantitative approach based first on the unit root test to show that all variables are stationary at the same level, using augmented tests Dickey & Fuller (1979) (ADF), Phillips & Perron (1988) (PP) and Kwiatkowski, Phillips, Schmidt & Shin (1992) (KPSS), so that we can move to the Johansen co-integration test to show the existence of a long-term relationship between participatory banks and the Turkish banking system. So, in order to avoid falling in the case of a spurious regression, it is necessary first to make sure that all the variables entering the regression (explained and explanatory) are stationary or at least integrated at the same level. Thus, Johansen's integration test focuses solely on the rank of the matrix β1. If the rank of this matrix is zero, then there is no co-integration relationship between the processes that

make up the Y vector. If, on the other hand, the rank of the matrix is a non-zero number, then there are co-integration relationships between the elements of vector Y. After the calculations of the rates of variation of the monthly observations of this study, which are previously identified, they are first grouped in a table in order to analyze them later statistically and empirically. For the application of those tests, we are going to use the EViews 10 software.

3.1. Unit root test

The unit root test the most used in the empirical works is the test of Dickey & Fuller (1979). The logic of this test consists in estimating the autoregressive model of order 1 a following one:

$$y_t = \phi y_{t-1} + u_t$$

And to test the worthless hypothesis $\phi = 1$, said by unit root, against the unilateral alternative $\phi<1$. If the test rejects the no hypothesis of unit root, so the studied process isn't stationary.

On the other hand, if the hypothesis worthless is rejected by the test, it means the series are stationarity. In the practice, the following, said regression of Dickey and Fuller, is used to facilitate the interpretation:

$$\Delta y_t = \psi y_{t-1} + u_t$$

The test of the worthless hypothesis $\phi = 1$ is equivalent to a test of $\psi = 0$ (because $\psi = \phi - 1$) in the regression of previous Dickey and Fuller which can also contain a constant term and/or a determinist linear tendency.

After all, the unit root test of Dickey and Fuller (noted test DF after) is successively made on the following 3 fitted models:

Model 1: $\Delta y_t = \mu + \lambda t + \psi y_{t-1} + u_t$
Model 2: $\Delta y_t = \mu + \psi y_{t-1} + u_t$
Model 3: $\Delta y_t = \psi y_{t-1} + u_t$

The models will be reduced one after the other by eliminating the tendency then the constant term in case they are not statistically significant.

But before testing the null hypothesis $\psi = 0$, it is necessary to make sure at first that residues u_t satisfy the conditions of a white noise. If such is not the case, it is necessary "to clear" it at first by inserting values delayed the explained variable ΔYt in the previous models which become:

Model 1: $\Delta y_t = \mu + \lambda t + \psi y_{t-1} + \alpha_1 \Delta y_{t-1} + \alpha_2 \Delta y_{t-2} + \ldots + \alpha_p \Delta y_{t-p} + u_t$
Model 2: $\Delta y_t = \mu + \psi y_{t-1} + \alpha_1 \Delta y_{t-1} + \alpha_2 \Delta y_{t-2} + \ldots + \alpha_p \Delta y_{t-p} + u_t$
Model 3: $\Delta y_t = \psi y_{t-1} + \alpha_1 \Delta y_{t-1} + \alpha_2 \Delta y_{t-2} + \ldots + \alpha_p \Delta y_{t-p} + u_t$

In this case, the test of the null hypothesis $\psi = 0$ is a test of Dickey and Fuller increased (noted test ADF afterward) because the models 1, 2 and 3 were "increased" by the terms Δy_{t-1}, Δy_{t-p},… and Δy_{t-p}.

The optimal number p of delays to be included is fixed automatically by a criterion of information. Phillips and Perron brought a correction non-parametric to the ADF test to allow autocorrelated residuals. The logic of their test (noted test PP afterward) is the same as that of the test ADF and suffers the same limits.

3.2. Cointegration test of Johansen

In finance, we are often brought to estimate the parameters of a linear regression by means of the slightest ordinary squares. To avoid falling in the case of a deceptive regression, it is necessary to make sure at first that all the variables entering the regression (explained and explanatory) are stationaries or at least cointegrated. A process is stationary if its statistical properties (means, variance and autocorrelations) are constant and independent from time. The stationarity of a process is generally verified by means of the unit root test, ADF or PP. If those tests reject the existence of a unit root in the process, then we can say that its stationarity.

Generally, the processes studied in economy and in finance aren't stationary at the level but stationary in first differences. These processes are said "integrated by order 1" (Noted I(1)) because it is necessary to differentiate them only once to return them stationary. More generally, a process is said integrated by order d if it is necessary to differentiate them d time to return them stationary. As a result, a stationary process is a process integrated of order 0 because we don't need to differentiate it to be stationary. Two processes are cointegrated if, at first, they are integrated by the same order d and into more their linear combination is integrated by strictly lower order in d. In particular, two processes integrated by order 1 are cointegrated if their linear combination is integrated by order 0, that is if it stationary.There are two approaches of cointegration tests: the approach of Engle & Granger (1987) and the approach of Johansen (1988). The approach of Engle and Granger is applicable only for two processes and can highlight that in most a single relation of cointegration between both processes.

To study the existence and the number of relations of cointegration which can exist between several processes, Johansen developed a multivariated approach based on the Vectorial AutoRegressive model the VAR (p) as following:

$$Y_t = \alpha_1 Y_{t-1} + \alpha_2 Y_{t-2} + \ldots + \alpha_p Y_{t-p} + U_t$$

Where Y and U are two vectors which can contain more than two elements and β are matrices of the coefficients. This model admits the

following representation which looks like the regression of Dickey and Fuller:

$$\Delta Y_t = \beta_1 Y_{t-1} + \beta_2 \Delta Y_{t-2} + \ldots + \beta_p \Delta Y_{t-p+1} + U_t$$

The cointegration test of Johansen concentrates only on the row of the matrix β_1.

If the row of this matrix is null, then there is no relation of cointegration between the processes which makes up the vector Y.

If the row of the matrix is a number r not null, then it exists r relations of cointegration between the elements of the vector Y.

3.3. Data

The following table contains the variables of our study, including the rate of change of each variable during the period of December 2011 and July 2018, that is 80 observations that are calculated on the basis of monthly data by the official website of the association of Turkish participation banks.

Table 1. *The rate of change in data during the period of December 2011 and July 2018*

Months	%CF	%AF	PN	%TABS
Jan-2012	-3,1	0,7	1,4	-0,3
Feb-2012	-1	1,5	3,5	0,3
Mar-2012	-1	1,5	4,5	0,3
Apr-2012	3,2	3,6	7,1	3,1
May-2012	7,3	9,6	9,3	3,1
Jun-2012	8,8	9,4	11,3	4,6
Jul-2012	10,2	12,4	13,6	5,5
Aug-2012	13,4	15,1	16	7
Sept-2012	15,8	16	17,5	7,5
Oct-2012	18,4	18,1	19,8	9,1
Nov-2012	20,2	21,4	21,8	9,7
Dec-2012	22,4	21,7	22,5	12,6
Jun-2013	3,4	1,7	-0,9	-0,2
Febr-2013	6,2	4,3	-0,9	1,9
Mar-2013	7,7	4,1	-0,8	4,2
Apr-2013	8,8	7,2	-0,7	5,1
May-2013	8,8	7,2	-0,7	5,1
Jun-2013	14,4	18,5	-0,5	11,5
Jul-2013	15,8	23	-0,4	14
Aug-2013	20,3	27	-0,3	17,6
Sept-2013	20,4	27,8	-0,2	20,3
Oct-2013	22,7	28	-0,1	19,4
Nov-2013	25,5	30,6	0,1	20,6
Dec-2013	27,6	34,4	0,2	26,4
Jun-2014	1,3	0,7	-0,9	3,6
Febr-2014	-1,2	-1,7	-0,9	3,3
Mar-2014	-3,9	-3,5	-0,7	3,7
Apr-2014	-3,5	-3,7	-0,4	3,5
May-2014	-2,7	-3,7	-0,3	3,6
Jun-2014	1,3	-2,3	-0,5	5,6
Jul-2014	1,5	-0,7	-0,4	6,9

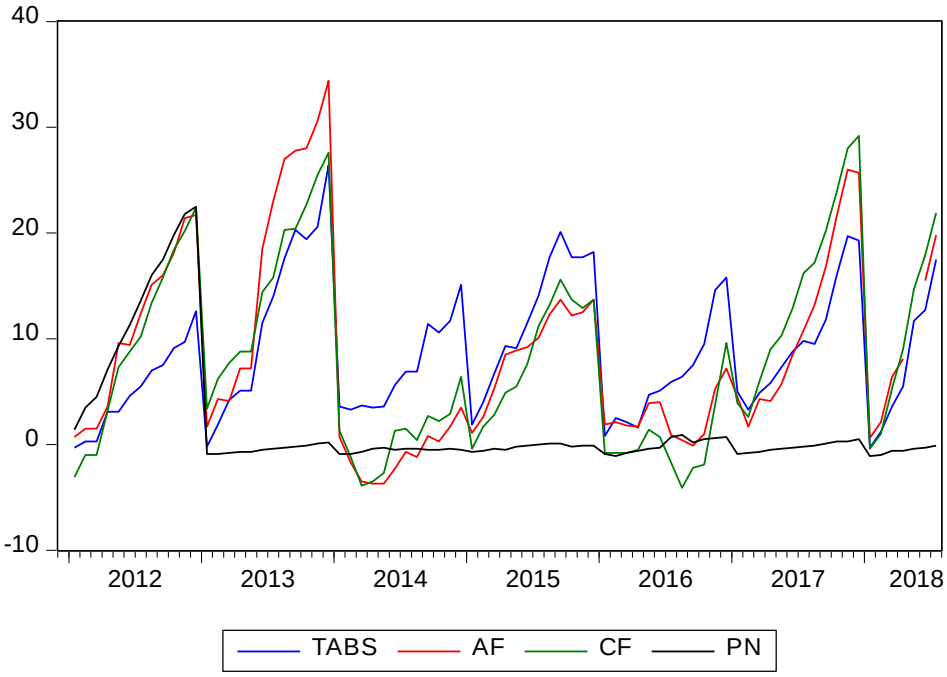
Aug-2014	0,4	-1,2	-0,4	6,9
Sept-2014	2,7	0,8	-0,5	11,4
Oct-2014	2,2	0,3	-0,5	10,6
Nov-2014	2,9	1,7	-0,4	11,7
Dec-2014	6,4	3,5	-0,5	15,1
Jun-2015	-0,4	1,1	-0,7	1,9
Feb-2015	1,7	2,6	-0,6	4
Mar-2015	2,8	5,3	-0,4	6,7
Apr-2015	4,9	8,5	-0,5	9,3
Mar-2015	5,5	8,9	-0,2	9,1
Jun-2015	7,6	9,2	-0,1	11,5
Jul-2015	11,2	10,1	0	14,1
Aug-2015	13,2	12,3	0,1	17,7
Sept-2015	15,6	13,7	0,1	20,1
Oct-2015	13,7	12,2	-0,2	17,7
Nov-2015	12,9	12,5	-0,1	17,7
Dec-2015	13,7	13,7	-0,1	18,2
Jun-2016	-0,8	1,9	-0,9	0,8
Feb-2016	-0,8	2,1	-1,1	2,5
Mar-2016	-0,8	1,8	-0,8	2,1
Apr-2016	-0,5	1,7	-0,6	1,6
May-2016	1,4	3,9	-0,4	4,7
Jun-2016	0,7	4	-0,3	5,1
Jul-2016	-1,7	0,9	0,7	5,9
Aug-2016	-4,1	0,4	0,9	6,4
Sep-2016	-2,2	-0,1	0,2	7,5
Oct-2016	-1,9	1	0,5	9,5
Nov-2016	3,8	5,3	0,6	14,6
Dec-2016	9,6	7,2	0,7	15,8
Jun-2017	3,9	4,5	-0,9	5
Feb-2017	2,6	1,7	-0,8	3,3
Mar-2017	6	4,3	-0,7	4,9
Apr-2017	9	4,1	-0,5	5,8
May-2017	10,3	5,7	-0,4	7,3
Jun-2017	12,9	8,5	-0,3	8,8
Jul-2017	16,2	10,8	-0,2	9,8
Aug-2017	17,2	13,2	-0,1	9,5
Sept-2017	20,2	16,8	0,1	11,8
Oct-2017	23,9	21,6	0,3	16
Nov-2017	28	26	0,3	19,7
Dec-2017	29,2	25,7	0,5	19,3
Jun-2018	-0,4	0,6	-1,1	-0,3
Feb-2018	1	2,1	-1	1,2
Mar-2018	5,3	6,4	-0,6	3,6
Apr-2018	9	8,1	-0,6	5,5
May-2018	14.7	14.9	-0,4	11.7
Jun-2018	17.9	15.5	-0,3	12.7
Jul-2018	21.9	19.8	-0,1	17.5

Source: by the official website of the Association of Turkish Participation Banks

4. Results

It's customary in any empirical work to begin by graphically representing the temporal evolution of the study variables, in order to highlight certain key moments in their evolution and also to have an idea

about their stationarity and cointegration. The following figure shows the rate of change of study variables during the period in question:



Graph 1. *The rate changes of variables TABS, CF, AF and PN*
Source: by the author using EViews10.

This figure shows the evolution of the change in the total assets of the banking system, the funds collected, the funds allocated and the net profits. This letter shows that all variables are comprehensively comprehended throughout the period considered, except for the period of net profit, which is characterized by stagnation after April 2012.

Descriptive statistics are known to be the set of methods used to obtain and process the data for a given variable first, in the case of our variables which contain quantitative data measured by a discrete number. It's necessary then to begin with the description of the statistical characteristics of our observations which are mainly:

The concentration characteristics of which the mean used to calculate the sum of the values of the variable weighted by the relative frequencies, the median which is the value of the statistical variable that shares the statistical series into two parts of total equal numbers. Dispersion characteristics such as the standard deviation which is intended to measure the dispersion or spread of a set of values around their mean, the asymmetry coefficient (Skewness test) which corresponds to the measurement of the asymmetry of the distribution of the variables, the flattening coefficient (kurtosis test) which is a direct measure of the acuity and an indirect measure of the flattening of the distribution of the variables, if it is positive, the distribution is said to be sharp, and if it's negative, the distribution is said to be flat. The following table summarizes those statistical tests of all study variables as a follow-up:

Table 2. *Statistical description of variables*

	Variables			
	TABS	CF	AF	PN
Max	26.4	29.2	34.4	22.5
Min	-0.3	-4.1	-3.7	-1.1
Mean	8.758228	8.322785	8.677215	1.603797
Median	7.00	6.4	5.7	-0.3
Standard Deviation	6.275913	8.844279	9.105816	5.355908
Skewness	0.618658	0.573075	0.910294	2.781633
Kurtosis	2.496	2.308799	2.992671	9.605769
Observations	80	80	80	80

This table indicates that the rate of change of total assets of the banking system has an average of 8.75%, a maximum value of 26.4%, a minimum value of -0.3%, moreover, it is highly dispersed with an estimated standard deviation of 6.27. Thus, it is asymmetrical on the right (Skewness: 0.61), and distributed according to Gaussian law (5.87% > 5%). For the independent variables, which are the rate of change of the collected funds, the rate of change of the allocated funds and the rate of change of the net profits, have an average of 8.32%, 8.67%, 1.6%, a minimum value of -4.1%, -3.7%, -1.1%, and a maximum value of 29.2%, 34.4%, 22.5% more, they are strongly dispersed with a standard deviation of 8.84, 9.10, 5.35, so they are asymmetric to the right (Skewness: 0.57, 0.91, 2.78).

After the statistical description of the variables, the unit root test and the co-integration test will be used to verify the long-term stationarity and relationship of the variables. Most econometric studies are based first on stationary assumptions that state that the probabilistic properties of the studied variables remain stable over time. In this study, the null hypothesis of non-stationarity of variables is tested using the ADF unit root tests of Dickey & Fuller (1979) and PP of Philips & Perron (1988) and KPSS of Kwiatkowski *et al.* (1992).

The results of stationarities are all summarized in the tables below, each table represents the results of each variable at level, first and second difference, to show that all variables are stationary at the same level, in another way that they are integrated in the same order (I1), so that the integration test of Johansen's long-term relationship can be done, each level contains three models, and in each model the statistical value for the ADF and PP test must be greater than the critical value with significant p-values, must be less than 5% (0.05) and vice versa for the KPSS test, where the p-values and the statistical value must be less than the critical value. The following table presents the stationary results of the dependent variable on the basis of the three tests:

Table 3. *Stationarity Results of "TABS"*

TABS	At level							
	ADF			PP			KPSS	
	statistic	crit val.	p-value	statistic	crit val.	p-value	statistic	crit val.
Model 1	-4.01932	-3.520307	0.0022	-4.09052	-3.520307	0.0018	0.103938	0.739000
Model 2	-3.95966	-4.085092	0.0142	-4.03465	-4.085092	0.0115	0.078146	0.216000
Model 3	-2.11808	-2.596160	0.0336	-2.11808	-2.596160	0.0336		
	1st difference							
	ADF			PP			KPSS	
	statistic	crit val.	p-value	statistic	crit val.	p-value	statistic	crit val.
Model 1	-1.88260	-3.538362	0.3383	-9.41261	-3.521579	0.0000	0.053982	0.739000
Model 2	-1.94625	-4.110440	0.6186	-9.38449	-4.086877	0.0000	0.028073	0.216000
Model 3	-1.88693	-2.602185	0.0569	-9.48219	-2.596586	0.0000		
	2nd difference							
	ADF			PP			KPSS	
	statistic	crit val.	p-value	statistic	crit val.	p-value	statistic	crit. val.
Model 1	-12.0870	-3.538362	0.0000	-47.5700	-3.522887	0.0001	0.112137	0.739000
Model 2	-11.9528	-4.110440	0.0000	-47.4220	-4.088713	0.0001	0.107535	0.216000
Model 3	-12.217	-2.602185	0.0000	-65.5237	-2.597025	0.0000		

Source: by the author using EViews10.

From this table, it can be seen that the data of the dependent variable are not stationary at the level, but according to the PP test and the KPSS one, they are stationary at the first difference. In the second difference, the three tests (ADF, PP, KPSS) showed the stationary of all variables. It can therefore be concluded that the data of the dependent variable are stationary in the second difference.

The following table summarizes the results of the tests carried out to verify the stationarity of the first independent variable (CF).

Table 4. *Stationarity Results of "CF"*

CF	At level							
	ADF			PP			KPSS	
	statistic	crit. val.	p-value	statistic	crit. val.	p-value	statistic	crit. val.
Model 1	-3.24963	-3.52030	0.0209	-3.24963	-3.52030	0.0209	0.095391	0.739000
Model 2	-3.22999	-4.08509	0.0865	-3.22999	-4.08509	0.0865	0.095391	0.216000
Model 3	-2.17997	-2.59616	0.0290	-2.23848	-2.59616	0.0252		
	1st difference							
	ADF			PP			KPSS	
	statistic	crit. val.	p-value	statistic	crit. val.	p-value	statistic	crit. val.
Model 1	-8.47966	-3.52157	0.0000	-8.54768	-3.52157	0.0000	0.056758	0.739000
Model 2	-8.42743	-4.08687	0.0000	-8.48736	-4.08687	0.0000	0.051646	0.216000
Model 3	-8.53406	-2.59658	0.0000	-8.60987	-2.59658	0.0000		
	2nd difference							
	ADF			PP			KPSS	
	statistic	crit. val.	p-value	statistic	crit. val.	p-value	statistic	crit. val.
Model 1	-7.64199	-3.53836	0.0000	-54.1213	-3.52288	0.0001	0.500000	0.739000
Model 2	-7.51179	-4.11044	0.0000	-54.9425	-4.08871	0.0001	0.500000	0.216000
Model 3	-7.73192	-2.60218	0.0000	-54.4897	-2.59702	0.0000		

It can be seen from this table that, at level, the KPSS test is the only test that showed data stationarity. In the first difference, the three tests have

significant results, and the same thing in the second difference, except in the second model of the KPSS test. So, we can see that the data for this variable are generally stationary at the second difference. The results of the stationary tests of the second independent variable (AF) are presented as follows:

Table 5. *Stationarity Results of "AF"*

AF	At level							
	ADF			PP			KPSS	
	statistic	crit. val.	p-value	statistic	crit. val.	p-value	statistic	crit. val.
Model 1	-3.10770	-3.52030	0.0302	-3.24048	-3.52030	0.0215	0.112125	0.739000
Model 2	-3.13670	-4.08509	0.1056	-3.26719	-4.08509	0.0798	0.078339	0.216000
Model 3	-2.13722	-2.59616	0.0322	-2.13722	-2.59616	0.0322		
	1st difference							
	ADF			PP			KPSS	
	statistic	crit. val.	p-value	statistic	crit. val.	p-value	statistic	crit. val.
Model 1	-8.30343	-3.52157	0.0000	-8.29820	-3.52157	0.0000	0.040658	0.739000
Model 2	-8.25159	-4.08687	0.0000	-8.24397	-4.08687	0.0000	0.038208	0.216000
Model 3	-8.35918	-2.59658	0.0000	-8.35641	-2.59658	0.0000		
	2nd difference							
	ADF			PP			KPSS	
	statistic	crit. val.	p-value	statistic	crit. val.	p-value	statistic	crit. val.
Model 1	-8.12695	-3.52561	0.0000	-65.3532	-3.52288	0.0001	0.422704	0.739000
Model 2	-8.04906	-4.09254	0.0000	-58.5291	-4.08871	0.0001	0.433876	0.216000
Model 3	-8.18515	-2.59793	0.0000	-57.3211	-2.59702	0.0000		

At level, the KPSS test is the only test that showed data stationary in both models, in addition, at first difference the three tests have significant results, and the same thing at the second difference, except in the second model of the KPSS test. So, we can also say that the data of this variable are stationary at the second difference. The results of stationarity of the third exogenous variable (NP) are grouped as follows:

Table 6. *Stationarity Results of "PN"*

PN	At level							
	ADF			PP			KPSS	
	statistic	crit. val.	p-value	statistic	crit. val.	p-value	statistic	crit. val.
Model 1	-2.32984	-3.51667	0.1654	-2.47909	-3.51667	0.1244	0.455207	0.739000
Model 2	-2.77033	-4.08002	0.2126	-2.96326	-4.08002	0.1492	0.136883	0.216000
Model 3	-2.25653	-2.59494	0.0241	-2.34431	-2.59494	0.0193		
	1st difference							
	ADF			PP			KPSS	
	statistic	crit val.	p-value	statistic	crit val.	p-value	statistic	crit val.
Model 1	-8.39201	-3.51784	0.0000	-8.38527	-3.51784	0.0000	0.044356	0.739000
Model 2	-8.33429	-4.08166	0.0000	-8.32562	-4.08166	0.0000	0.046103	0.216000
Model 3	-8.44574	-2.59534	0.0000	-8.44075	-2.59534	0.0000		
	2nd difference							
	ADF			PP			KPSS	
	statistic	crit val.	p-value	statistic	crit val.	p-value	statistic	crit val.
Model 1	-14.3151	-3.51905	0.0001	-66.1437	-3.51905	0.0001	0.339580	0.739000
Model 2	-14.2204	-4.08335	0.0001	-69.8194	-4.08335	0.0001	0.315713	0.216000
Model 3	-14.4111	-2.59574	0.0000	-65.3607	-2.59574	0.0000		

This table shows that at the level, the KPSS test is the only one that has meaningful results in both models, in addition, at the first difference, the ADF, PP, KPSS tests, have significant results, at the second difference, all results are significant, except that the second KPSS test model where the statistical value is higher than the critical one. So, we can say that the data of this variable are stationary at the second difference. Globally, we found that all variables, dependent and independent ones, are all stationary at the same level (second difference), in another way, we can say that they are integrated at the same order (I2), this will allow us to pass doing the Johansen's cointegration test of the long-term relationship to know whether there is a long term relationship or the opposite between the study variables. After showing that all variables are integrated in the same order (I2), it remains to be seen whether there is a long-term relationship between them or not, starting first with the selection of the optimal number of delays. Before testing the cointegration between those variables, it is necessary firstly to find the optimal number of delays to include in this test. This number is selected by different information criteria, such as the AIC, BIC and HQ, which are most used in the largest proportion of econometric studies. So, the optimal number of delays being the one that minimizes the information criteria, the table below gives the results of the selection:

Table 7. *Optimal Delay Selection Criteria*

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-875.345	NA	246371.4	23.76610	23.89064	23.81578
1	-698.7179	329.3868*	3210.313*	19.42481*	20.04753*	19.67322*
2	-694.3526	7.668761	4414.239	19.73926	20.86016	20.18640

Notes: * indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion

The information criteria AIC, SC, HQ, FPE, LR provide the same estimated number of delays which is 1, while the results of the trace statistics and those of the maximum own value are summarized in the tables below where "R" identifies the number of long-term relationships retained. So, after selecting the optimal number of delays which is equal to (1), we will test now the cointegration of Johansen's long-term relationship, and for this, we will base ourselves on the statistics of the trace and then those of the maximum own value. These statistics are summarized in the following two tables:

Table 8. *The statistics of the Trace*

Hypothesized No. Of CE (s)	Eigenvalue	Trace Statistic	0.05 Critical Val.	Prob**
None*	0.278516	52.39322	47.85613	0.0176
At most 1	0.195921	28.88922	29.79707	0.0633
At most 2	0.101838	13.18904	15.49471	0.1080
At most 3	0.072977	5.455934	3.841466	0.0195

Notes: * denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values.

According to this table, the trace statistics show that there is no co-integration between the independent variables including the funds collected, the funds allocated and the net profits of the Turkish participation banks, and the dependent variable represented by the total assets of the Turkish mixed banking system. This is shown by the non-significance of the associated probabilities.

Table 9. *Statistics of the maximum own value*

Hypothesized No. Of CE (s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob**
None	0.278516	23.50400	27.58434	0.1530
At most 1	0.195921	15.70017	21.13162	0.2429
At most 2	0.101838	7.733108	14.26460	0.4065
At most 3*	0.072977	5.455934	3.841466	0.0195

Notes: * denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values.

According to this table, the statistics of the maximum own value show that there are three comparators between the independent variables including the funds collected, the funds allocated and the net profits of the Turkish participation banks, and the dependent variable represented by the total assets of the Turkish banking system. This is shown by the significance of the associated probability. The existence of a long-term relationship between the independent variables and the dependent one, gives us coefficients of cointegration showing the relationship of each independent variables to the dependent variable, those coefficients are summarized in the following table:

Table 10. *The coefficients of co-integration*

Variables	ATSB	FC	FA	PN
Coefficients	0.317196	0.023936	-0.114081	0.147431
	-0.039475	-0.357965	0.414717	-0.082198
	0.083573	-0.228856	0.089357	0.205322
	0.185468	-0.115760	-0.056401	-0.039376

Thus, according to this chart, the coefficient associated with the variable for the funds collected is estimated to be 0.0754, (7.54%), and the coefficient associated with the variable allocated funds is -0.3596, (-35.96%) and in the end the coefficient of the last variable concerning net profits of the Islamic banks is 0.4647 (46.47%). So, those coefficients are summarized in the following cointegration equation:

$$ATSB = C + 0.0754*FC - 0.3596*FA + 0.4647*PN$$

From this equation, it can be attributed that a 1% increase in total assets in Turkey's banking system would result in a long-term decrease of 35.96% in funds allocated and a 7.54% increase in funds raised and net profits would increase by 46.47%.

Thus, on the basis of these econometric results, it can be said that participation banks contribute partially to the development of the banking system where the existence of conventional banks in the hybrid banking system in the Turkish Republic.

5. Conclusion

The aim of this paper was to find out whether the Turkish participation banks are contributing to the development of the banking system, which is also characterized by the existence of conventional banks, and to solve this problem, we have seen several empirical works previously dealing with the same context. This is why we based ourselves on an empirical study, which first summarizes the stationary tests and then the cointegration of Johansen's long-term relationship, whose results for the unit root test have shown that all variables of the study are stationary at the same level, and therefore they are integrated in the same order, as well as the results of the Johansen cointegration test have shown that there are three long-term relationships between them, but this has been confirmed only by the statistics of the maximum own value and the opposite for the trace statistics. Hence it can be said that participation banks contribute partially on the development of the mixed banking system of the Turkish Republic.

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