



ISLAMIC (PARTICIPATION) BANKING AND ECONOMIC GROWTH: EMPIRICAL FOCUS ON TURKEY



 **Gonca Atici**¹

Istanbul University, School of Business, Business Administration, Avcilar Campus, Avcilar, Istanbul, Turkey
Email: goncaatici@istanbul.edu.tr



ABSTRACT

Article History

Received: 23 July 2018

Revised: 30 August 2018

Accepted: 2 October 2018

Published: 8 November 2018

Keywords

Islamic (participation) banking

Economic growth

Turkey

Granger causality

VECM

Supply-leading

Demand-following.

JEL Classification:

E02; E20; E60; G20.

The purpose of this study is to analyze the causal relationship between Islamic (participation) banking and economic growth in Turkey. A quarterly time-series data is employed from 2008:1 to 2018:1. Vector Error Correction Model (VECM) based Granger causality test is conducted to find evidence in support of “supply-leading” or “demand-following” hypothesis. Empirical results of the study suggest a significant unidirectional long-run causality from Islamic (participation) banking to economic growth that confirms the “supply-leading” hypothesis. This finding is noteworthy as it emphasizes the crucial complementary role of Islamic (participation) banking besides conventional banking in Turkey. Findings draw attention to the fact that, efforts to improve the underlying regulatory system of Islamic (participation) banking will have positive contributions on growth. Besides, new business models/ Islamic banking window and diversified instruments are expected to position Turkey in a well-deserved place in the international Islamic banking industry.

Contribution/ Originality: This study contributes to the existing literature by examining the participation banking and economic growth nexus. This study is the only study which has investigated the causal relationship by covering the latest data for a meaningful time frame. The paper's primary contribution is the finding that suggests a “supply-leading” hypothesis.

1. INTRODUCTION

Financial development and economic growth nexus has been one of the most discussed subjects in literature. Although importance of financial development and economic growth is well recognized, the direction of causality between them is still an issue of controversy both for developed and developing countries which has different implications and consequences in terms of economic policies.

Schumpeter (1911) is the first to argue that financial services are essential for technological innovation and economic growth. Goldsmith (1959) criticizes the increasing number of opponents that ignore the importance of financial aspects and even treat finance as a secondary issue. In his study, he stresses the strong relation between financial and economic development. The relation in which financial services encourage economic growth is referred to as “supply-leading” hypothesis named after (Patrick, 1966). According to “supply-leading” or alternatively “finance-led growth hypothesis” there is a causal relationship from financial development to economic

growth which also posits the view that financial development stimulates economic growth by being a productive determining cause of it. [Mckinnon \(1973\)](#) and [Shaw \(1973\)](#) argue the existence of a banking system free from restrictions and they support a liberalized financial system that enables financial deepening, increasing competition that encourages economic growth. They assert that a well-developed financial sector minimizes transaction costs, monitoring costs and asymmetric information which in turn improves financial intermediation that contributes both to diversification of financial services and accessibility of these services by the market participants in real sector.

On the other end of this hypothesis, an opposing view is asserted by [Robinson \(1952\)](#) who argues that financial development follows economic growth. This view, which is called “demand-following” hypothesis, suggests that causality flows from economic growth to financial development. Within this concept, development of real economy triggers demand for financial services which in turn introduces new financial institutions, new financial instruments and transforms the current ones to satisfy the increasing demand for financial services. [Gurley and Shaw \(1967\)](#), [Goldsmith \(1969\)](#) and [Jung \(1986\)](#) support the “demand-following” phenomenon.

Another dimension of financial development and economic growth debate is suggested by [Patrick \(1966\)](#). This approach incorporates the two views and is referred to as “the stage of development hypothesis”. According to this hypothesis, “supply-leading” hypothesis is expected to be dominant in the initial stages of economic development. During this period, financial development causes real capital formation, new spectrum of opportunities and services for the market participants which in turn accelerates a self-feeding economic growth. Following the gradual diminishing and dissolving effect of “supply-leading” development phase, “demand-following” development period launches ([Calderon and Liu, 2003](#)).

Although theoretical and empirical research on financial development and economic growth nexus is voluminous, studies written on the causal link between Islamic (participation) banking and economic growth for the case of Turkey are still scarce. Therefore, this study seeks to shed light to this gap by covering the latest data and econometric techniques that would allow us to test the prevailing hypothesis proposed by literature. The rest of the paper is organized as follows. Section 2 presents Islamic (participation) banking in Turkey. Section 3 reports empirical literature. Section 4 discusses data and research methodology, Section 5 presents empirical results and discussion, and Section 6 concludes the paper and make recommendations.

2. ISLAMIC (PARTICIPATION) BANKING IN TURKEY

Islamic banking as a mainstream industry has an increasing presence not only in Muslim populated countries but also in the rest of the world. By transforming from a micro-lending institution to a systematic model, it keeps attracting international appetite. Islamic Bank of Britain is the first to establish a fully-fledged Islamic bank in 2004 in order to satisfy the customer demand for Islamic financial products and services in a country outside the Islamic world. Likewise, Britain’s issuance of its first Sukuk -the Islamic equivalent of bond- in 2014 was a considerable step that is taken in terms of its position in the Islamic finance industry ([CityUK, 2015](#)). According to the [World Islamic Banking Competitiveness Report of Ernst & Young \(2016\)](#). Islamic banking achieved a growth rate of 16% between years 2010-2014, despite all unfavorable local and regional eopolitical developments in the aftermath of the global financial crisis.

Islamic (participation) banking has a special and promising feature in the Turkish financial system. Few empirical studies that have been conducted to explore the characteristics of it ([Cevik and Charap, 2011](#); [Ongena and Şendeniz-Yüncü, 2011](#)) reveal the importance of the subject and pointed to the need for further research on it. In Turkey, Islamic (participation) banks are performing side by side with conventional banks. Key difference of conventional and Islamic (participation) banking system is the subject of interest. As interest is prohibited in Islamic belief, Islamic (participation) banking model is based on profit and loss sharing mechanism which is undertaken by profit-sharing and joint venture contracts. Profit and loss sharing mechanism operates in such a way

to balance the bank's assets and liabilities so that while borrowers share profit and loss with banks, they also share profit and loss with depositors (Aysan *et al.*, 2013).

Turkish Islamic (participation) banking history goes back to the early 1980s. Islamic finance which is a part of the banking system was first made legal in 1985 to attract more foreign direct investment (FDI) from the Gulf States. To distinguish the Islamic financial institutions from conventional banks, they were given the status of Special Finance Houses in 1984. Major local currency crisis of 1994, Asian Crisis of 1997, Russian Crisis of 1998 and local banking crisis of 2001 had adverse effects on the Turkish banking system. Post crisis of 2001 was a restructuring and revitalization period for the Turkish financial system. Under the Banking Act No. 4389, Special Finance Houses were brought under the same regulations imposed on conventional banks. Following the amendments to the banking law, Special Finance Houses were renamed as Participation Banks, which allowed them to integrate fully into the financial system. Legal infrastructure has been unified with that of conventional banking under the Banking Law No 5411, in 2005 (Atici, 2017).

Currently, there are five Islamic (participation) banks operating in the Turkish banking system. As Islamic (participation) banks do not undertake the risk of interest which is one of the most important risks that must be managed in the banking system, these institutions are less sensitive to the financial crisis in this manner. According to the regulations of Turkish banking system, participation banks also have capital buffers to protect themselves towards the potential cyclical downswings. As of the end of 2017, capital adequacy ratio (CAR) of participation banks is 17.25% which is higher than deposit banks and in parallel with the sector average of 17.20%.

Table-1. Turkish Banking Sector as of the End of 2017

Banks	Number of Institutions	CAR*	Assest %	Deposits %	Loans %
Participation Banks	5	17.25	4.91	6.12	4.97
Deposit Banks	33	16.77	89.71	93.87	88.83
Development & Investment Banks	13	24.40	5.31	0	6.19
Total	51		100	100	100

Source: Banking Regulation and Supervision Agency (2018); Participation Banks Association of Turkey (2018)

*Capital Adequacy Ratio

Banking sector is the main strength of the Turkish economy. It accounts for almost 70% of the overall financial system. As presented in Table 1, participation banking has not made up a large portion of the banking sector in Turkey. Even so, it has managed to maintain its high growth rate despite the challenges in local and global environment. With the help of the regulatory reforms covering corporate governance issues and regulations on new business models/ window system and insurance mechanisms specific to this field, Islamic (participation) banking is expected to gain ground further to encourage new market entrants that might use technology based market strategies and contribute to the deepening and sophistication of the Turkish financial system.

3. EMPIRICAL LITERATURE

Islamic Banking and economic growth nexus is analyzed empirically by several researchers from different countries. However, test results are mixed and causality patterns differ from each other. Furqani and Mulyany (2009) examined the interaction of Islamic banking and economic growth for Malaysia by employing Cointegration and Vector Error Model (VECM). They used a time series data of total Islamic bank financing, real Gross Domestic Product (GDP) per capita, fixed investment and trade activities for the period of 1997:1-2005:4. Their findings for the short-run reveal that only fixed investment granger causes Islamic banking to develop. Whereas, in the long-run they found a bi-directional relationship between Islamic bank development and fixed investment. As an evidence to support "demand following" hypotheses, they found a causal link that runs from GDP to Islamic banking development in the long-run and vice versa. Gudarzi *et al.* (2012) examined Islamic Banking development and economic growth nexus for the case of Iran and Indonesia by using quarterly data for the period 2000:1-2010:4.

They utilized the bound testing approach of Cointegration and Error Correction Models (ECM), developed within an Autoregressive Distributed Lag (ARDL) framework. Their results suggest a significant bi-directional causality between Islamic banking development and growth for the short and long term. Adeyeye *et al.* (2015) specifically tested whether “supply-leading” hypothesis holds in the case of Nigeria. Data covers the period of 1981-2013. Their results provide weak evidence in favor of “supply-leading” hypothesis but rather support “demand-following” hypothesis. Abduh and Chowdhury (2012) analyzed the long-run dynamic relationship between Islamic banking development and economic growth in the case of Bangladesh. They structured a quarterly time-series data covering the variables of economic growth, total financing and total deposit for the period of 2004:01- 2011:02. Cointegration and Granger Causality tests reveal a positive and significant relationship between Islamic bank financing and economic growth for the short and long-run. Abduh and Azmi (2012) examined the relationship between Islamic banking development and economic growth in the case of Indonesia. They utilized Bound Testing Approach of Cointegration and ECM within an ARDL framework for the quarterly data collected for the period of 2003:1-2010:2. Their results support a bi-directional significant relationship between Islamic financial development and economic growth for the short and long run. Sassi and Goaid (2011) analyzed the relationship between the Islamic financial development and growth for the Middle East and North Africa (MENA) region. They conducted their study using an unbalanced panel data from 16 MENA region countries based on system Generalized Method of Moments (GMM) estimation of a dynamic panel model. Results of their study demonstrate that the relationship between the financial development and growth is quite heterogeneous across MENA Countries. The relation is negative for petroleum exporting MENA Countries and positive but not significant in MENA Countries without oil. Masih *et al.* (2009) tested the causality between financial development and economic growth for Saudi Arabia. They applied error correction and Variance Decomposition Techniques including Long-Run Structural Modelling (LRSM). Results of their study support “supply-leading” hypothesis rather than “demand-following” hypothesis at the early stage of development of the economy. Jobarteh and Ergec (2017) examined Islamic finance development and economic growth nexus of Turkey for the period of 2005:M12-2015:M11 by employing econometric methods of Unit root, Cointegration and Granger causality in a VECM framework. Their results reveal a uni-directional short and long-run causality that flow from Islamic finance development to economic growth.

Out of the extensive research carried out in this field, there are no sufficient works conducted with regard to Islamic (participation) banking and economic growth nexus for Turkey. To help filling this gap, this study tries to empirically examine the relationship between Islamic (participation) banking and economic growth for the case of Turkey. The study is guided by the following questions:

Q1: Is there any significant causal relationship between Islamic (participation) banking and economic growth, which confirms “supply-leading” or “demand-following” hypothesis for the case of Turkey?

Q2: If there is, what can be recommended as an economic policy?

4. DATA AND RESEARCH METHODOLOGY

This study aims to present whether Islamic (participation) banking development and economic growth causality exists in Turkey. Quarterly time-series data is collected from OECD, IMF, Banking Regulation and Supervision Agency (BRSA) and Participation Banks Association of Turkey (PBAT). The period under review spans from 2008:1 to 2018:1.

Granger (1969) suggests a time series data based approach in order to check for causality. In this approach, “a” is a cause of “b”, if it is “useful” in forecasting “b”. The term “useful” means that, “a” is capable of increasing the certainty of the prediction of “b” regarding the forecast, by only considering the past values of “b” (Foresti, 2007). In this paper, the empirical results are calculated within the Granger causality approach in order to test whether Islamic (participation) banking development granger causes economic growth and/or vice versa. For this purpose, the models below are formed including Prod (Productivity), FCF (Fixed capital formation), FC (Funds collected),

and E (Equity). It must be noted that variables are seasonally adjusted, deflated and all of them are employed by taken their natural logarithm.

1. *Group of Models*

$$LRProd_t = \alpha_0 + \alpha_1 LFC_t + e_1 a \quad (1-a)$$

$$LFC_t = \beta_0 + \beta_1 LRProd_t + e_2 a \quad (1-b)$$

$$LRProd_t = \gamma_0 + \gamma_1 LE_t + e_1 b \quad (2-a)$$

$$LE_t = \delta_0 + \delta_1 LRProd_t + e_2 b \quad (2-b)$$

2. *Group of Models*

$$LRF CF_t = \rho_0 + \rho_1 LFC_t + e_1 c \quad (3-a)$$

$$LFC_t = \sigma_0 + \sigma_1 LRF CF_t + e_2 c \quad (3-b)$$

$$LRF CF_t = \varphi_0 + \varphi_1 LE_t + e_1 d \quad (4-a)$$

$$LE_t = \vartheta_0 + \vartheta_1 LRF CF_t + e_2 d \quad (4-b)$$

Gross Domestic Product (GDP) per capita is a common statistic that is used to represent the economic level of a particular country by dividing GDP to total population, for a certain time frame. Still, as [Acemoglu et al. \(2015\)](#) state, total population includes children, the elderly, and those who are not employed or who do not take part in production. A natural solution to this situation is to focus on GDP per worker, defined as GDP over employed. This measure gives a better understanding with regard to the amount that each worker produces on average. Though GDP (income) per worker and productivity are not identical concepts, they are very closely related and variation in their calculations are minor. So, using GDP per employed allows us to use the term productivity (Prod), as well. *LRProd* is the natural logarithm of *Prod* as the first represent of the real economic activity in Turkey. *LRF CF*, the natural logarithm of Gross Fixed Capital Formation is employed in real terms as the second represent of the real business activity that is a measure of net new investments by enterprises in the domestic economy in fixed capital assets comprising items like dwellings, machinery and equipment, during an accounting period.

As an initial Islamic (participation) banking development indicator, *LFC* is included in the study, as the natural logarithm of Funds Collected by Islamic (participation) banking system. As the second financial development indicator, Equity is covered in its natural logarithm form as *LE*, to represent Islamic (participation) banking sector.

$\alpha, \beta, \gamma, \delta, \rho, \sigma, \varphi$, and ϑ are coefficients to be determined and $e_1 a, e_2 a, e_1 b, e_2 b, e_1 c, e_2 c, e_1 d$, and $e_2 d$ are the error terms.

First step of the study is to understand whether financial development and economic growth series are stationary or non-stationary (contain unit root or not). According to [Fuller \(1976\)](#) causality analysis is spurious when there is presence of unit root in a time-series data which reduces forecast accuracy. In order to test for stationary, Augmented [Dickey and Fuller \(1979\)](#) and [Phillips and Perron \(1988\)](#) tests are applied. As a rule of thumb, ADF test is conducted with the inclusion of a constant and trend, for each time-series. Null hypothesis (H_0) and alternative hypothesis (H_1) are as follows: H_0 : variable is not stationary or got unit root. H_1 : Stationary. Failure to reject the null hypothesis implies that the linear combination of the variables is non-stationary. Unit root test results are provided at Table 2.

As a second step, presence of cointegration check is made since causality can occur when variables are cointegrated. [Johansen and Juselius \(1990\)](#) have developed two test statistics –the trace test and the maximal eigenvalue test– to determine the number of the cointegrating vectors. But before applying Johansen and Juselius cointegration tests, we need to determine the optimal lag length “n” in VAR model. By using the optimal lag length, Johansen cointegration test is employed to determine the existence of long-run stationary equilibrium relationship among variables. The presence of cointegration suggests that the variables have a long-run relationship. If there is

no cointegration of variables, then there is no evidence of a common trend in the movement of the variables. Results of Table 3 reveal the cointegration relation of the variables.

If variables are non-stationary at level but stationary at their first difference, which means time series are cointegrated, we can run causality test that is based VECM, restricted Vector Autoregressive (VAR) model, in order to examine both short-run and long-run dynamics of the series. To find “p” value for each model, the system equation of coefficient is found in the specifications. Δ , is the first difference of the operator. Coefficient in each of the Error Correction Term (ECT) equation, (ω), which is negative and significant, suggests that there is a long-run causality running from independent variable to the dependent variable. In other words, there would be a speed of adjustment towards long-run equilibrium. Assuming the presence of cointegrating vector among the variables, Granger causality equations expressed in a VECM base are formed as follows:

1. *Group of Models*

$\Delta LProd_t = \alpha_0 + \sum_{i=1}^n \alpha_1 \Delta LProd_{t-i} + \sum_{i=0}^n \alpha_2 \Delta LFC_{t-i} + \omega ECT_{t-1} + u_t$	(5-a)
$\Delta LFC_t = \beta_0 + \sum_{i=1}^n \beta_1 \Delta LFC_{t-i} + \sum_{i=0}^n \beta_2 \Delta LProd_{t-i} + \omega ECT_{t-1} + u_t$	(5-b)
$\Delta LProd_t = \gamma_0 + \sum_{i=1}^n \gamma_1 \Delta LProd_{t-i} + \sum_{i=0}^n \gamma_2 \Delta LE_{t-i} + \omega ECT_{t-1} + u_t$	(6-a)
$\Delta LE_t = \delta_0 + \sum_{i=1}^n \delta_1 \Delta LE_{t-i} + \sum_{i=0}^n \delta_2 \Delta LProd_{t-i} + \omega ECT_{t-1} + u_t$	(6-b)
Group of Models	
$\Delta LFCF_t = \rho_0 + \sum_{i=1}^n \rho_1 \Delta LFCF_{t-i} + \sum_{i=0}^n \rho_2 \Delta LFC_{t-i} + \omega ECT_{t-1} + u_t$	(7-a)
$\Delta LFC_t = \sigma_0 + \sum_{i=1}^n \sigma_1 \Delta LFC_{t-i} + \sum_{i=0}^n \sigma_2 \Delta LFCF_{t-i} + \omega ECT_{t-1} + u_t$	(7-b)
$\Delta LFCF_t = \varphi_0 + \sum_{i=1}^n \varphi_1 \Delta LFCF_{t-i} + \sum_{i=0}^n \varphi_2 \Delta LE_{t-i} + \omega ECT_{t-1} + u_t$	(8-a)
$\Delta LE_t = \theta_0 + \sum_{i=1}^n \theta_1 \Delta LE_{t-i} + \sum_{i=0}^n \theta_2 \Delta LFCF_{t-i} + \omega ECT_{t-1} + u_t$	(8-b)

Following hypothesis is tested under the long-run causality:

- 1) *LFC* does not Granger cause *LProd* if $H_0: \alpha_2 = 0$, against the alternative $H_1: \alpha_2 \neq 0$ *LFC* Granger causes *LProd*. (5-a)
- 2) *LProd* does not Granger cause *LFC* if $H_0: \beta_2 = 0$, against the alternative $H_1: \beta_2 \neq 0$ *LProd* Granger causes *LFC*. (5-b)
- 3) *LE* does not Granger cause *LProd* if $H_0: \gamma_2 = 0$, against the alternative $H_1: \gamma_2 \neq 0$ *LE* Granger causes *LProd*. (6-a)
- 4) *LProd* does not Granger cause *LE* if $H_0: \delta_2 = 0$, against the alternative $H_1: \delta_2 \neq 0$ *LProd* Granger causes *LE*. (6-b)
- 5) *LFC* does not Granger cause *LFCF* if $H_0: \rho_2 = 0$ against the alternative $H_1: \rho_2 \neq 0$ *LFC* Granger causes *LFCF*. (7-a)
- 6) *LFCF* does not Granger cause *LFC* if $H_0: \sigma_2 = 0$ against the alternative $H_1: \sigma_2 \neq 0$ *LFCF* Granger causes *LFC*. (7-b)

- 7) LE does not Granger cause $LFCF$ if $H_0: \Phi_2=0$ against the alternative $H_1: \Phi_2 \neq 0$ LE Granger causes $LFCF$. (8-a)
- 8) $LFCF$ does not Granger cause LE if $H_0: \vartheta_2=0$ against the alternative $H_1: \vartheta_2 \neq 0$ $LFCF$ Granger causes LE . (8-b)

In order to check for a short-run causality Wald test is conducted. H_0 : No causality. H_1 : Causality. If we manage to reject null we can conclude for a short-run causality. Direction of causality between target and independent variables can be determined by checking probability of Chi-square. Table 4 presents results of Wald Test.

Last step is to check whether the structured models are robust and dynamic. For this control, Breusch-Gofrey (B-G) Serial Correlation LM Test is conducted. H_0 : No serial-correlation. Second test is Breusch -Pagan -Gofrey (BPG) Heteroscedasticity Test. H_0 : No Heteroscedasticity. As a third step, Jarque-Bera (JB) Normality Test is employed. H_0 : Normally distributed. For the final step, under stability diagnostics and recursive estimates, CUSUM test is conducted to make sure that the model is dynamic. Result of CUSUM is expected to be significant for the selected variables that stay within the boundaries. Test outcomes are provided in Table 5.

5. EMPIRICAL RESULTS AND DISCUSSION

5.1. Unit Root Test

Table 2 presents the summary of ADF and PP unit root test results. All variables are non-stationary at level and when we converted to their first-difference they become stationary. Steady state of all variables are attained and they are integrated of same order. Test results reveal the presence of first-order integration so there is the potential of cointegration among variables.

Table-2. Unit Root Test Results

Variables	Augmented Dickey-Fuller Test		Phillips-Perron Test		Order of Integration
	Level	1 st Difference	Level	1 st Difference	
LProd	-2.868731 (0.1830)	-5.231173 (0.0007)*	-2.882367 (0.1787)	-6.665880 (0.0000)*	I(1)
LFCF	-2.372208 (0.3860)	-3.859909 (0.0269)**	-3.897133 (0.0214)**	-18.78031 (0.0000)*	I(1)
LFC	-2.438181 (0.3555)	-5.833503 (0.0001)*	-2.245216 (0.4528)	-9.591765 (0.0000)*	I(1)
LE	-2.433161 (0.3579)	-5.824435 (0.0001)*	-2.239263 (0.4559)	-9.247291 (0.0000)*	I(1)

Notes: *, **, ***significant at 1%, 5%, 10% level respectively, figures in parentheses are the p-values

5.2. Cointegration Test

Having confirmed that all variables are integrated of same order, I(1), Cointegration Test is run, following Johansen (1988). This test is applied to understand whether there is long-run equilibrium relation among variables. Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ) are used to select the optimum lag length of the system equation in each case. H_0 : There is no Cointegration. H_1 : There is cointegration. Results are provided in Table 3.

Table-3. Johansen Cointegration Test (VAR, LAG 1)

1. Group: <i>LProd, LFC, LE</i>			2. Group: <i>LFCF, LFC, LE</i>		
Null	Trace Statistic	0.05 Critical Value	Null	Trace Statistic	0.05 Critical Value
$H_0: r=0$	31.01630**	29.79707	$H_0: r=0$	29.2657534	29.79707
$H_0=r\leq 1$	13.25321	15.49471	$H_0=r\leq 1$	7.245080	15.49471
Cointegration Equation: $LProd = -0.165625LFC$ (0.06233) $LProd = -0.065999LE$ (0.06229)					

Note: *significant at %5 level, figures in parentheses are the standard errors

Results of Table 3 denote that H_0 is rejected at 5 percent level for the first group of variables suggesting that there is at least one cointegrated equation in the first group. But, for the second group, H_0 cannot be rejected but rather accepted. So, second group of variables are excluded from the study and rest of the analysis is conducted for the first group of variables. Sign of coefficients are positive in each of the cointegration equations. According to the first equation an increase in *LFC* occurs with an increase in *LProd* (GDP per employed) in the long-run. Likewise, an increase in *LE* occurs with an increase in *LProd* (GDP per employed) in the long-run. Findings suggest that Islamic (participation) banking and economic productivity (GDP per employed) are positively correlated in the long-run.

5.3. Causality Test Results Based on VECM

As cointegration of time-series are confirmed for the first group of variables, we run the VECM to examine both short and long-run dynamics of the series. Causality test results are given in Table 4.

Table-4. Granger Causality Test

CAUSALITY	WALD STATISTICS		T-STATISTICS	
	F-Statistic	P-value	ECM _{t-1}	P-value
LFC→LProd	0.124976	0.7258	-3.430203	0.0004*
LProd→LFC	3.689135	0.0629	3.032589	0.0010
LE→LProd	0.130301	0.7203	-3.429304	0.0004*
LProd→LE	3.710049	0.0622	3.039542	0.0010

According to the Wald Test results, neither *LFC* nor *LE* granger causes *LProd* (GDP per employed) and vice versa. However, results for the long-run are quite remarkable. Sign and significance level of t-statistics of ECM reveals that *LFC* granger causes *LProd*. Besides, *LE* granger causes *LProd*. This long-run causality is uni-directional.

Short-run results are meaningful while considering the time-frame that is required to see the reflections on the economic indicator, *LProd* (GDP per employed). Furthermore, long-run results are worthful and promising. Either we consider funds collected or equity accumulated, results highlight that potential financial buildup in the Islamic (participation) banking side has a positive reflection on the real side of the economy by means of diversified financial services and accessibility of these services by the market participants.

5.4. Robustness Check

The purpose of this section is to test the robustness of the results attained. Results of robustness check is given in Table 5.

5.4.1. B-G Serial Correlation LM test

H_0 : There is no serial correlation, could not be rejected but rather accepted at 5 percent significance level for all cases in Table 5.

5.4.2. B-P-G Heteroscedasticity

H_0 : No heteroscedasticity, cannot be rejected but rather accepted for all cases at 5 percent significance level.

5.4.3. Jarque-Bera Normality

H_0 : Normally distributed, cannot be rejected but rather accepted for all cases at 5 percent significance level.

5.4.4. CUSUM Test

For all cases trend lines lie within the 5 percent significance boundary, showing that models are dynamically stable.

Table-5. Robustness Check

Robustness Check				
Causality	Breusch-Godfrey Serial Correlation LM Test (Prob. Chi- Square of Obs R- squared)	B-P-G Heteroscedasticity. (Prob. Chi-Square of Obs R- squared)	Jarque-Bera Normality	Cumulative Sum of Recursive Residuals (CUSUM) Test
<i>IFC</i> → <i>IProd</i>	0.8922	0.1207	0.835904	*
<i>IProd</i> → <i>IFC</i>	0.3032	0.1954	0.288361	*
<i>IE</i> → <i>IProd</i>	0.8901	0.1197	0.835597	*
<i>IProd</i> → <i>IE</i>	0.1863	0.2002	0.286127	*

Note: *: Trend line lies within the 5 percent significance boundary

6. CONCLUSION AND RECOMMENDATION

This study assessed the causal relationship between Islamic (participation) banking and economic growth in Turkey. While variables of Funds collected and Equity accumulated were selected as the represents of the Islamic (participation) banking or the financial sector, Productivity (GDP per employed) was taken as the represent of economic growth on the real side. Empirical findings of the study are as follows. 1) There is long-run causality running from Islamic (participation) banking to economic growth either funds collected or equity accumulated is selected as the represent of the Islamic (participation) banking. Causality is uni-directional. 2) In the short-run, findings reveal no causality flow from Funds collected or Equity accumulated to Productivity (GDP per employed) and vice versa.

Causality between Islamic (participation) banking development and economic growth is crucial as it will require different policy implications. In the long-run, Islamic (participation) banking positively and significantly causes economic productivity which is measured by GDP per employed. This finding confirms “supply-leading” hypothesis and reveals that Islamic (participation) banking has a remarkable potential to contribute to real economy as a crucial complementary to the conventional banking in Turkey and as a stabilizer of the economy. In this regard, regulations comprising corporate and legal issues related to the current Islamic (participation) banking system, new business models/ window system are expected to improve sustainable growth and equity (fairness) of economic outcomes. A sound infrastructure with diversified instruments is expected to bring Turkey to a well-deserved place in the international Islamic banking industry.

This study seeks to fill the gap by assessing the causal relationship between Islamic (participation) banking and economic growth in Turkey by covering the latest data and econometric techniques to test the prevailing hypothesis proposed in literature. It would be essential that more researches should be made on the issue for the

coming years in order to capture the progress in the Islamic (participation) banking sector indicators and the nexus between Islamic (participation) banking development and economic growth.

Funding: This study received no specific financial support.

Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

REFERENCES

- Abduh, M. and O.M. Azmi, 2012. Islamic banking and economic growth: The Indonesian experience. *International Journal of Islamic and Middle Eastern Finance and Management*, 5(1): 35-47. Available at: <https://doi.org/10.1108/17538391211216811>.
- Abduh, M. and N.T. Chowdhury, 2012. Does Islamic banking matter for economic growth in Bangladesh. *Journal of Islamic Economics, Banking and Finance*, 8(3): 104-113.
- Acemoglu, D., D. Laibson and J.A. List, 2015. *Macroeconomics*. Harlow, United Kingdom: Pearson Education Limited. pp: 118.
- Adeyeye, P.O., O. Fapetu, O.A. Aluko and S.O. Migiro, 2015. Does Supply-Leading Hypothesis hold in a Developing Economy? A Nigerian Focus. *Procedia Economics and Finance*, 30: 30-37. Available at: [https://doi.org/10.1016/s2212-5671\(15\)01252-6](https://doi.org/10.1016/s2212-5671(15)01252-6).
- Atici, G., 2017. Global financial crisis and Islamic financial products. *China-USA Business Review*, 16(173): 549-556.
- Aysan, A.F., M. Disli and H. Ozturk, 2013. Integration of the Participation Banking Legislations to the Banking Law and its Influence on Competition. *Afro Eurasian Studies*, 1(2): 91-110.
- Banking Regulation and Supervision Agency, 2018. Available from <http://www.bddk.org.tr> [Accessed 10.08.2018].
- Calderon, C. and L. Liu, 2003. The direction of causality between financial development and economic growth. *Journal of Development Economics*, 1(72): 321-334. Available at: [https://doi.org/10.1016/s0304-3878\(03\)00079-8](https://doi.org/10.1016/s0304-3878(03)00079-8).
- Cevik, M.S. and M.J. Charap, 2011. The behavior of conventional and Islamic bank deposit returns in Malaysia and Turkey. *IMF Working Papers*, WP/11/156. pp: 1-156.
- CityUK, I.F.M.A.G., 2015. *The uk: Leading western centre for islamic finance*. London: The CityUK Islamic Finance Market Advisory Group.
- Dickey, D.A. and W.A. Fuller, 1979. Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366a): 427-431. Available at: <https://doi.org/10.2307/2286348>.
- Foresti, P., 2007. Testing for granger causality between stock prices and economic growth. *MPRA, University Library of Munich*, 2962. pp: 1-11.
- Fuller, W.A., 1976. *Introduction to statistical time series*. New York: Wiley. pp: 470.
- Furqani, H. and R. Mulyany, 2009. Islamic banking and economic growth: empirical evidence from Malaysia. *Journal of Economic Cooperation and Development*, 30(2): 59-74.
- Goldsmith, R.W., 1959. A chapter in financial structure and development as a subject for international comparative study. *National Bureau of Economic Research*. pp: 114-123.
- Goldsmith, R.W., 1969. *Financial structure and development*. USA: Yale University Press. pp: 561.
- Granger, C.W., 1969. Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*: 424-438. Available at: <https://doi.org/10.2307/1912791>.
- Gudarzi, F.Y., M. Hossein and S. Seyed, 2012. Analysis of Islamic Bank's Financing and Economic Growth: Case Study Iran and Indonesia. *Journal of Economic Cooperation & Development*, 4(33): 1-24.
- Gurley, J.G. and E.S. Shaw, 1967. Financial structure and economic development. *Economic Development and Cultural Change*, 15(3): 257-268. Available at: <https://doi.org/10.1086/450226>.
- Jobarteh, M. and E.H. Ergec, 2017. Islamic finance development and economic growth: Empirical evidence from turkey. *Turkish Journal of Islamic Economics*, 4(1): 31-47. Available at: <https://doi.org/10.15238/tujise.2017.4.1.31-47>.
- Johansen, S., 1988. Statistical analysis of cointegration vectors. *Elsevier*, 12(2-3): 23-254.

- Johansen, S. and K. Juselius, 1990. Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2): 169–210. Available at: <https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x>.
- Jung, W.S., 1986. Financial development and economic growth: International evidence. *Economic Development and Cultural Change*, 2(34): 336–346.
- Masih, M., A. Al-Elg and H. Madani, 2009. Causality between financial development and economic growth: an application of vector error correction and variance decomposition methods to Saudi Arabia. *Applied Economics*, 41(13): 1691–1699. Available at: <https://doi.org/10.1080/00036840701320233>.
- Mckinnon, R.I., 1973. Money, capital and banking in economic development. Washington D.C.: Brooklyn Institution. pp: 177.
- Ongena, S. and İ. Şendeniz-Yüncü, 2011. Which firms engage small, foreign, or state banks? And who goes Islamic? Evidence from Turkey. *Journal of Banking & Finance*, 35(12): 3213–3224. Available at: <https://doi.org/10.1016/j.jbankfin.2011.05.001>.
- Participation Banks Association of Turkey, 2018. Available from <http://www.tkbb.org.tr/> [Accessed 10.06.2018].
- Patrick, H.T., 1966. Financial development and economic growth in underdeveloped countries. *Economic Development and Cultural Change*, 2(14): 174–189. Available at: <https://doi.org/10.1086/450153>.
- Phillips, P.C.B. and P. Perron, 1988. Testing for a unit root in time series regression. *Biometrika*, 2(75): 335–346.
- Robinson, J.C., 1952. The generalization of the general theory in the rate of interest and other essays. London: Macmillan.
- Sassi, S. and M. Goaid, 2011. Financial development, islamic banking and economic growth evidence from mena region. *International Journal of Business and Management Science*, 4(2): 105–128.
- Schumpeter, J.A., 1911. The theory of economic development. Cambridge: Harvard University Press. pp: 255.
- Shaw, E., 1973. Financial deepening in economic development. New York: Oxford University Press. pp: 260.
- World Islamic Banking Competitiveness Report of Ernst & Young, 2016. Available from ey.com/mena.

APPENDIX

Table-1. Descriptive Statistics

Statistics	Prod	FCF	FC	E
Mean	8341.220	46.61983	8338.585	1241.171
Median	8341.000	46.35200	8683.000	1293.000
Maximum	9684.000	65.68000	13459.00	2003.000
Minimum	7168.000	29.16100	4166.000	620.0000
Std. Dev.	670.7944	8.375940	2617.839	389.6819
Observations	41	41	41	41

Views and opinions expressed in this article are the views and opinions of the author(s), Asian Economic and Financial Review shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.