



## **Causality Relationship Between Banking & Industrial Production: Comparing Islamic & Conventional Banking in Turkey**

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### **Abstract**

*In Islamic finance, since money cannot be traded, the connection between the real economy and finance is expected to be much stronger compared to the conventional finance. In this paper, we analyse the interaction between Islamic banking and the real economy in Turkey in comparison with conventional banking. By using monthly data for the period 2010-2020 and employing Toda-Yamamoto approach, we investigate the causal relationships between six variables belonging to Islamic and conventional banking sector, and eight industrial production indexes. We find that the number of causal relationships between industrial production and Islamic banking are fewer compared to conventional banking and the directions of these relationships are mostly from the industry to banking. This means that the impact of the Islamic finance on Turkish industrial production is relatively limited, and the real economy has a strong influence on Islamic finance.*

*Keywords: Islamic Banking, Conventional Banking, Industrial Production*

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## **1. Introduction**

Despite its relatively short history, whose first modern applications appeared in 1963, Islamic finance has reached a total volume of 2.5 trillion dollars and 1400 financial intermediaries operating in 80 different countries. In addition to the constraints of conventional finance, Islamic finance is a model that also needs to be compatible with Islam. Hence, Islamic financial institutions have more constraints compared with conventional finance. However, these constraints also provide the theoretical ground for Islamic finance to establish a strong link with the real economy (Ergec, 2018).

Receipt and payment of interest, transactions featuring speculation, investing in ethically and socially unacceptable businesses according to Islam are prohibited in Islamic finance, whereas sharing risk and profit, avoiding debt and credit products are promoted. Because of promoting risk sharing, partnership based financing, and avoiding debt products and credit, financial transactions of Islamic finance are based on real assets. Therefore, Islamic finance is associated with productive economic activities and parallelism between financial flows and real flows is established. This parallelism contributes to macroeconomic stability and prevents excessive borrowing (Ergec, 2018).

In order to better understand the effects of the Islamic finance on real economy and compare it with conventional finance, Islamic financial principles should be evaluated in detail.

In Islamic finance, risk sharing and partnership principles are applied in both fund raising and disbursement processes. Parties that supply funds, use these funds and financial intermediaries share their risks in return for sharing the profit. The risk sharing and partnership between these parties during the funding process prevents transferring all the risk from the capital owner to the debtor (Asutay, 2013). Due to risk sharing and partnership principles, in case of a loss after credit transaction, the losses of the party using the funds are shared with the financial intermediary and the losses of the financial intermediary are shared with the fund lenders. Therefore, the burdens that may arise from a possible loss are minimized. As a result, risk sharing between the parties increases the strength of the private sector and financial intermediaries (Errico and Farahbaksh, 1998; Khan and Mirakhor, 1990). Moreover, in presence of these principles, it becomes easier to provide funds for the projects that have long-term high risks and high earning potentials. This is likely to affect economic development positively (Chapra, 1992; Mills and Presley 1999).

In Islam, money is not seen as a tradable object. For this reason, in Islamic finance the fund collection and transfer processes are different compared to the conventional finance where it is possible to sell money for money. Hence, by avoiding credit and debt products Islamic finance ensures integration of financial transactions and real economy (Asutay, 2012). Both in Turkey and in

countries where Islamic finance sector is relatively developed, most popular method of financing is Murabaha. With this method, the goods or services required by the client are purchased by the financial intermediary and sold to the client at a price which includes a mark-up together with the acquisition cost. The Profit and Loss sharing (PLS) is another method used in Islamic finance in which the client and financial intermediary establish a partnership on a business. Note that both with Murabaha and PLS methods, supplied funds are spent for the purchase of real assets. Therefore, financial transactions establish a strong link with the flow of goods and services which is expected to have stronger effects on the real economy compared to the case where money is directly traded. This effect becomes more evident especially in the PLS method where the profit of the financial intermediary is directly affected by the profitability of the partnership. For this reason, PLS method is expected to increase the efficiency of resource allocation and funding opportunities of profitable projects (Iqbal, 1997; Khan, 1986). Since relatively more profitable investments will be financed in the PLS method, the funds used to finance projects will boost the economy more (Dahduli, 2009). Because of all these positive aspects of Islamic finance, the relationship between Islamic finance and real economy is expected to be stronger compared to conventional finance.

This paper studies the interaction between the real economy and loans supplied by Islamic and conventional banks. For this purpose, we investigate the causal relationships between different types of loans supplied by Turkish Islamic and conventional banks and a number of industrial production indexes. For a detailed analyses, instead of Industrial Production Index we consider several sub-indexes. For this purpose, as variables we use eight industrial production sub-indexes, which were constructed according to the types and technology intensity of the produced goods.

The second section of this paper discusses the current view of Islamic banking in Turkish banking system. The third section presents the data and the methodology employed in this paper. The fourth and the fifth sections contain the results and the discussion of these results respectively.

## **2. Islamic Banking In Turkish Banking System**

Islamic banks started to operate in Turkey under the name of Special Finance Houses in 1985. These financial intermediaries were named as Participation Banks by the end of 1995 and were subject to Turkish Banking Act in 1999. Table 1 presents the current view of six Islamic banks in Turkish banking system, three of which are public and three of which are privately owned.

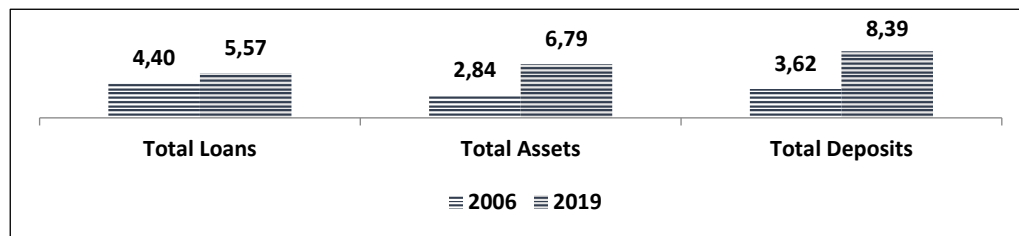
**Table 1: Current View of Turkish Islamic Banks (2019, Mil. TL)**

	Privately Owned				Public		Total
	Albaraka Türk	Kuveyt Türk	Türkiye Finans	Emlak Katilim	Vakif Katilim	Ziraat Katilim	
<b>Total Deposits</b>	39,769	85,494	39,975	5,953	22,953	25,457	219,601
<b>Total Loans</b>	30,881	57,926	33,273	5,730	18,771	29,565	176,145
<b>Total Actives</b>	51,392	104,439	52,427	9,282	30,349	36,392	284,282
<b>Net Assets</b>	3,822	6,821	4,827	1,169	1,961	3,167	21,767
<b>Net Profit</b>	63	1,110	378	45	325	517	2,438
<b>Number of Employees</b>	3,791	5,955	3,461	382	1,322	1,133	16,044
<b>Number of Branches</b>	230	431	310	11	104	93	1,179

Source: Participation Banks Association of Turkey

Graph 1 shows the share of Islamic banks in deposit banking sector for the year 2006 when Islamic banks are subject to same legal regulations as conventional banks and the most recent year 2019. According to Graph 2.1 the share of Islamic banks increased in all three financial figures (total loans, total assets and total deposits) from 2006 to 2019 which means that the growth performance of Islamic banking sector is above that of conventional banking.

**Graph 1: Share of Islamic Banking in Deposit Banking of Turkey (2006-2019, %)**

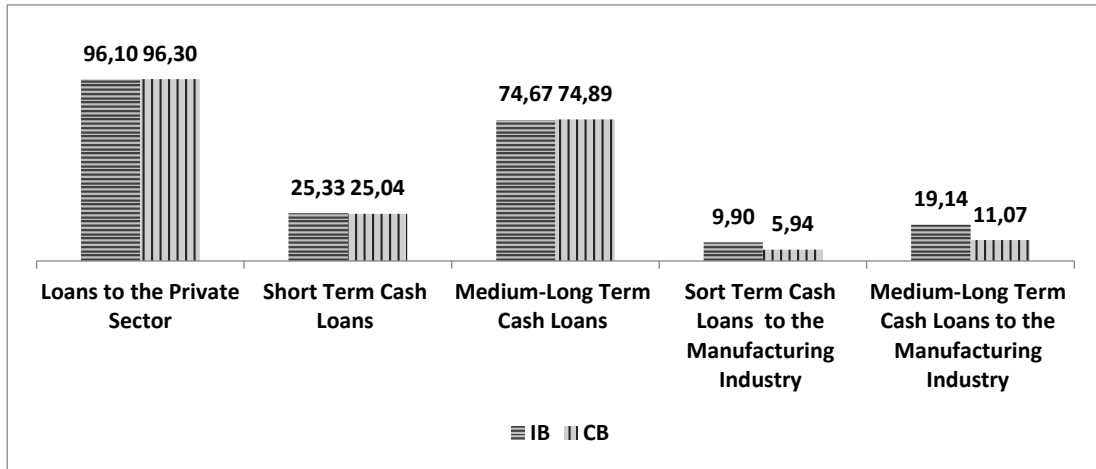


Source: Banking Regulation and Supervision of Agency (BRSA)

Graph 2. provides the shares of different loan types in total loans for conventional and Islamic banks. According to the graph, the shares of private sector loans and the cash loans are close to each other for both bank types. On the other hand, when the loans to the manufacturing industry are taken into consideration, it is seen that the shares for Islamic banking sector are higher than conventional banking in both maturity types (short term and medium-long term). So, the tendency of Islamic banks to give loans to the manufacturing

industry is higher compared to conventional banking, especially for long-term loans.

**Graph 2:** Distribution of the Types of Loans for Islamic and Conventional Banking (2019, %)



Source: BRSA and Central Bank of the Republic of Turkey (CBRT)

### 3. Literature Review

The interaction between Islamic finance and the real economy is investigated by many papers focusing on the relationship between financial development and economic growth (see: Furqani and Mulyany (2009), Abduh and Chowdhury (2012), Tabash and Dhankar (2014), Imam and Kpodar (2016), Tunay (2016) and Jawad and Christian (2019)). The common conclusion of these papers is that Islamic banking sector has a positive contribution to the economic growth. The literature about the interaction between Islamic finance and the real economy in Turkey is also quite rich.

By using monthly data for 2005-2012 and Granger Causality Analysis, Asutay and Ergec (2013) investigates the causal relationships between Islamic and conventional banking and the real economy in Turkey. Together with total assets, total loans to the private sector, total deposits of Islamic and conventional banking; Asutay and Ergec (2013) takes Industrial Production Index as the measure for real economy and determines causal relationships from both Islamic and conventional banking to economic growth.

Kalayci and Tekin (2016) considers the Turkish quarterly data for 2002-2014 to study the relationships between economic growth, foreign direct investment and Islamic banking. By employing Johansen Cointegration and Granger

Causality methods, Kalaycı and Tekin (2016) shows the existence of two-way causal relationship between the total deposits of Islamic banks and economic growth.

Jobarteh and Ergec (2017) analyses the relationship between development of Islamic financial sector and economic growth in Turkey by using monthly data for the period 2005-2015. As the variables, Jobarteh and Ergec (2017) considers total loans to the households and private sector by Islamic banks, total deposits collected by Islamic banks and Industrial Production Index. Jobarteh and Ergec (2017) uses Co-integration and Granger Causality Analysis within the framework of VECM and finds one-way causal relationship from the development of Islamic finance to economic growth both in the short and long term.

Yuksel and Canoz (2017) employs VAR Granger Causality Analysis to study the relationship between Islamic banking, economic growth and industrial production. As variables Yuksel and Canoz (2017) considers total loans by Islamic banks, Industrial Production Index, GDP and concludes that total loans by Islamic banks has no significant effect on the economic growth and industrial production in Turkey.

Kocak (2018) studies the relationship between Islamic finance and economic growth using quarterly data for the period 2005-2015. In this paper, total loans to the private sector by Islamic banks and GDP are considered as variables. Kocak (2018) employs Granger Causality based on VEC and finds one-way causal relationship from Islamic finance to economic growth. Similarly, by using the same method and the data for 2008-2018, Atici (2018) shows the existence of one-way causal relationship from Islamic banking to economic growth.

For the period 2005-2016, Bozkurt et al. (2020) studies the relationship between loans to the private sector and GDP in Turkey by using ARDL bounds testing. Bozkurt et al. (2020) shows the existence of a non-linear relationship between economic growth and development of Islamic and conventional banking sectors. According to their results, the relationship between Islamic banking and economic growth has a U shape while the relationship between conventional banking and economic growth has an inverse U shape.

Almost all papers in the literature, studying the relationship between Islamic banking and economy, consider GDP or Industrial Production Index to represent the economic growth. We believe that a deeper analysis of the relationship between Islamic finance and the real economy is required to understand the channels through which Islamic finance is affecting the economy.

Although rare, some papers in the literature study the interaction between Islamic finance and real economy in detail. Chazi et al. (2020) considers 28 industries of 14 countries (including Turkey) which has an Islamic banking sector. Chazi et al. (2020) takes the total assets, total loans, ratios of Islamic

banking measures and conventional banking measures as the independent variables, and real production of the 28 sectors as the independent variables. By employing panel regression analysis method, Chazi et al. (2020) finds that Islamic banking has a positive effect on the growth of industries that are more dependent on external finance.

Bougatef et al. (2020) examines the impact of Islamic banking on real economy in detail by using Malaysian data for the period 2010-2018. In this study, Industrial Production Index, total funds supplied by Islamic banks, PLS funds and non-PLS funds are taken as variables, ARDL and Toda-Yamamoto methods are employed. Bougatef et al. (2020) finds only a two-way causal relationship from non-PLS funds to industrial development for both short and long term.

To the best of our knowledge, in the literature there is no study which provides a detailed analysis of the impact of Islamic banking on the real economy for Turkey. Although considering a different question, Ergec and Kaytanci (2017) provides a detailed analysis for the effect of Islamic finance on labour markets. By using 2009-2014 data, Ergec and Kaytanci (2017) examines the relationship between total loans by Islamic and conventional banks to five sectors (manufacturing, wholesale, construction, education, transport), and the employment in these sectors. Ergec and Kaytanci (2017) employs Granger Causality Method and finds that the loans supplied by Islamic banks affect the employment only in the construction and wholesale sectors.

We believe that for a deeper analysis, the variables measuring the development of Islamic finance and the variables measuring economic activities are need to be handled in more detail. For this purpose, we analyse the causal relationships between six variables (total assets and five different loan types) belonging to Islamic and conventional banking sectors and eight industrial production indexes that are created according to the types and technology intensity of the goods produced. This study will contribute to the understanding of the effects of the development of Islamic finance on the economy in more detail and will provide an answer to the question on how to support Islamic finance for economic development.

#### **4. Data And Methodology**

In this paper, we investigate the causal relationships between six variables belonging to Islamic and conventional banking sectors and eight industrial production indexes in Turkey. The list of variables used in this paper are given in Table 2. As the banking variables; we consider total assets, total cash loans, total loans to the private sector, and total loans to the manufacturing sector for both Islamic and conventional banks. The reason we include total cash loans in the analysis is its ability reflect the total loans. Since it is frequently used as an indicator of financial development, we also consider total loans to the private

sector. Manufacturing industry forms the backbone of the industrial production in Turkey and the share of loans supplied by Islamic banks to this sector is quite high compared to the conventional banks. Because of this reason, we also include the total loans to the manufacturing sector in our analysis. For all types of loans (excluding the total loans to the private sector), both short term and medium-long term loans are evaluated separately.

**Table 2: List of Variables**

<b>Industrial Production Indexes</b>	
HT	High Technology Goods Production
MHT	Medium-High Technology Goods Production
LT	Low Technology Goods Production
MLT	Medium-Low Technology Goods Production
CG	Capital Goods
DG	Durable Goods
IG	Intermediate Goods
NDG	Non-durable Goods
<b>Banking Sector Variables</b>	
IA	Islamic Banking Total Assets
CA	Conventional Banking Total Assets
IP	Islamic Banks Loans to Private Sector
CP	Conventional Banks Loans to Private Sector
ISC	Islamic Banks Short Term Cash Loans
CSC	CB Short Term Cash Loans
IMLC	Islamic Banks Medium-Long Term Cash Loans
CMLC	CB Medium-Long Term Cash Loans
ISM	Islamic Banking Short Term Loans to Manufacturing Industry
CSM	Conventional Banks Short Term Loans to Manufacturing Industry
IMLM	Islamic Banks Medium-Long Term Loans to Manufacturing Industry
CMLM	Conventional Banks Medium-Long Term Loans to Manufacturing Industry

Two groups of industrial production indexes are considered as the measures for real economy. The first group is the collection of production indexes that are constructed according to the technology density of the produced goods. These are High Technology Goods Production Index, Medium-High Technology Goods Production Index, Medium-Low Technology Goods Production Index, and Low Technology Goods Production Index. The second group of indexes are the ones constructed according to the intended use of the produced goods. Capital Goods Production Index, Durable Goods Production Index, Intermediate Goods Production Index, and Non-durable Goods Production Index are the ones in this group.

Monthly data used in this paper covers the period 2010-2020 and contains 121 observations. Industrial production indexes are taken from TURKSTAT, loans to the private sector are taken from CBRT and all other variables are taken from BRSA. Nominal variables are converted to real variables by using Consumer



Price Index. After applying seasonality tests, logarithm of all variables are used in the analysis.

We employed Toda-Yamamoto Causality Method to investigate the causal relationships between banking variables and industrial production indexes. For Toda-Yamamoto (1995) method, the variables do not need to be stationary i.e. the non-stationarity and cointegration relations between the variables do not affect the results of analysis. The method developed by Toda and Yamamoto (1995) is based on the estimation of an augmented VAR model for which the optimal lag (k) and the maximum co-integration level (dmax) should first be determined. Here, k is the optimal time lag chosen by using information criteria of the VAR model and dmax is the maximum integration order on variables system. To use Toda-Yamamoto method, a VAR model with the k+dmax lag structure is estimated variables' levels and then Modified Wald Test (MWALD) is applied.

Below is a representative augmented VAR model equations to analyse the Granger causality between a Banking Variable (BANK) and an Industrial Production Index (IND).

$$IND_t = \gamma_0 + \sum_{i=1}^k \alpha_i IND_{t-i} + \sum_{j=k+1}^{k+d_{max}} \alpha_j IND_{t-j} + \sum_{i=1}^k \beta_i BANK_{t-i} + \sum_{j=k+1}^{k+d_{max}} \beta_j BANK_{t-j} + \varepsilon_{1t}$$

$$BANK_t = \gamma_0 + \sum_{i=1}^k \delta_i BANK_{t-i} + \sum_{j=k+1}^{k+d_{max}} \delta_j BANK_{t-j} + \sum_{i=1}^k \theta_i IND_{t-i} + \sum_{j=k+1}^{k+d_{max}} \theta_j IND_{t-j} + \varepsilon_{2t}$$

where k is the optimal lag and dmax is the maximum integration order in the initial VAR model.

The significance of the causal relationship depends on the significance of the coefficients of these equations. To test the null hypothesis which states that there is no Granger causality from BANK to IND we test  $H_0: \beta_i = 0$  for all  $i = 1, \dots, k$ . Similarly, to test the null hypothesis which states that there is no Granger causality from IND to BANK we test  $H_0: \theta_i = 0$  for all  $i = 1, \dots, k$ .

## 5. Empirical Results

In order to use Toda-Yamamoto Causality Method, maximum co-integration degree and lag should be found for which stationary tests are required. In this paper, we prefer Augmented Dickey Fuller (ADF) stationary test (Dickey and Fuller, 1981). The test results of stationary test are given in Table 3. All production indexes, except Medium-High Technology Goods Production Index (MHT), are stationary at the level. MHT is stationary at the first difference. For the banking variables, total assets of conventional banks (CA) and total loans

supplied by the conventional banks to the private sector (CP) are stationary at the level. All other banking variables are stationary at the first difference.

**Table 3: Augmented Dickey Fuller (ADF) Stationary Test Results**

	Level		First Difference	
	t statistics	Probability	t statistics	Probability
HT	-6,200	0,00	-10,581	0,00
MHT	-3,099	0,11	-10,975	0,00
LT	-3,487	0,05	-16,575	0,00
MLT	-3,056	0,03	-14,549	0,00
CG	-2,660	0,08	-11,546	0,00
DG	-6,223	0,00	-10,072	0,00
IG	-3,127	0,10	-14,628	0,00
NDG	-3,878	0,02	-20,247	0,00
IA	-2,632	0,27	-7,697	0,00
CA	-4,822	0,00	-7,862	0,00
IP	-1,835	0,68	-10,204	0,00
CP	-3,515	0,04	-10,257	0,00
ISC	0,398	1,00	-4,256	0,00
CSC	-2,813	0,20	-13,723	0,00
IMLC	-2,986	0,14	-7,188	0,00
CMLC	-2,273	0,18	-8,019	0,00
ISM	-1,484	0,83	-10,782	0,00
CSM	-2,939	0,15	-10,563	0,00
IMLM	-1,898	0,65	-7,453	0,00
CMLM	-3,050	0,12	-8,372	0,00

For the optimal lag k, we employ Akaike Information Criteria (AIC) and Schwarz Criterion (SC). The optimal lag of the variables are given in Table 4.

**Table 4: Number of Optimal Lag for Information Criteria**

	HT		MHT		LT		MLT		CG		DG		IG		NDG	
	AIC	SC	AIC	SC	AIC	SC	AIC	SC	AIC	SC	AIC	SC	AIC	SC	AIC	SC
IA	3	2	3	3	2	2	2	2	3	2	2	1	2	2	2	2
CA	2	2	2	1	2	1	2	1	2	2	12	1	2	1	2	2
IP	3	2	7	2	2	1	2	1	3	2	1	1	2	1	2	2
CP	2	1	2	1	2	1	2	1	3	2	1	1	2	1	2	2
ISC	4	2	4	1	2	2	2	1	4	2	1	1	2	1	4	2
CSC	4	2	4	2	4	1	2	1	4	2	4	1	2	1	4	2
IMLC	2	2	2	2	2	2	2	2	3	2	2	1	2	2	2	2
CMLC	2	2	2	1	2	1	2	2	3	2	2	1	2	2	2	2
ISM	4	2	4	1	2	2	2	1	4	2	1	1	2	1	4	2
CSM	4	2	3	2	2	2	2	1	3	2	1	1	2	1	2	2
IMLM	3	2	3	2	2	2	2	2	3	2	2	2	2	2	2	2
CMLM	2	2	3	2	2	2	2	2	3	2	2	1	2	2	2	2

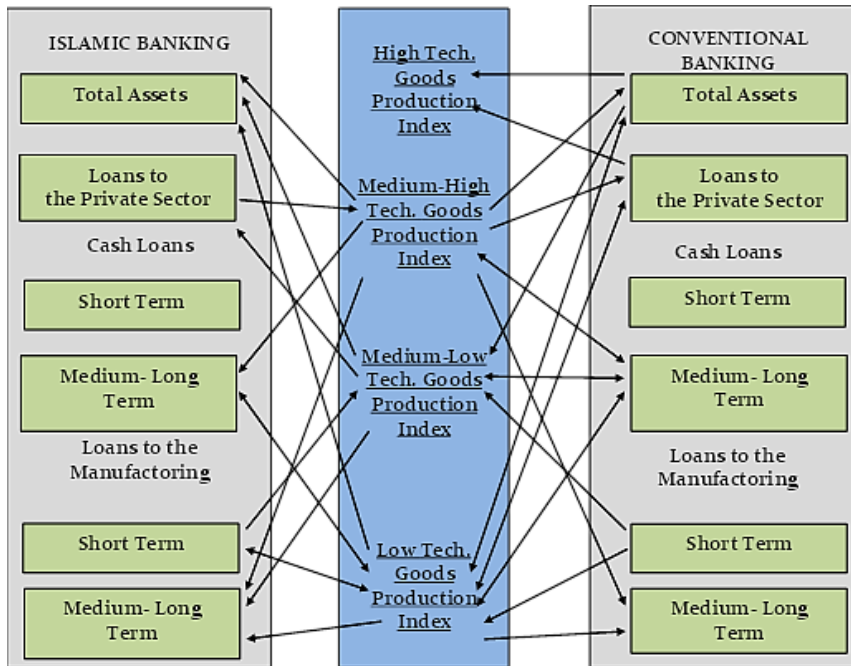
The results of Toda-Yamamoto Method for the causal relationships between banking variables and production indexes constructed according to the technological intensity of the product are provided in Table 5.

**Table 5: Toda-Yamamoto No-causality Test Results (Modified WALD)**

Type of Index	Direction of Causality	Test Statistics	Total Assets		Loans to the Private Sector		Short Term Cash Loans		Medium-Long Term Cash Loans		Short Term Loans to the Man. Sector		Medium-Long Term Loans to Man Sector		
			IB	CB	IB	CB	IB	CB	IB	CB	IB	CB	IB	CB	
			Chi-sq	df	Prob.	Chi-sq	df	Prob.	Chi-sq	df	Prob.	Chi-sq	df	Prob.	Chi-sq
High Tech. Goods Prod. Index	Bank to Index	Chi-sq	1,15	1,86	3,15	36,25	4,53	1,33	0,22	2,64	1,83	7,18	0,30	0,50	
		df	3	2	3	2	4	4	2	2	4	4	3	2	
	Index to Bank	Chi-sq	0,67	0,00	0,37	0,00	0,34	0,86	0,90	0,27	0,77	0,13	0,96	0,78	
		Prob.	2,53	0,85	1,10	0,41	0,75	4,33	0,65	1,44	2,53	1,92	2,33	0,19	
	Medium-High Tech. Goods Prod. Index	Bank to Index	Chi-sq	0,47	0,65	0,78	0,81	0,95	0,36	0,72	0,49	0,64	0,75	0,51	0,91
			df	3,92	2,55	16,78	1,31	4,79	2,38	2,13	8,05	2,17	2,24	3,31	3,09
Index to Bank		Chi-sq	0,27	0,28	0,02	0,52	0,31	0,67	0,35	0,02	0,71	0,52	0,35	0,38	
		Prob.	6,37	7,87	3,87	6,84	1,19	3,49	5,04	10,06	4,23	3,34	13,51	16,05	
Bank to Index		Chi-sq	0,09	0,02	0,80	0,03	0,88	0,48	0,08	0,01	0,38	0,34	0,00	0,00	
		df	2,40	4,58	0,45	1,84	3,23	0,51	3,09	5,04	5,36	4,55	1,54	4,41	
Medium-Low Tech. Goods Prod. Index	Bank to Index	Chi-sq	0,30	0,10	0,80	0,40	0,20	0,78	0,21	0,08	0,07	0,10	0,46	0,11	
		df	4,62	3,05	1,54	4,09	0,90	0,71	3,76	5,06	0,81	0,36	5,67	2,69	
	Index to Bank	Chi-sq	0,10	0,22	0,46	0,13	0,64	0,70	0,15	0,08	0,67	0,84	0,06	0,26	
		Prob.	1,56	16,69	0,91	6,19	1,47	1,29	4,61	5,00	5,86	5,33	1,32	2,85	
	Bank to Index	Chi-sq	0,46	0,00	0,63	0,05	0,48	0,86	0,10	0,08	0,05	0,07	0,52	0,24	
		df	8,77	4,53	3,22	5,55	3,02	4,04	5,50	6,79	7,47	0,77	6,23	9,42	
Index to Bank	Chi-sq	0,01	0,10	0,20	0,06	0,22	0,40	0,06	0,03	0,02	0,68	0,04	0,01		
	Prob.														

To visualize the results presented in Table 5, we construct the Diagram 1. In this diagram, all causal relationships that are significant at the 10% significance level are shown with an arrow representing the direction of the relationship.

**Diagram 1:** Causality Relationships between Banking Variables and Production Indexes Constructed According to the Technological Intensity of the Product



Fourteen causal relationships (five of them are two-way) are found between the production indexes created according to the technological intensity of the product and the conventional banking variables. Similarly, twelve causal relationships (two of them are two-way) are found between the production indexes constructed according to the technological intensity of the product and the Islamic banking variables. From Islamic banking variables to the production indexes, we find four significant causal relationships. These causal relationships are from loans to the private sector, medium-long term cash loans, and short term loans to the manufacturing sector. Moreover, we find no causal relationship from Islamic banking variables to the High Technology Goods Production Index. On the other hand, from conventional banking variables to the production indexes, the number of significant causal relationships is ten. The two of these significant causal relationships from conventional banking variables to High Technology Goods Production Index.

The results of Toda-Yamamoto causal relationship between the banking sector variables and four production indexes created according to the product types are provided in Table 6 and visual representation of this table is given in Diagram 2.

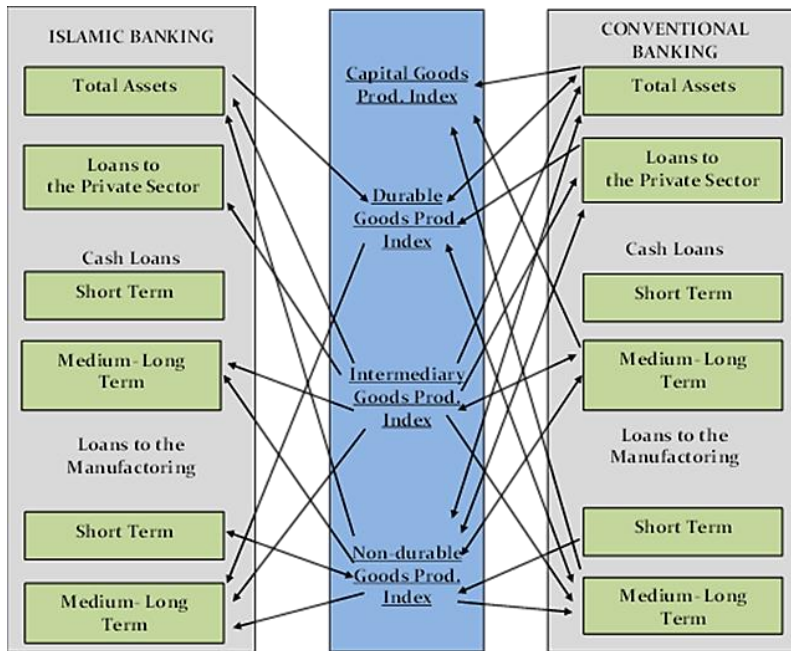
**Table 6: Toda-Yamamoto No-causality Test Results (Modified WALD)**

Type of Index	Direction of Causality	Total Assets		Loans to the Private Sector		Short Term Cash Loans		Medium-Long Term Cash Loans		Short Term Loans to the Man. Sector		Medium-Long Term Loans to Man Sector		
		IB	CB	IB	CB	IB	CB	IB	CB	IB	CB	IB	CB	
		Test Statistics												
Non-durable Goods Man. Index	Bank to Bank	Chi-sq	5,17	8,07	3,54	1,47	7,41	1,94	1,34	8,72	3,04	1,21	3,03	6,48
	Index	df	3	2	3	3	4	4	3	3	4	3	3	3
	Index	Prob.	0,16	0,02	0,32	0,69	0,12	0,75	0,72	0,03	0,55	0,75	0,39	0,09
Intermediate Goods Man. Index	Bank to Bank	Chi-sq	2,64	1,49	3,22	2,64	3,82	0,14	3,19	4,65	2,62	1,08	5,15	0,65
	Index	df	3	2	3	3	4	4	3	3	4	3	3	3
	Index	Prob.	0,45	0,48	0,36	0,45	0,43	1,00	0,36	0,20	0,62	0,78	0,16	0,89
Durable Goods Man. Index	Bank to Bank	Chi-sq	4,76	50,50	0,67	17,75	0,02	0,39	4,49	3,44	0,73	0,05	3,64	11,67
	Index	df	2	12	1	2	1	4	2	2	1	1	2	2
	Index	Prob.	0,09	0,00	0,41	0,00	0,89	0,98	0,11	0,18	0,39	0,83	0,16	0,00
Man. Index	Bank to Bank	Chi-sq	1,24	2,96	1,15	3,02	0,01	6,16	1,52	3,91	0,51	0,79	6,81	7,58
	Index	df	2	12	1	2	1	4	2	2	1	1	2	2
	Index	Prob.	0,54	0,00	0,28	0,22	0,94	0,19	0,47	0,14	0,47	0,37	0,03	0,02
Non-durable Goods Man. Index	Bank to Bank	Chi-sq	2,40	2,71	1,67	1,65	2,27	0,57	4,01	7,12	4,20	2,98	1,70	3,64
	Index	df	2	2	2	2	2	2	2	2	2	2	2	2
	Index	Prob.	0,30	0,26	0,43	0,44	0,32	0,75	0,13	0,03	0,12	0,23	0,43	0,16
Intermediate Goods Man. Index	Bank to Bank	Chi-sq	9,82	5,40	2,31	5,38	2,89	1,00	6,39	7,99	2,20	0,71	10,03	6,77
	Index	df	2	2	2	2	2	2	2	2	2	2	2	2
	Index	Prob.	0,01	0,07	0,32	0,07	0,24	0,61	0,04	0,02	0,33	0,70	0,01	0,03
Durable Goods Man. Index	Bank to Bank	Chi-sq	0,36	13,11	1,34	7,81	1,03	1,16	1,79	5,17	5,54	6,22	1,23	1,39
	Index	df	2	2	2	2	4	4	2	2	2	2	2	2
	Index	Prob.	0,84	0,00	0,51	0,02	0,91	0,88	0,41	0,08	0,06	0,04	0,54	0,50
Non-durable Goods Man. Index	Bank to Bank	Chi-sq	9,18	5,90	3,40	7,76	5,95	5,56	7,37	7,83	12,85	3,64	6,51	7,02
	Index	df	2	2	2	2	4	4	2	2	2	2	2	2
	Index	Prob.	0,01	0,05	0,18	0,02	0,20	0,23	0,03	0,02	0,00	0,16	0,04	0,03

Fifteen causal relationships (six of them are two-way) are found between the production indexes created according to the product types and the conventional banking variables. Eleven of these causal relationships are from conventional banking variables to the production indexes. The number of casual relationships between the production indexes created according to the product types and the Islamic banking variables is found to be ten (one of them is two-way). Two of these casual relationships are from Islamic banking variables to the production indexes (to Durable Goods Production Index and to

Non-durable Goods Production Index). We find no causal relationship from Islamic banking variables to Capital Goods Production Index and Intermediate Goods Production Index. On the other hand for each production index, there is a casual relationship from a conventional banking variable.

**Diagram 2: Causality Relations between Banking Variables and Production Indexes Constructed According to the Product Type**



## 6. Conclusion

Despite its short history, Islamic finance has shown a rapid growth performance compared to conventional finance both across the world and in Turkey. Because of promoting risk-sharing and partnership; avoiding debt products and credit, Islamic finance is expected to establish a stronger link with real economy compared to the conventional finance.

The interaction between Islamic finance and the real economy has been the subject of many studies most of which are focusing on the relationship between financial development and economic growth. However, these studies generally use variables such as total loans or total deposits to measure the size financial sector. Regarding the real economy, variables such as GDP or Industrial Production Index are used. We believe that for a deeper analysis for the relationship between Islamic finance and real economy, instead of variables like GDP, Industrial Production Index or total loans, more detailed macro variables should be considered.

In this paper, we analyse the interaction between Islamic banking sector and real economy by considering total assets and total amount of five loan types supplied by Islamic and conventional banks. To represent the real economy instead of Industrial Production Index, we consider several sub- indexes that are constructed according to the product types and technology intensity of the products. We employ Toda-Yamamoto method, and find that the number of significant causal relationships between banking variables and production indexes are much more for conventional banking sector compared to Islamic banking sector. Similarly the number of significant causal relationships from conventional banking variables to production indexes are much more compared to Islamic banking sector. Since the share of Islamic banks in Turkish banking sector is relatively small, this might be considered as an expected result. On the other hand, the causal relationships from the production indexes to banking variables are similar to each other for conventional and Islamic banking sectors.

According to our results, there is no significant causal relationship from an Islamic banking variable to High Technology Goods Production Index. We find significant causal relationship from Islamic banking variables to Durable Goods Production Index and Non-durable Goods Production Index. Moreover we find no significant causal relationship from Islamic banking variables to Capital Goods Production Index and Intermediate Goods Production Index. For conventional banking sector, the results are quite different and there is significant causal relationships to each production index from some conventional banking variables. These results tell that the development of Islamic banking sector in Turkey has limited effect on real economy while the economic development affects Islamic banking more. We think this means that it is a demand-following financial development for Islamic banking sector.

## References

- Abduh, M., Chowdhury, N. T. (2012). "Does Islamic Banking Matter For Economic Growth In Bangladesh", *Journal of Islamic Economics, Banking and Finance*, 8(3), 104-113.
- Abdul Manap, T. A., Abduh, M., & Omar, M. A. (2012). Islamic banking growth nexus: evidence from Toda-Yamamoto and Bootstrap Granger Causality Test. *Journal of Islamic Finance*, 176(813), 1-8.
- Asutay, M. (2012). Conceptualising and locating the social failure of Islamic finance: aspirations of Islamic moral economy vs the realities of Islamic finance. *Asian and African Area Studies*, 11 (2), 93-113.
- Asutay, M. (2013). Islamic moral economy as the foundation of Islamic finance. In V. Cattelan (ed.), *Islamic Finance in Europe: Towards a Plural Financial System*. Cheltenham: Edward Elgar Publishing.
- Asutay, M. & Ergec, E. H. (2013). Financial Development and Economic Performance Nexus in the Case of Islamic and Conventional Banks in Turkey: An Empirical Analysis. 9th International Conference on Islamic Economics and Finance, Istanbul.
- Atici, G. (2018). Islamic (Participation) banking and economic growth: empirical focus on Turkey. *Asian Economic and Financial Review*, 8(11), 1354-1364.
- Bougatef, K., Nakhli, M. S., & Mnari, O. (2020). The nexus between Islamic banking and industrial production. *ISRA International Journal of Islamic Finance*, 12(1), 103-114.
- Bozkurt, M., Altıntaş, N., & Yardımcıoğlu, F. (2020). Katılım bankacılığı ve konvansiyonel bankacılığın ekonomik büyüme üzerindeki etkileri: Türkiye üzerine bir inceleme. *Uluslararası İslam Ekonomisi ve Finansı Araştırmaları Dergisi*, 6(1), 95-114.
- Chapra, M.U. (1992). *Islam and the Economic Challenge*. International Institute of Islamic Thought, Hendon, VA.
- Chazi, A., Mirzaei, A., Zantout, Z., & Azad, A. S. (2020). Does the size of Islamic banking matter for industry growth: International evidence. *Applied Economics*, 52(4), 361-374.
- Dahduli, M. S. (2009). Islamic banking and economic development. *SSRN Electronic Journal*.
- Dickey, D. & Fuller, W. (1981). Likelihood ratio statistics for autogressive time series with a unit root. *Econometrica*, 49, 1052-1072.
- Ergec, E. H. & Kaytancı, B. G. (2017). Effects of Islamic Banking on employment: Turkish experience. In *Handbook of Research on Unemployment and Labor Market Sustainability in the Era of Globalization*. IGI Global.



- Errico, L. & Farahbaksh, M. (1998). "Islamic banking: Issues in prudential regulations and supervision" IMF Working Paper, No. 30, 1-32
- Furqani, H. & Mulyany, R. (2009). Islamic Banking and Economic Growth: Empirical Evidence from Malaysia, *Journal of Economic Cooperation and Development*, 30(2), 59-74.
- Granger, C.W.J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37(3), 424-438.
- IFSB (2019). Islamic Financial Services Industry Stability Report 2019. IFSB, Kuala Lumpur.
- Iqbal, Z. (1997). Islamic financial systems. *Finance and Development*, 34, 42-45.
- Imam P. & Kpodar, K. (2016) Islamic banking: Good for growth?, *Economic Modelling*, 2016, 59 (C), 387-401.
- Jawad A. & Christian K., 2019. "Islamic Banking And Economic Growth: Applying The Conventional Hypothesis," *Journal of Islamic Monetary Economics and Finance*, Bank Indonesia, 5(1), 1-26
- Jobarteh, M. & Ergec, E. H. (2017). Islamic finance development and economic growth: empirical evidence from Turkey. *Turkish Journal of Islamic Economics*, 4(1), 31-47.
- Kalayci, S. & Tekin, B. E. (2016). Interactions between economic growth, FDI and Islamic banking development in Turkey. *International Journal of Business and Management*, 11(8), 230-240.
- Khan, M.S. (1986). *Islamic interest-free banking: a theoretical analysis*. Palgrave Macmillan Journals, 33(1), 1- 27.
- Khan, M. S. & Mirakhor, A. (1990). Islamic banking: experiences in the Islamic Republic of Iran and in Pakistan. *Economic Development and Cultural Change*, 38(2), 353-375.
- Kocak, E. (2018). İslami finans ve ekonomik büyüme: Türkiye üzerine ekonometrik bir uygulama. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, (51), 67-91.
- Mills, P. S. & Presley, J. R. (1999). *Islamic finance: Theory and practice*. Basingstoke, UK: Macmillan Press.
- Tabash, M.I. & Dhankar, R.S. (2014) Islamic Banking and Economic Growth — A cointegration Approach, *Romanian Economic Journal*, 2014, 17(53), 61-90.
- Tunay B. (2016). Causality Relations Between Islamic Banking and Economic Growth. *Yonetim ve Ekonomi* 23(2)
- Toda, H. Y. & Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics*, 66(1-2), 225-250.

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Yuksel, S. & Canoz, I. (2017). Does Islamic banking contribute to economic growth and industrial development in Turkey? *Ikonomika*, 2(1), 93-102.