

## Financial development and economic growth in emerging market: bootstrap panel causality analysis

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**Abstract.** *In this study, it was investigated whether there is a causality relationship between financial development and economic growth in emerging market countries. Data from the period between 1988 and 2013 was analyzed using the bootstrap panel causality test, which takes cross-section dependence and heterogeneity into account. The results of the test showed that there is a weak causal relationship between economic growth and financial development support the neutrality hypothesis in emerging countries, except for Turkey.*

**Keywords:** Financial Development, Economic Growth, Emerging Market, Panel Bootstrap Causality.

**JEL Classification:** C33, F43, O16, O52.

## 1. Introduction

The relationship between financial development and economic growth was first discussed by Bagehot (1873) and Schumpeter (1911) and then examined and debated through a more comprehensive approach in the studies conducted by Goldsmith (1969), McKinnon (1973) and Shaw (1973). Today, the relationship between these two variables is still being studied and discussed. What makes the relationship between financial development and economic growth important is that these two variables provide insight regarding how much priority needs to be given to reforms concerning the financial sector in developing countries, especially where financial institutions are not adequately developed and organization and auditing systems are weak. Another factor that makes the aforementioned relationship important is that the level of development in financial markets partly clarifies why countries grow at different rates.

There are certain risks that savers face when they aim to turn their savings into investments. These are liquidity and efficiency risks. Liquidity risks emerge because of the uncertainty in turning assets into cash. Efficiency risks occur due to the shocks experienced throughout the production process that keep risk-avoiding individuals away from investing in firms (Levine, 1997). Financial institutions protect investors from such risks through the investment tools they develop. The risk-spreading ability of financial markets contributes to economic growth by shifting portfolio investments to projects with higher expected returns (Obstfeld, 1994). Furthermore, developed banking systems decrease the asymmetric information between the company and the bank. In addition to these, financial institutions collect savings from units that have fund surplus and distribute these savings to units that need funding and thus meet the needs of both parties (King and Levine 1993a).

When scholars consider both theoretical and empirical studies, they can group the hypotheses that explain the relationship between financial development and economic growth under four titles. The first is the “supply-leading hypothesis” pioneered by Schumpeter (1911) and developed by Patrick (1966), which argues that financial development has a rather large and positive effect on economic growth. Here, financial intermediation contributes to growth by increasing the effectiveness of capital accumulation, savings and, accordingly, investment rates.

The second hypothesis that explains the relationship between financial development and economic growth is the “demand-following hypothesis,” which was first put forward by Robinson (1952) and states that financial development follows economic growth. This hypothesis states that the demand for financial services will increase as the real part of the economies of countries develops. This hypothesis can be summarized as “entrepreneur leads and finance follows.”

Third, the bidirectional causality hypothesis is a combination of the supply-leading and demand-following hypotheses. It postulates that financial development and economic growth are mutually or bidirectionally causal (see Table 1). Financial development gradually induces economic growth and this, in turn, causes feedback and induces further financial development.

The fourth is the theory put forth by Lucas (1988), who states that there is a very weak or no causality relationship between financial development and economic growth. This theory is stated as the “neutrality hypothesis.”

The aim of this study is determine if there is a relationship between financial development and economic growth in emerging countries. The study is a causality analysis. Although there are various empirical studies on the relationship between financial development and economic growth, this study differs from studies in the literature in terms of method and scope. For the assumption of cross-sectional independence and heterogeneity are difficult to satisfy in panel data, neglecting this information causes bias and inconsistency in empirical results (Bai and Kao, 2006). The method used in this study developed by Konya (2006) is unlike from the previous studies accounts for cross-sectional dependency and cross country heterogeneity in the empirical modeling.

Financial development is a comprehensive term. Therefore, proxy preference is of great importance for studies on financial development. Incorrect or inadequate preference of proxy may lead to failure results. This may also lead policy makers to make incorrect decisions. In this study, different from the majority of previous empirical studies, 5 proxies representing financial development were deployed. Besides, there are not many empirical studies about emerging markets for the periods after the years of 1980s, when the financial liberalization began to increase all over the world. Moreover, especially Turkey showed important development in financial sector in comparison to other emerging countries after the years of 2000. So, the relationship between the financial development and economic growth of Turkey may be an example for other emerging countries. Therefore, the analysis of Turkey and other emerging countries has an importance for governments of countries with similar qualifications. According to these results, policy makers can make use of the macroeconomic policies of countries with similar qualifications.

This study comprises of five sections. Following this introductory section, data and the methods used in the study are clarified in section two. Section two provides information regarding the data and the methods used in the study. Empirical findings and the economic interpretations of these findings are presented in section three. Finally, conclusion and policy suggestions are given in section four.

## 2. Literature review

There are various studies conducted on financial development and economic growth. The first studies on this topic were conducted by Bagehot (1873) and Schumpeter (1911). Numerous theoretical and empirical studies have been conducted in the literature following the study by Schumpeter (1912). Gurley and Shaw (1955, 1967), Bencivenga and Smith (1991), Obstfeld (1994), Bencivenga et al. (1995) can be given as examples for theoretical studies.

**Table 1.** *Studies about the causality between the financial development and economic growth*

Author(s)	Methodology	Country	Period	Results and findings
Ahmed and Ansari (1998)	Standard Granger causality	3 South-Asian countries: India, Pakistan, and Sri Lanka.	1973-1991	FD→EG (supply leading hypothesis)
Ghali (1999)	Cointegration, VECM causality	Tunisia	1963-1993	FD→EG (supply leading hypothesis)
Gürsoy and Al-Aali (2000)	Granger causality	Bahrain, Saudi Arabia and Kuwait	1973-1988	FD→EG (Kuwait) (supply leading hypothesis) EG→FD (Bahrain and Saudi Arabia)
Kar and Pentecost (2000)	Cointegration, VECM causality	Turkey	1963-1995	The direction of the causality between financial development and economic growth changed according to the financial development indicator.
Bhattacharya and Sivasubramanian (2003)	Cointegration, VECM causality	India	1970-1999	FD→EG (supply leading hypothesis)
Fase and Abma (2003)	Standard Granger causality	9 emerging countries: Bangladesh, India, Malaysia, Pakistan, Philippines, Singapore, South Korea, Sri Lanka and Thailand.	1974-1999	FD→EG (supply leading hypothesis)
Ghirmay (2004)	VAR, VECM causality	13 sub-Saharan African countries	1971-2001	FD→EG (8 countries) FD↔EG (6 countries)
Chang and Caudill (2005)	VAR, VECM causality	Taiwan	1962-1998	FD→EG (supply leading hypothesis)
Liang and Teng (2006)	VAR, VECM causality	Chine	1952-2001	EG→FD (supply leading hypothesis)
Shan and Jainhong (2006)	VAR, VECM causality	Chine	1978-2001	FD↔EG
Aslan ve Küçükaksoy (2006)	VAR, Granger causality	Turkey	1970-2004	FD→EG (supply leading hypothesis)
Aslan and Korap (2006)	Cointegration, VECM causality	Turkey	1987-2004	The direction of the causality between financial development and economic growth changed according to the financial development indicator.
Demir et al. (2007)	VAR, VECM causality	Turkey	1995-2005	FD→EG (supply leading hypothesis)
Ang and McKibbin (2007)	Cointegration, VECM causality	Malaysia	1960-2001	EG→FD (demand-following hypothesis)
Altunç (2008)	Cointegration, VECM causality	Turkey	1970-2006	The direction of the causality between financial development and economic growth changed according to the financial development indicator.
Yang and Yi (2008)	Superexogeneity tests, Causality	Korea	1971-2001	FD→EG (supply leading hypothesis)
Abu-Bader and Abu-Qarn (2008)	VAR, VECM causality	Egypt	1960-2001	FD↔EG
Odhiambo (2008)	Cointegration, VECM causality	Kenya	1969-2005	EG→FD (demand-following hypothesis)

Author(s)	Methodology	Country	Period	Results and findings
Kakilli Acaravci et al. (2009)	Panel GMM and causality	24 sub-Saharan African countries	1975-2005	FD↔EG
Odhiambo (2009)	Cointegration, VECM causality	South Africa	1960-2006	EG→FD
Nazlıoğlu et al. (2009)	ARDL, DL Granger causality	Turkey	1987-2007	EG→FD
Rathinam and Raja (2010)	VAR, VECM causality	India	1950-2006	FD→EG (supply leading hypothesis)
Öztürk et al. (2011)	Holt-Eakin, Newey and Rosen panel causality	9 MENA countries	1992-2009	EG→FD
Kar et al. (2011)	Bootstrap panel granger causality	15 MENA countries	1980-2007	FD≠EG
Soytaş and Küçükkaya (2011)	VAR, VECM causality	Turkey	1991-2005	FD≠EG
Ozcan and Ari (2011)	VAR, VECM causality	Turkey	1998-2009	EG→FD
Shahbaz and Lean (2012)	ARDL, VECM causality	Tunis	1971-2008	FD↔EG
Shahbaz et al. (2013)	ARDL, VECM causality	China	1971-2011	FD↔EG
Hsueh, et al. (2013)	Bootstrap panel granger causality	10 Asian countries	1980-2007	FD→EG (Malaysia, Indonesia, Korea, Singapore, Thailand, Taiwan and China) EG→FD (Malaysia) FD≠EG (Philippines, India and Japan)
Öztürk and Acaravci (2013)	ARDL, VECM causality	Turkey	1960-2007	FD→EG (supply leading hypothesis)

Abbreviations defined as follows; Economic growth or GDP (EG), Financial development (FD), Toda-Yamamoto (TY), Dolado-Lutkepohl (DL), The Economic Community of West African States (ECOWAS).

→, ↔, and ≠ represent unidirectional causality, bidirectional causality, and no causality, respectively

## 2. Data and methodology

The primary aim of this study is to analyze the relationship between the economic growth and financial development for the economies of 13 emerging countries (Argentina, Brazil, Bulgaria, Chile, China, Colombia, Indian, Indonesia, Malaysia, Mexico, Russia, South Africa, Thailand and Turkey) classified by Morgan Stanley Capital Index (MSCI). The MSCI emerging markets index consists of twenty three emerging countries. The analysis of the study covers annual data for the period of 1988–2013. The data were obtained from the World Development Indicator (WDI), is an electronic database of World Bank.

It is crucial that the variables selected to analyze the relationship between economic growth and financial development actually represent economic growth and financial development. The proxies that are used to represent the developments in the financial

sector can be classified in three groups: (1) monetary aggregate variables<sup>(1)</sup>, (2) domestic and private credit value and banking variables<sup>(2)</sup> and (3) stock and bond market variables<sup>(3)</sup>. Because a significant part of data regarding the monetary aggregate variables could not be obtained, monetary aggregates such as M1, M2 and M3 were not used in this study. In addition, stock trade data could not be obtained for the majority of the emerging markets, so the data could not be analyzed for these countries. This study employs five indicators for financial development: (i) DCB: domestic credit provided by banking sector to GDP, (ii) DCP: domestic credit to private sector to GDP, (iii) GDS: gross domestic savings to GDP, (iv) TR: total export and import of goods and services to GDP, (v) IR: real interest rate (%). The logarithmic value of Real GDP based on 2005 prices was chosen as a proxy of economic growth.

In this study, cross-section dependence and homogeneity tests were conducted, and then the causality test was performed.

### 2.1. Panel Causality Test

Three approaches were employed to examine the direction of causality in a panel data (Kar et al., 2011). The first approach is based on a GMM estimator. However, this approach is not able to take into account cross-sectional dependence (Pesaran et al., 1999). The second approach was developed by Hurlin (2008) for examining the causality relation in a panel data. However, this approach is not able to account for cross-sectional dependence. The third approach proposed by Konya (2006) accounts for cross-sectional dependence. Moreover, this approach is able to take into account heterogeneity (Nazlioglu et al., 2011). If cross-sectional dependency exists, it will be more efficient to use the seemingly unrelated regressions (SUR) approach instead of OLS when estimating panel data causality (Zellner, 1962). This approach, developed by Konya (2004, 2006), is more appropriate than other approaches defined previously for analyzing the causality in a heterogeneous panel.

This approach is based on SUR estimation of the set of equations and Wald tests with country specific bootstrap critical values in detecting causal relationships. Besides, the variables in the system are not supposed to be stationary, implying that the variables are used in level form irrespective of their unit root and cointegration properties, because country specific bootstrap critical values are used (Konya, 2006).

The panel causality approach of Konya (2006) can be formulated as follows:

$$\begin{aligned}
 y_{1,t} &= \alpha_{11} + \sum_{l=1}^{ly_1} \beta_{1,1,l} y_{1,t-l} + \sum_{l=1}^{lx_1} \delta_{1,1,l} x_{1,t-l} + \varepsilon_{1,1,t} \\
 y_{2,t} &= \alpha_{2,1} + \sum_{l=1}^{ly_1} \beta_{1,2,l} y_{2,t-l} + \sum_{l=1}^{lx_1} \delta_{1,2,l} x_{2,t-l} + \varepsilon_{1,2,t} \\
 &\vdots \\
 y_{N,t} &= \alpha_{1,N} + \sum_{l=1}^{ly_1} \beta_{1,N,l} y_{N,t-l} + \sum_{l=1}^{lx_1} \delta_{1,N,l} x_{N,t-l} + \varepsilon_{1,N,t}
 \end{aligned} \tag{1}$$

and

$$\begin{aligned}
 x_{1,t} &= \alpha_{2,1} + \sum_{l=1}^{ly_2} \beta_{2,1,l} y_{1,t-l} + \sum_{l=1}^{lx_2} \delta_{2,1,l} x_{1,t-l} + \varepsilon_{2,1,t} \\
 x_{2,t} &= \alpha_{2,2} + \sum_{l=1}^{ly_2} \beta_{2,2,l} y_{2,t-l} + \sum_{l=1}^{lx_2} \delta_{2,2,l} x_{2,t-l} + \varepsilon_{2,2,t} \\
 &\vdots \\
 x_{N,t} &= \alpha_{2,N} + \sum_{l=1}^{ly_2} \beta_{2,N,l} y_{N,t-l} + \sum_{l=1}^{lx_2} \delta_{2,N,l} x_{N,t-l} + \varepsilon_{2,N,t}
 \end{aligned} \tag{2}$$

Where  $t$  refers to the time period ( $t=1, \dots, T$ ),  $N$  is the number of countries ( $j=1, \dots, N$ )  $l$  to the lag. In this system, each equation in the SUR system has different predetermined variables to test for Granger causality, there are alternative causal relations to be found for a country in which (1) there is one-way Granger causality from X to Y if not all  $\delta_{1,j,i} s$  are zero, but all  $\beta_{2,i,j} s$  are zero; (2) there is one-way Granger causality from Y to X if all  $\delta_{1,j,i} s$  are zero, but not all  $\beta_{2,i,j} s$  are zero; (3) there is two-way Granger causality between X and Y if neither  $\delta_{1,j,i} s$  nor  $\beta_{2,i,j} s$  are zero; (4) there is no Granger causality between X and Y if all  $\delta_{1,j,i} s$  and  $\beta_{2,i,j} s$  are zero<sup>(4)</sup>.

### 3. Empirical Findings

Before conducting the causality test developed by Konya (2006), it is necessary to test cross-section dependence and heterogeneity. Breusch-Pagan (1980)  $CD_{LM1}$ , Pesaran (2004)  $CD_{LM2}$ , Pesaran (2004)  $CD_{LM}$  and Pesaran et al. (2008) tests were used for cross-section dependence. Pesaran and Yamagata (2008) test was used for homogeneity. The results of the cross-section dependence and homogeneity tests for thirteen emerging countries are presented in Appendix 1. According to the results given in Appendix 1, it was concluded that there was cross-section dependence and heterogeneity in all three groups included in the study. Therefore, it would be possible to conduct the panel causality test of Konya (2006).

The first variable used as proxy for the financial sector is DCB. The results of the causality test between DCB and GDP for G7 countries are given in Table 2.

The results of the causality test between GDP and DCB for emerging countries are presented in Table 2.

The null hypothesis stating that there is no causality from GDP to DCB is rejected in Colombia, India, Indonesia and Turkey at 5 percent and in Chile at 10 percent significance levels. The null hypothesis is accepted in the remaining nine emerging countries. Alternatively, the null hypothesis that there is no causality from DCB to GDP is rejected for South Africa at 1 percent, for Chile, Indonesia, Thailand and Turkey at 5 percent significance levels.

**Table 2.** *The Results of Panel Causality Test for GDP and DCB in Emerging Market*

Countries	H <sub>0</sub> : GDP does not cause DCB				H <sub>0</sub> : DCB does not cause GDP			
	Wald stat.	Bootstrap Critical Values			Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%		1 %	5%	10%
Argentina	0.34	42.26	20.73	13.45	1.75	66.47	30.43	19.40
Brazil	1.20	26.16	14.24	9.43	0.28	62.32	30.89	20.21
Chile	10.09*	29.48	14.81	9.48	36.72**	67.52	34.28	22.90
China	8.51	83.58	45.36	31.34	7.84	76.18	39.37	26.20
Colombia	53.94**	77.22	42.57	29.25	9.59	92.22	43.66	28.21
Indian	28.97**	47.33	24.13	15.83	0.45	41.74	20.60	13.93
Indonesia	29.55**	35.93	17.75	11.99	36.10**	67.33	34.11	23.26
Malaysia	1.19	32.01	16.34	10.91	14.75	86.17	42.99	28.94
Mexico	1.64	57.28	28.43	19.26	0.18	48.10	24.47	16.10
Russia	2.24	26.38	14.63	10.31	1.25	34.55	17.19	11.80
South Africa	1.16	24.16	12.68	8.62	40.10***	34.17	19.52	12.80
Thailand	1.67	27.95	15.67	11.01	20.60**	23.89	11.51	7.71
Turkey	25.23**	43.50	24.60	17.87	14.60**	29.34	14.55	9.44

\*\*\*, \*\* and \* indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

Accordingly, it can be said that there is bidirectional causality between GDP and DCB in Chile, Indonesia and Turkey. In addition, it can be said that there is unidirectional causality from GDP to DCB in Colombia and India and from DCB to GDP in South Africa and Thailand. However, no causality was determined between the variables for the economies of Argentina, Brazil, China, Malaysia, Mexico and Russia.

The second variable representing the development of the financial sector for emerging countries is DCP. The results of the causality test between GDP and DCP are summarized in Table 3.

**Table 3.** *The Results of Panel Causality Test for GDP and DCP in Emerging Markets*

Countries	H <sub>0</sub> : GDP does not cause DCP				H <sub>0</sub> : DCP does not cause GDP			
	Wald stat.	Bootstrap Critical Values			Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%		1 %	5%	10%
Argentina	0.74	48.14	22.62	15.47	73.27***	64.74	32.80	21.34
Brazil	0.67	33.18	17.08	11.69	1.47	65.60	33.93	22.12
Chile	16.68	106.52	58.55	43.09	30.77*	82.48	41.03	26.82
China	4.81	53.05	27.35	18.88	3.52	79.51	40.14	26.94
Colombia	3.08	28.60	14.52	9.68	1.03	84.90	40.05	26.24
Indian	44.52*	94.73	53.01	38.40	0.56	38.01	18.85	12.36
Indonesia	2.95	42.97	18.12	11.91	4.63	100.59	46.83	30.46
Malaysia	0.67	41.93	19.72	13.14	2.14	62.16	30.56	21.12
Mexico	0.43	38.38	19.58	13.12	5.43	59.81	29.91	19.26
Russia	0.70	28.80	14.11	9.47	11.81*	25.45	13.27	8.93
South Africa	0.72	27.54	14.53	9.71	18.17**	33.37	17.80	12.33
Thailand	0.86	26.97	15.22	10.76	16.72**	21.15	11.13	7.80
Tunisia	1.19	18.23	9.55	6.40	2.21	27.34	14.26	9.57
Turkey	7.79	53.98	28.08	19.95	1.44	25.16	12.41	8.34

\*\*\*, \*\* and \* indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

As it can be seen in Table 5, the null hypothesis that there is no causality from GDP to DCP is rejected only for India at a 10 percent significance level. Alternatively, the null hypothesis stating that there is no causality from DCP to GDP is rejected for Argentina at 1 percent, for South Africa and Thailand at 5 percent, for Chile, Russia at 10 percent significance levels. Alternatively, the null hypothesis that there is no causality from DCP to GDP is rejected for Argentina at 1 percent, for South Africa and Thailand at 5 percent and for Chile and Russia at 10 percent significance levels. Therefore, it can be said that there is unidirectional causality from GDP to DCP for India and from DCP to GDP for Argentina, Chile, Russia, South Africa and Thailand. However, no causality was determined for the economies of Brazil, China, Colombia, Indonesia, Malaysia, Mexico and Turkey.

The results of the causality test between GDP and GDS for emerging markets are summarized in Table 4.

**Table 4.** *The Results of Panel Causality Test for GDP and GDS in Emerging Market*

Countries	H <sub>0</sub> : GDP does not cause GDS				H <sub>0</sub> : GDS does not cause GDP			
	Wald stat.	Bootstrap Critical Values			Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%		1 %	5%	10%
Argentina	19.01*	52.80	25.26	16.45	4.23	43.16	21.82	14.70
Brazil	0.38	48.83	25.84	17.19	0.84	29.01	15.14	10.07
Chile	7.32	54.22	27.84	18.54	1.21	45.47	24.06	15.52
China	1.72	69.40	34.92	22.59	2.75	84.71	45.29	30.71
Colombia	21.01*	49.09	25.27	17.28	1.54	44.18	20.86	13.97
Indian	0.89	52.70	25.82	17.02	25.70**	45.47	23.30	16.02
Indonesia	0.14	157.5	55.24	31.81	0.91	18.68	10.65	6.96
Malaysia	0.54	70.66	36.22	24.51	0.23	37.72	18.47	12.24
Mexico	27.77*	64.60	30.86	20.94	2.63	30.47	15.70	10.41
Russia	1.05	38.63	19.84	13.4	7.74	28.14	15.31	10.55
South Africa	10.14*	28.48	14.99	9.88	0.25	23.35	12.44	8.55
Thailand	1.14	24.98	13.11	8.86	7.17	28.18	15.57	10.56
Turkey	12.06*	26.55	13.44	9.02	13.3**	22.15	12.05	8.14

\*\*\*, \*\* and \* indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

The null hypothesis that there is no causality from GDP to GDS is rejected for Argentina, Colombia, Mexico, South Africa and Turkey at 10 percent significance levels. Alternatively, the null hypothesis stating that there is no causality from GDS to GDP is rejected for India and Turkey at 5 percent significance levels. A general evaluation of the results shows that there is bidirectional causality between GDP and GDS only for the Turkish economy. At the same time, there is a unidirectional causality relationship from GDP to GDS for Argentina, Colombia, Mexico and South Africa and from GDS to GDP for India. However, no causality relationship was determined between the variables for the economies of Brazil, Chile, China, Indonesia, Malaysia, Russia and Thailand.

The results of the causality test between TR and GDP, which were used as proxy for the financial sector, are summarized in Table 5.

**Table 5.** *The Results of Panel Causality Test for GDP and TR in Emerging Market*

Countries	H <sub>0</sub> : GDP does not cause TR				H <sub>0</sub> : TR does not cause GDP			
	Wald stat.	Bootstrap Critical Values			Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%		1 %	5%	10%
Argentina	5.99	63.63	30.89	20.42	22.10*	63.80	31.35	20.65
Brazil	3.35	45.61	22.96	15.50	3.43	76.15	35.52	23.45
Chile	3.50	57.37	30.60	20.80	0.30	52.30	27.66	18.81
China	1.77	84.06	47.29	34.15	23.46*	68.60	33.79	22.74
Colombia	5.88	18.46	9.72	6.57	0.40	83.80	41.12	27.43
Indian	18.91	101.3	56.12	41.35	28.73**	54.31	27.01	17.65
Indonesia	0.16	20.61	10.12	7.25	2.40	127.57	50.41	30.40
Malaysia	1.82	34.67	18.64	12.71	2.98	60.13	32.59	22.26
Mexico	1.83	58.60	29.18	19.05	6.30	57.86	29.59	20.01
Russia	4.31	19.32	11.08	7.68	0.12	41.26	20.31	13.32
South Africa	3.01	31.07	16.47	11.25	0.36	32.32	16.54	11.49
Thailand	5.01	39.48	21.59	15.23	1.67	21.95	11.38	7.66
Turkey	5.41	23.65	13.25	9.28	10.51*	24.40	12.58	8.42

\*\*\*, \*\* and \* indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

Table 5 shows that the null hypothesis that there is no causality from TR to GDP is rejected for India and Uruguay at 5 percent and for Argentina, China and Turkey at 10 percent significance levels. According to these results, it can be said that there is unidirectional causality from TR to GDP for Argentina, China, India, Turkey and Uruguay. However, no causality was determined for some emerging countries<sup>(5)</sup>.

Finally, the results of the causality test between IR and GDP for emerging countries are presented in Table 6.

**Table 6.** *The Results of Panel Causality Test for GDP and IR in Emerging Market*

Countries	H <sub>0</sub> : GDP does not cause IR				H <sub>0</sub> : IR does not cause GDP			
	Wald stat.	Bootstrap Critical Values			Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%		1 %	5%	10%
Argentina	0.94	30.87	15.48	10.22	0.110	73.03	35.30	22.83
Brazil	5.53	44.28	20.97	13.77	1.653	76.78	34.38	22.58
Chile	3.674	39.14	19.18	13.05	26.26*	77.47	35.48	23.21
China	1.382	45.88	22.86	15.59	0.223	64.65	30.38	19.70
Colombia	8.23	49.87	25.46	17.63	27.10*	70.41	38.41	26.41
Indian	0.25	27.98	14.49	9.72	0.533	64.39	29.97	19.14
Indonesia	3.07	37.82	19.32	12.84	88.22***	83.15	39.57	24.39
Malaysia	8.68	42.74	22.18	14.87	15.11	83.12	39.60	26.31
Mexico	2.56	37.84	19.72	13.61	0.154	28.208	13.84	9.442
Russia	0.34	37.00	19.79	13.69	8.78	38.48	18.96	12.57
South Africa	0.53	29.57	16.45	11.10	7.89	26.05	13.15	9.01
Thailand	1.39	33.94	18.11	12.50	2.22	29.69	14.75	9.74
Turkey	20.97*	43.46	23.29	16.27	6.98	26.70	13.31	8.86

\*\*\*, \*\* and \* indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

As it can be seen in Table 6, the null hypothesis that there is no causality from GDP to IR is rejected for Turkey at a 10 percent significance level, whereas it is accepted for the other twelve countries. Alternatively, the null hypothesis that there is no causality from IR to GDP is rejected for Indonesia at 1 percent, for Chile and Colombia at 10 percent significance levels. Therefore, it can be said that there is unidirectional causality for emerging countries when the analysis is based on the variable of interest rate, which is taken as proxy for financial development. It was found that the direction of this causality was from GDP to IR in Turkey and from IR to GDP in Chile, Colombia and Indonesia. However, no causality was determined in the majority of the emerging countries<sup>(6)</sup>.

**Table 7.** Summary for the direction of causality

Emerging Mr.	DCB	DCP	GDS	TR	IR	Emerging Mr.	DCB	DCP	GDS	TR	IR
	Panel A: from FD to economic growth						Panel B: from economic growth to FD				
Argentina	no	→	no	→	no	Argentina	no	no	→	no	no
Brazil	no	no	no	no	no	Brazil	no	no	no	no	no
Chile	→	→	no	no	no	Chile	→	no	no	no	no
China	no	no	no	→	no	China	no	no	no	no	no
Colombia	no	no	no	no	no	Colombia	→	no	→	no	no
Indian	no	no	→	→	no	Indian	→	→	no	no	no
Indonesia	→	no	no	no	no	Indonesia	→	no	no	no	no
Malaysia	no	no	no	no	no	Malaysia	no	no	no	no	no
Mexico	no	no	no	no	no	Mexico	no	no	→	no	no
Russia	no	→	no	no	no	Russia	no	no	no	no	no
South Africa	→	→	no	no	no	South Africa	no	no	→	no	no
Thailand	→	→	no	no	no	Thailand	no	no	no	no	no
Turkey	→	no	→	→	→	Turkey	→	no	→	no	→

Findings that support the neutrality hypothesis were obtained for emerging countries. Bidirectional causality between financial development and economic growth was determined only for Turkey. It was found that there was no causality, or a very weak causality, relationship between financial development and economic growth in the other twelve emerging countries. No causality could be determined for the variables representing financial development, especially in Brazil and Malaysia.

In this study, no causality was determined between financial development and economic growth in certain emerging countries, particularly in Argentina, Brazil, China, Russia and Mexico, which have high income levels. This can be attributed to the fact that the financial markets of the aforementioned countries experienced a late integration into the liberalization process. Socialist systems prevailed in Russia and China until the beginning of the 1990s, and the market mechanism was not completely developed. The financial markets of these two countries began to develop starting from the beginning of the 2000s. China and Russia fell behind the G7 and EU countries in terms of both trading volume and the diversity of financial instruments until the 2000s. Besides, in a socialist system, production is totally in the charge of the state. In addition to the planning of the production process by the state, the absence of private ownership and the control of trade and interest rates by the state disavow the connection between the financial sector and the

real sector. For these reasons, no causality was found between financial development and economic growth in the aforementioned countries.

Although there was not a socialist system in Latin American countries, such as Argentina, Brazil and Mexico in the period of 1990–2011, the public sector was dominant in the economy. Furthermore, continuous political instability and economic crises experienced in these countries (1994 in Mexico and 2001 in Argentina), this period deeply affected the economies of Latin American countries. For this reason, the necessary reforms could not be made and consequently the financial sector did not develop in Latin American countries until the 2000s. Starting from the beginning of the 2000s, the financial sector began to develop together with the new reforms, the acceleration of the privatization process and the liberalization process of the markets. However, such activities started late. Consequently, the coordination between the financial sector and the real sector was maintained at a considerably later stage. This weakened the connection between financial development and economic growth and thus no causality was found in the study.

#### 4. Conclusion

In this study, whether there was a causality relationship between the financial sector and the real sector in emerging countries was analysed. The panel bootstrap causality test, which was developed by Konya (2006) and involves cross-section dependence and heterogeneity, was used in the analyses. The results of this test showed that weak causality was found between economic growth and financial development in emerging countries, except for Turkey. This shows that the neutrality hypothesis is valid for emerging markets. That is, neither the supply-leading nor the demand-following hypotheses are valid for emerging markets.

The financial sector in emerging markets does not have a developed structure compared to G7 and EU countries. In emerging countries, such as China, Russia, Brazil, Argentina and Mexico, the financial sector began to develop starting from the 2000s. When the researchers divided the studied period into two, before and after 2000, different findings can be obtained regarding the aforementioned countries. For this reason, separate evaluation of the periods before and after 2000 in analyzing the relationship between financial development and economic growth for these five countries may provide an opportunity for obtaining different results compared to previous studies.

The economies of emerging countries<sup>(7)</sup> are not as developed as the economies of G7 and EU countries. It is primarily necessary for these countries to develop their financial markets. For this purpose, emerging countries may look at Turkey as a model. Turkey entered a new period after 2000. Following the two economic crises experienced in 2000 and 2001, Central Bank of Turkey (CBT) became an autonomous institution. The fixed exchange rate system was replaced by the flexible exchange rate system. The Banking Regulation and Supervision Agency (BRSA) were founded and the financial sector was taken under control. In addition to all these positive developments, successful privatization practices accelerated the liberalization of the markets and contributed to the development of the financial sector. Together with the development of the financial

sector, coordination with the real sector also increased. Thus, an annual average economic growth rate of 5 percent was achieved in the period of 2001–2012 in Turkey and accordingly the financial sector also made significant progress. Besides the banking sector, important developments were also experienced in the stock exchange market. This shows that a high coordination has been achieved between financial development and economic growth in Turkey after the year 2000.

In addition to these developments, political stability also has great importance in the development of financial markets in Turkey. Foreign capital targets those countries where there is stability and does not prefer countries experiencing uncertainty, because such countries are considered to be risky for investments. Foreign capital has a large share in the financial markets of countries, such as Turkey, which has both economic and political stability. This has positively contributed to the development of the financial markets in Turkey. It can be said that emerging countries should take Turkey as a model because of the aforementioned and similar positive developments.

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## Notes

- (1) This variable is from Sinha and Macri (2001), Kar et al. (2011) and Hsueh et al. (2013).
- (2) This variable is from Khan and Senhadji (2003), Liang and Teng (2006), Kar et al. (2011), Hsueh et al. (2013), Narayan and Narayan (2013).
- (3) This variable is from Khan and Senhadji (2000), Adjasi and Biekpe (2006), Enisan and Olufisayo (2009).
- (4) The estimations were performed by the SUR model of TSP 5. We are grateful to László Kónya for sharing his TSP codes.
- (5) Brazil, Chile, Colombia, Indonesia, Malaysia, Mexico, Russia, South Africa and Thailand.
- (6) Argentina, Brazil, China, India, Malaysia, Mexico, Russia, S. Africa and Thailand.
- (7) Except for Turkey, China, Russia, Brazil, Argentina and Mexico.

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## Appendix 1

**Table 1.1.** Cross-section Dependence and Homogeneity tests

Test	Statistic	p-value
LM	608.84	0.000
CD <sub>LM</sub>	42.501	0.000
CD	20.868	0.000
LM <sub>adj</sub>	136.589	0.000
Delta	8.332	0.000
Tilde	9.933	0.000