

## Structural breaks, financial globalization, and financial development: Evidence from Turkey

Pinar Avci<sup>1\*</sup>, Murat Cetin<sup>2</sup><sup>1</sup>School of Sarköy Vocational, Tekirdag Namik Kemal University, Tekirdag, Turkey<sup>2</sup>Faculty of Economics and Administrative Sciences, Tekirdag Namik Kemal University, Tekirdag, Turkey\*Corresponding author: [pavci@nku.edu.tr](mailto:pavci@nku.edu.tr)

### Article Info

**Article history:**

Received 14 January 2022

Accepted 23 September 2022

Published 5 October 2022

**JEL Classification Code:**

F60, E44, O16

**Author's email:**[mcetin@nku.edu.tr](mailto:mcetin@nku.edu.tr)

DOI: 10.20885/ejem.vol14.iss2.art5

### Abstract

**Purpose** — Mishkin's hypothesis suggests that globalization appears to be a vital factor in stimulating the development of the financial system. The study examines this hypothesis for the Turkish economy from 1970 to 2017. It focuses on the link between financial globalization and financial development by integrating economic growth, inflation, and natural resource rent as additional determinants into the financial development specification.

**Methods** — The Ng-Perron and Vogelsang-Perron unit root tests are used to check the stationarity of variables. The cointegration analysis is performed using the Hatemi-J and ARDL bounds testing procedures.

**Findings** — The main empirical results show that the series are cointegrated under structural breaks; in the long run, financial globalization and economic growth increase financial development while inflation and natural resource rent negatively affect financial development. A unidirectional causality exists from financial globalization and economic growth to financial development. At the same time, there is bidirectional causality between inflation and financial development, natural resource rent, and financial development.

**Implications** — The empirical findings can present important recommendations for policymakers.

**Originality** — Very few time-series studies include Turkey's economy and structural breaks.

**Keywords** — Financial globalization, financial development, economic growth.

### Introduction

In 1973, after Bretton Woods, many dimensions of globalization, such as economic, trade, financial, social, political, and environmental, and their effects on various development areas had become the topics to be studied and discussed (Balcilar, Gungor, & Olasehinde-Williams, 2019). For example, globalization can affect economic growth (Ghosh, 2017), income inequality (Adams, 2008), energy consumption (Chen & Chen, 2011), employment (Chen, Felipe, Kam, & Mehta, 2021), trade (Egger & Fischer, 2020), and human capital (Li, Lu, Song, & Xie, 2019). Although these studies intensify the relationship between globalization and several macroeconomic variables, they do not consider the globalization-financial development link.

Many researchers suggest that globalization affects financial development in both emerging and developed economies (García, 2012; Haseeb, Xia, Danish, Baloch, & Abbas, 2018; Mishkin,

2009). Globalization contributes to financial market development by increasing domestic savings, reducing costs with global risk distribution, using new technologies, and promoting managerial knowledge transfusion (Häusler, 2002). Moreover, globalization causes sudden inflows and outflows of international capital in developing countries. Therefore, economic and financial crises have risen in these countries (Harris, 1999). Hence, the disappearance of borders in the financial market is becoming a single world market; in other words, financial globalization creates advantages and disadvantages (Avci, 2020).

Mishkin's study (2009) is one of the pioneer studies to theoretically argue that globalization may encourage economic growth by considering multi-directional links between globalization, financial development, and institutional capacity. He focuses on the connection between globalization and the financial sector. According to Mishkin (2009), globalization helps to develop financial institutions by leading domestic financial institutions to enter foreign markets. It may decrease bureaucracy and enhance a country's property rights and political stability. It enables domestic and foreign investors to access capital from banking and stock markets by improving institutional capacity. Consequently globalization has a beneficial impact on the financial sector. García (2012), Haseeb et al. (2018), Rajan and Zingales (2003) agree with the idea of Mishkin (2009). Rajan and Zingales (2003) conclude that globalization benefits the development of the financial sector. Garcia (2012) indicates that financial globalization decreases international transaction costs and strengthens the international link between the financial and real sectors. Finally, Haseeb et al. (2018) summarize that globalization is accepted as a crucial determinant of economic growth and financial development by triggering institutional reforms. Finally, it can be said that globalization has positive effects on economic and financial development.

Tornell, Westermann, and Martínez (2004) suggest that financial liberalization has generally followed trade liberalization in developing countries. For several reasons, the Turkish economy is selected as a case for our empirical study. First, Turkey, an emerging economy, has gradually started liberalization since the 1980s. Turkey's liberalization process has initiated with the 24th January 1980 decisions. The foreign trade regime was revised in 1980. Since then, tariffs have been reduced, and all governments have started adopting export-oriented policies (Çevik, Atukeren, & Korkmaz, 2019). Moreover, The Investment Support and Promotion Agency of Turkey (ISPAT) was launched in 2006 to attract foreign investors.

Second, The Turkish Investment Report (2020) presented by the U.S. Department of State indicates that Turkey has one of the most liberal legislative reforms for FDI among OECD countries. One of its essential development targets is to fascinate new foreign direct investments (FDI) significantly. In this respect, Turkey's investment incentive schemes were revised to stimulate investment in related sectors in 2018. Turkey attracted a total of USD 5.6 billion in FDI in 2019.

Based on the considerations above, the present study focuses on the relationship between financial globalization and financial development for the Turkish economy. It can be seen in Table 1 that there are very few time-series studies that include Turkey's economy and structural breaks. Here, we investigate Mishkin's argument that globalization is a crucial factor that encourages financial development and economic growth in developing economies. For this purpose, the study integrates economic growth, inflation, and natural resource rent into the financial development equation as additional variables. We first use the Ng-Perron and Vogelsang-Perron tests to check the stationarity of variables. Secondly, we use the ARDL bounds test and Hatemi-J cointegration procedure to identify the long-run relationship between the variables. Thirdly, we estimate the long-term coefficients applying the Fully Modified Ordinary Least Squares (FMOLS) and Canonical Cointegrating Regressions (CCR) estimators. Finally, the causality analysis is conducted through the Vector Error Correction Model (VECM) Granger causality test.

It is stated that globalization is an essential factor that stimulates financial development, especially for developing countries (Mishkin, 2009). Several empirical studies dwell on various time-series analyses for different countries (Atil, Nawaz, Lahiani, & Roubaud, 2020; Guan, Kirikkaleli, Bibi, & Zhang, 2020; Shahbaz, Mallick, Mahalik, & Hammoudeh, 2018). First, Shahbaz et al. (2018) dwell on the globalization-financial development link for India over the period 1971-2013. Using the ARDL procedure, the study reveals that social, economic, and political globalization and

inflation are negatively related to financial development in the long run. In contrast, economic growth and population are positively linked with financial development. The study also reveals that social, economic, and political globalization causes financial development in the long run. Second, Guan et al. (2020) explore the nexus between natural resources and financial development by considering the impact of globalization on China between 1971-2017. They include human capital and economic growth in the financial development model. The findings show that the series are cointegrated. There exists a long-run relationship among the variables. The results of ARDL, FMOLS, DOLS, and CCR suggest that globalization is positively linked with financial development in the long run. The results also show that globalization causes financial development in the short and medium-run. Last, Atil et al. (2020) investigated the link between natural resources and financial development in Pakistan between 1972-2017. The long-run cointegration analysis findings suggest that economic globalization reduces financial development. This finding supports the results of Shahbaz et al. (2018), but it does not confirm the results of Guan et al. (2020).

There exist many studies which examine the nexus between globalization and financial development by using the panel data methods. García (2012) indicates that financial globalization, trade openness, and economic growth have a positive effect on credit and stock market values which are indicators of financial development. However, inflation has a detrimental influence on financial development. Asongu (2014) explores 15 African countries from 1996-2009 and globalization hampers financial development.

Law, Tan, and Azman-Saini (2015) intensify the links between globalization, institutions, and financial development in East Asia from 1988-2008. The study uses private sector credit and stock market capitalization as indicators of financial development. The results indicate a positive relationship between globalization and financial development. Private sector credit causes globalization, while globalization causes stock market capitalization in the long run.

Helhel (2017) tests the link between globalization and financial development for BRICS countries and Turkey from 2002-2015. She suggests that globalization positively affects financial development in the long run. This finding is in line with the results of Muye and Muye (2017), who examined the link between globalization, institutions, and financial development for BRICS, MINT, and ECOWAS countries from 1984 to 2013; Haseeb et al. (2018), who investigated the relationship among financial development, globalization, and carbon emissions for BRICS countries from the period of 1995-2014; Zaidi et al. (2019), who examine the links among globalization, economic growth, natural resources, human capital, gross fixed capital formation and financial development for 31 OECD countries during the period 1990-2016. Moreover, Balcilar et al. (2019) find that globalization, economic growth, trade openness, and institutional quality have a significant and positive impact on financial development for 36 countries over the period 1996-2016. Contrary to these studies, Asongu (2017) and Nasreen, Mahalik, Shahbaz, and Abbas (2020) show that globalization injures financial development.

Several studies exist intensifying the causal linkage between globalization and financial development by applying the Dumitrescu-Hurlin causality approach. Zaidi, Zafar, Shahbaz, and Hou (2019) investigated APEC countries from 1990-2016, while Saud, Chen, Haseeb, and Sumayya (2020) examined 49 countries between 1990-2004. The first study shows a unidirectional causality running from globalization to financial development, while the second study indicates a bidirectional causality between the variables.

## Methods

This study deals with the link between financial globalization and financial development using the time-series methodology for the Turkish economy. The motivation to create this econometric model is based on Mishkin's hypothesis, which is *globalization encourages the development of the financial system*. Moreover, Law et al. (2015) and Nasreen et al. (2020) put emphasis on globalization, institutional nature, inflation rate, and economic growth. Shahbaz et al. (2018) examine the impact of various globalization indicators on financial development. Shahbaz, Naeem, Ahad, and Tahir (2018) discuss the role of natural resources, economic growth, education, and capitalization in financial development, which have a debilitating or adverse effect on sectors. In the study, it is

determined that a financial system improves economic growth compensating for the negative impact of natural resources on economic growth. Zaidi, et al. (2019) find it plays a key role in increasing financial development using globalization and natural resources effectively. Therefore, as seen in these empirical studies, important variables such as globalization, economic growth, natural resources, and inflation rate, which are the determinants of financial sector development, are analyzed for different countries. Still, it has been determined that this issue has not been examined for the Turkish economy. Finally, the econometric model of our study is determined as follows, taking into account the empirical models in studies such as Guan et al. (2020) and Atil et al. (2020):

$$\ln FD_t = \delta_0 + \delta_1 \ln FGL_t + \delta_2 \ln GDP_t + \delta_3 \ln INF_t + \delta_4 \ln NRR_t + \mu_t \quad (1)$$

Where FD is liquid liabilities (% of GDP) as a measure of financial development (Asongu, 2017; Nasreen et al., 2020), FG is the financial globalization index as an indicator of globalization (Nasreen et al., 2020), GDP is per capita real income (constant 2010 US\$), which indicates a measure of economic growth (Guan et al., 2020), INF is consumer price index (annual %) as a measure of inflation (Bittencourt, 2011); and NRR is natural resource rent (the total rents of natural resources, %of GDP) (Shahbaz, Naeem, et al., 2018).

$t$  is the time term 1970-2017, and the residual term, which is normally distributed and it is indicated by  $\mu$ .  $\delta_0$  is the intercept,  $\delta_1, \delta_2, \delta_3$ , and  $\delta_4$  are the long-run coefficients for liquid liabilities with financial globalization, per capita real income, consumer price index and natural resource rent, respectively. We employ the logarithmic values of the variables to obtain the elasticity coefficients.

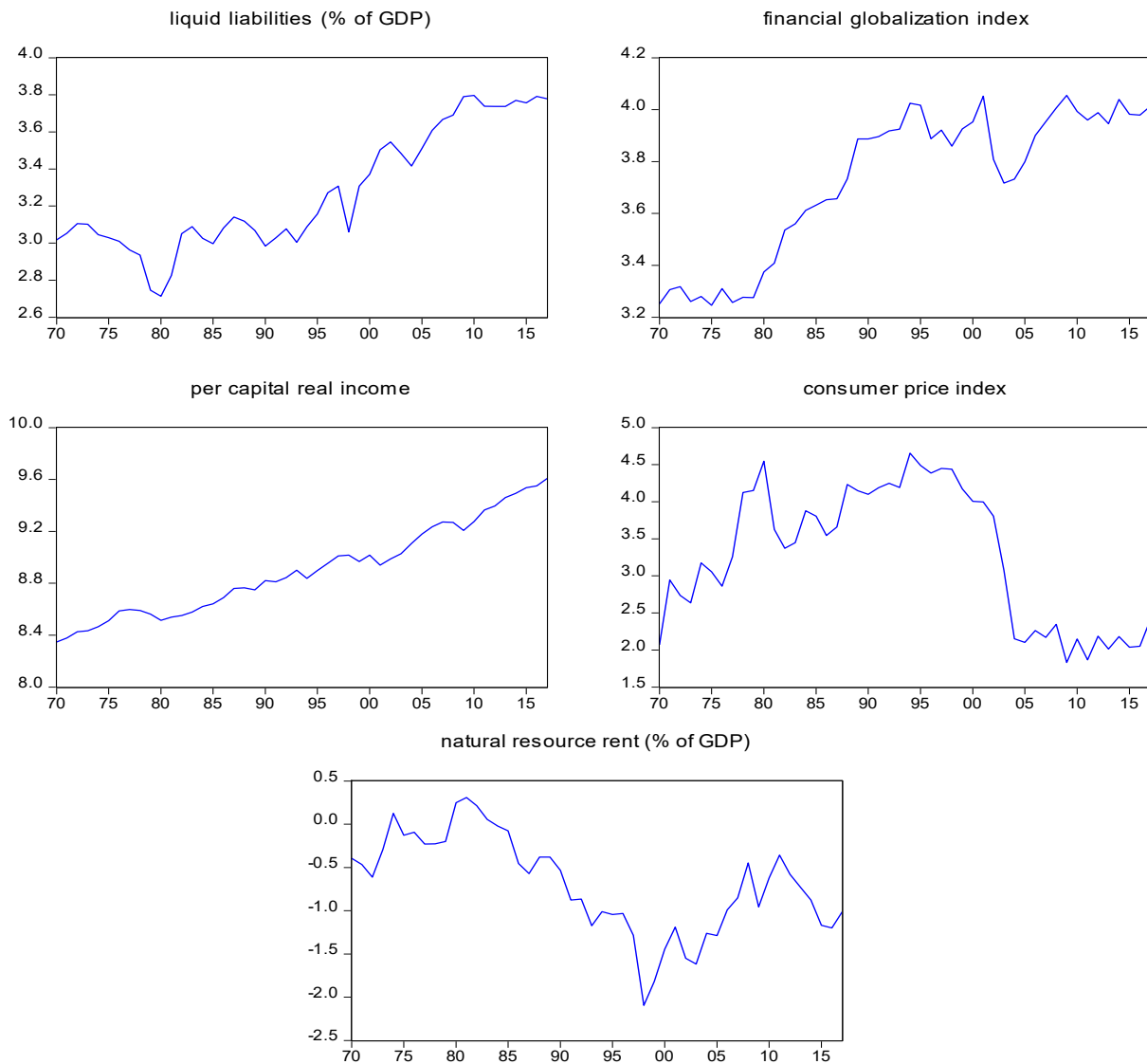
The time-series data from 1970 to 2017 are used in this study. The period starts with the year 1970 due to the availability of data set for the financial globalization index. The data on liquid liabilities, per capita real income, consumer price index, and natural resource rent are gathered from the World Bank, World Development Indicators-WDI (2020) database. The financial globalization index is obtained from KOF Swiss Economic Institute (2019) database. Table 1 indicates the variables and their expected signs. The statistics and correlations are indicated in Table 2. Fig.1. demonstrates the trends of the variables during the period 1970-2017.

**Table 1.** Variables and their expected signs.

Variables	Definition	Source	Expected sign
$FD_t$	Liquid liabilities (% of GDP)	WDI	-
$FGL_t$	Financial globalization index	KOF	(+)(-) Asongu (2014); Guan et al. (2020)
$GDP_t$	Real GDP per capita (constant 2010US\$)	WDI	(+) Atil e al. (2020)
$INF_t$	Consumer price index (annual, %)	WDI	(-) Asongu (2017)
$NRR_t$	The total rents of natural resources (%of GDP)	WDI	(-)(+) Shahbaz et al. (2018b); Guan et al. (2020)

**Table 2.** Descriptive statistics and correlations.

Statistics/Variables	$FD_t$	$FGL_t$	$GDP_t$	$INF_t$	$NRR_t$
Mean	3.273	3.729	8.902	3.276	-0.697
Median	3.111	3.873	8.871	3.409	-0.617
Std.dev.	0.324	0.284	0.352	0.922	0.565
Min.	3.797	4.055	9.607	4.656	0.308
Max.	2.713	3.246	8.348	1.833	-2.095
Skewness	0.379	-0.617	0.345	-0.158	-0.249
Kurtosis	1.803	1.829	2.061	1.505	2.493
Obs.	48	48	48	48	48
$LFD_t$	1.000				
$LFG_t$	0.694	1.000			
$LGDP_t$	0.900	0.823	1.000		
$LINF_t$	-0.687	-0.073	-0.480	1.000	
$LNRR_t$	-0.479	-0.636	-0.565	-0.023	1.000



**Figure 1.** Trends of the variables (1970-2017).

The times series technique is utilized to test the model (1). Firstly, the stationary analysis of variables is conducted via the Ng-Perron unit root and Vogelsang-Perron (AO and IO models) tests with one structural break. The property of the Ng-Perron tests is used to eliminate the restrictions of ADF and PP tests. Ng and Perron (2001) suggest four test statistics for stationarity analysis:  $MZ_a$ ,  $MZ_t$ ,  $MSB$ , and  $MPT$ . These tests can be formulated as follows:

$$MZ_{\alpha} = \left( (T^1 y_T^d)^2 - f_0 \right) / 2k \quad (2)$$

$$MZ_t = MZ_{\alpha} \times MSB \quad (3)$$

$$MSB = (k/f_0)^{1/2} \quad (4)$$

$$MPT = (\bar{c}^2 k - \bar{c} T^1) (y^d T)^2 / f_0 \quad (5)$$

The findings can be biased and spurious because Ng-Perron unit root tests do not consider structural breaks in the series (Alkhatlan & Javid, 2013). We also use the Vogelsang-Perron unit root test, which considers one structural break. This procedure developed by Bai and Perron (1998) can be applied with the help of two different models (the additive outlier value (AO) model and the innovation outlier value (IO) model). We employ the AO model to investigate the stationarity properties of the variables in this study.

In the second stage, the ARDL bounds test and Hatemi-J cointegration approach are applied to determine the presence of cointegration between the variables. The traditional cointegration tests developed by Engle and Granger (1987) and Stock and Watson (1999) require

that the series are integrated at  $I(1)$ . The ARDL approach provides statistically more reliable results than the classical cointegration test results since the unrestricted error correction model (UECM) is used. Additionally, the long-run and short-run parameters can be estimated through the UECM (Pesaran et al., 2001). The UECM can be shown as follows:

$$\begin{aligned} \Delta \ln FD_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta \ln FD_{t-i} + \sum_{i=0}^q \alpha_{2i} \Delta \ln FGL_{t-i} + \sum_{i=0}^q \alpha_{3i} \Delta \ln GDP_{t-i} + \\ & \sum_{i=0}^q \alpha_{4i} \Delta \ln INF_{t-i} + \sum_{i=0}^q \alpha_{5i} \Delta \ln NRR_{t-i} + \beta_1 \ln FD_{t-1} + \beta_2 \ln FGL_{t-1} + \\ & \beta_3 \ln GDP_{t-1} + \beta_4 \ln INF_{t-1} + \beta_5 \ln NRR_{t-1} + \beta_6 D_{1999} + u_t \end{aligned} \quad (6)$$

In the ARDL approach, Akaike information criteria (AIC) or Schwarz information criteria (SIC) are used to assign the suitable lag length. Following Alkhatlan and Javid (2013), we employ the SIC for the optimal lag length (Pesaran, Shin, & Smith, 2001).

Lower and upper critical bounds derived by Narayan (2005) and Pesaran et al. (2001) are compared with the  $F$ -statistic to obtain information regarding the cointegration between the variables. If the computed  $F$ -statistic is between these critical bounds, we do not provide any information about cointegration. Moreover, we implement various diagnostic tests such as normality, serial correlation, heteroskedasticity, and, functional form to investigate the reliability of the ARDL approach.

The two structural breaks test suggested by Hatemi-J (2008) are also used to investigate the cointegration among the series in this study. This test is an augmented form of Gregory and Hansen (1996) test with one structural break. Moreover, Hatemi-J (2008) test benefits from the ADF test offered by Engle and Granger (1987) and  $Z_a$  and  $Z_t$  test statistics developed by Phillips (1987) to analyze whether or not there exists a cointegration between the variables in the model. We apply the model with two structural breaks, both in constant and slope suggested by Hatemi-J (2008). This model can be expressed as follows:

$$y_t = \alpha_0 + \alpha_1 D_{1t} + \alpha_2 D_{2t} + \beta'_0 x_t + \beta'_1 D_{1t} x_t + \beta'_2 D_{2t} x_t + \mu_t \quad (7)$$

where  $D_{1t}$  and  $D_{2t}$  represent the dummy variables expressing two structural breaks. These dummy variables can be shown as follows:

$$D_{1t} = \begin{cases} 0 & \text{if } t \leq [n\tau_1] \\ 1 & \text{if } t > [n\tau_1] \end{cases} \text{ and } D_{2t} = \begin{cases} 0 & \text{if } t \leq [n\tau_2] \\ 1 & \text{if } t > [n\tau_2] \end{cases} \quad (8)$$

Here,  $\tau_1 \in (0, 1)$  and  $\tau_2 \in (0, 1)$  represent unknown parameters denoting the timing of the respective structural break point. The test statistics can be stated as follows:

$$ADF^* = \inf_{(\tau_1, \tau_2) \in T} ADF(\tau_1, \tau_2) \quad (9)$$

$$Z_t^* = \inf_{(\tau_1, \tau_2) \in T} Z_t(\tau_1, \tau_2) \quad (10)$$

$$Z_\alpha^* = \inf_{(\tau_1, \tau_2) \in T} Z_\alpha(\tau_1, \tau_2) \quad (11)$$

The ADF,  $Z_a$ , and  $Z_t$  test statistics which have a non-standard distribution, are compared with the critical values tabulated by Hatemi-J (2008) to decide whether the null hypothesis of no cointegration is rejected or not. In the third stage, the long-term coefficients are estimated by the FMOLS and CCR estimators. The CCR and FMOLS procedures necessitate that the series are integrated at  $I(1)$ . These approaches are carried out by employing Bartlett Kernel with Newey-West fixed bandwidth (Abu & Staniewski, 2019).

Finally, the VECM Granger causality analysis is performed to investigate causality between the variables. The VECM procedure includes the error-correction term ( $ECT_{t-1}$ ) obtained from the long-run model in the classical VAR model as a new variable. The VECM can be specified as follows:

$$(1 - L) \begin{bmatrix} \ln FD_t \\ \ln FGL_t \\ \ln GDP_t \\ \ln INF_t \\ \ln NRR_t \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{bmatrix} + \sum_{i=1}^p (1 - L) \begin{bmatrix} c_{11i} c_{12i} c_{13i} c_{14i} \\ c_{21i} c_{22i} c_{23i} c_{24i} \\ c_{31i} c_{32i} c_{33i} c_{34i} \\ c_{41i} c_{42i} c_{43i} c_{44i} \end{bmatrix} \times \begin{bmatrix} \ln FD_{t-1} \\ \ln FGL_{t-1} \\ \ln GDP_{t-1} \\ \ln INF_{t-1} \\ \ln NRR_{t-1} \end{bmatrix} + \begin{bmatrix} \beta \\ \theta \\ \delta \\ \gamma \end{bmatrix} ECT_{t-1} + \begin{bmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \\ u_{4t} \end{bmatrix} \tag{12}$$

When the coefficient of  $ECT_{t-1}$  is negative and statistically significant, it shows a long-term causal relationship among the variables.

### Results and Discussion

Table 3 reports the results of Ng-Perron unit root tests. The results show that the variables include unit roots, which implies that they are not stationary at their level. The variables can be said to be stationary in their first difference. The results are in line with the findings of the Vogelsang-Perron AO model (Table 4). Therefore, we conclude that they are integrated at  $I(1)$ . Table 4 also indicates the structural break dates for financial development, financial globalization, economic growth, inflation, and natural resource rent are 1999, 1981, 2002, 2002, and 1985, respectively.

**Table 3.** Ng-Perron unit root test.

Regressor	$MZ_a$	$MZ_t$	$MSB$	$MPT$	Results
Panel A: Level					
$FD_t$	-0.125	-0.066	0.532	20.275	-
$FGL_t$	-0.059	-0.041	0.687	29.635	-
$GDP_t$	2.458	3.001***	1.220	130.126	-
$INF_t$	-2.577	-1.127	0.437	9.469	-
$NRR_t$	-4.479	-1.452	0.324	5.549	-
Panel B: First difference					
$\Delta FD_t$	-158.454***	-8.898***	0.056***	0.158***	$I(1)$
$\Delta FGL_t$	-22.809***	-3.377***	0.148***	1.074***	$I(1)$
$\Delta GDP_t$	-22.988***	-3.375***	0.146***	1.117***	$I(1)$
$\Delta INF_t$	-15.344***	-2.769***	0.180**	1.597***	$I(1)$
$\Delta NRR_t$	-22.985***	-3.366***	0.146***	1.144***	$I(1)$

Note: The optimal lag length is selected by SIC. \*\*\*, \*\* and \* show the significant at 1%, 5% and 10% level of significance, respectively.

**Table 4.** Vogelsang-Perron test.

Models	Additive outlier		
Variables	$t$ -statistic	Time break	Results
Panel A: Level			
$FD_t$	-3.525(0)	1999	-
$FGL_t$	-3.192(0)	1981	-
$GDP_t$	-1.527(0)	2002	-
$INF_t$	-4.516(0)	2002	-
$NRR_t$	-3.049(0)	1985	-
Panel B: First difference			
$\Delta FD_t$	-7.334(0)***	1982	$I(1)$
$\Delta FGL_t$	-7.205(0)***	1989	$I(1)$
$\Delta GDP_t$	-7.133(0)***	2001	$I(1)$
$\Delta INF_t$	-7.877(0)***	2004	$I(1)$
$\Delta NRR_t$	-7.953(0)***	1998	$I(1)$

Note: \*\*\* shows significance at 1%.

The year 1999 is very important for the Turkish economy. The Asian (1997) and Russian (1998) crises led to a long-time crisis in 1998 and 1999 in Turkey. In these years, the Turkish economy witnessed high inflation and negative growth. For these reasons, the Turkish government signed the 17th stand-by agreement with the IMF in 1999. There was also the Marmara earthquake in 1999 (Uygur, 2010).

Before applying the cointegration tests, the optimal lag length should be detected. The optimal lag length is determined using the SIC through the VAR model. When looking at Table 5, the optimal lag length is found as 1.

**Table 5.** Selection of appropriate lag length.

Lag length	LR	FPE	AIC	SIC	HQ
1	361.757	2.76e-10*	-7.831	-6.614*	-7.379*
2	28.317	3.81e-10	-7.552	-5.322	-6.725
3	40.393*	3.16e-10	-7.859	-4.615	-6.656
4	31.622	3.19e-10	-8.097*	-3.839	-6.518

Note: \* shows optimal lag length.

We apply the cointegration techniques developed by Pesaran et al. (2001) and Hatemi-J (2008) to analyze the long-term relationship between financial development and independent variables under structural breaks. The findings in Table 6 show that the computed  $F$ -statistic is 7.67 and statistically significant at a 1% level of significance. The findings also show that the coefficient of  $ECT_{(t-1)}$  is -0.450. In addition, the values of  $ADF^*$  and  $Z_t^*$  obtained from the Hatemi-J cointegration analysis are 7.998 and -8.085, respectively. These values are statistically significant at a 5% level of significance. So, the results mean that there exists a long-run link between financial globalization, economic growth, inflation, and natural resource rent and financial development over the period. Our results are confirmed by Atil et al. (2020) for Pakistan, Guan (2020) for China, Balcilar et al. (2019) for 36 countries, Zaidi, Wei, et al. (2019) for 31 OECD countries, Haseeb et al. (2018) for BRICS countries and Helhel (2017) for BRICS countries and Turkey.

**Table 6.** Cointegration tests.

Panel A: Bounds $F$ -test		
Estimated equation	$F(FD/FGL, GDP, INF, NRR)$	
Optimal lag structure	[1,0,0,0]	
$F$ -statistic	7.67***	
Structural breaks	1999	
$ECT_{(t-1)}$	-0.450***	
Pesaran et al. (2001) critical values		
Significance level	Lower bounds, $I(0)$	Upper bounds, $I(1)$
1%	4.40	5.72
5%	3.47	4.57
10%	3.03	4.06
Narayan (2005) critical values		
Significance level	Lower bounds, $I(0)$	Upper bounds, $I(1)$
1%	5.18	6.68
5%	3.83	5.06
10%	3.24	4.35
Panel B: Hatemi-J test		
Test statistics	Estimated value	
$ADF^*$	7.998**	
$Z_t^*$	-8.085**	
$Z_\alpha^*$	-54.490	
Break dates	1989;1996	
Cointegration	Yes	

Note: The optimal lag length is selected based on SIC. \*\*\* and \*\* denote significance at 1% and 5%, respectively.



Table 7 presents the results obtained from the FMOLS and CCR estimates. The findings demonstrate the long-term impact of financial globalization, economic growth, inflation, and natural resource rent on financial development. In Table 7, it is seen that the estimation methods give similar results. According to the FMOLS results, the coefficient of financial globalization is 0.325 and statistically significant at a 5% level. This reveals that financial globalization is positively linked with financial development. This means that a 1% rise in financial globalization increases financial development by 0.325%. This finding validates Mishkin's claim (2009) that globalization is a powerful driver of financial development. Our result is supported by Guan et al. (2020) for China, Helhel (2017) for BRICS countries, and Turkey and Garcia (2012) for 26 transition countries. However, our result is not proved by Atil et al. (2020) for Pakistan and Asongu (2014; 2017) for African countries.

The results reveal that the estimated coefficient of economic growth is 0.285 and statistically significant at a 5% level. This shows that economic growth positively affects financial development. This implies that a 1% increase in economic growth rises financial development by 0.285%. This result confirms Patrick's demand following hypothesis (1966). Our finding is consistent with Guan et al. (2020) for China and Balçilar et al. (2019) for 36 countries.

We find that the inflation coefficient remains negative and statistically significant at the 1% level. This states that inflation negatively affects financial development. This implies that a 1% rise in inflation decreases financial development by 0.186%. Our finding is in line with Shahbaz, Mallick, et al (2018) for India, Nasreen et al. (2020) for European countries, and Bittencourt (2010) for Brazil.

We also find that natural resource rent has a negative and statistically significant coefficient. This reveals that financial development is negatively influenced by natural resource rent, which means that a 1% increase in natural resource rent reduces financial development by 0.182%. This result is supported by Guan et al. (2020) for China. Our result is not in line with Atil et al. (2020) for Pakistan and Shahbaz, Naeem, et al. (2018) for the USA.

**Table 7.** FMOLS and CCR estimates.

Methods	FMOLS		CCR	
Variables	Coefficients	<i>t</i> -statistics	Coefficients	<i>t</i> -statistics
Constant	0.084	0.103	-0.074	-0.094
$FGL_t$	0.325**	2.692	0.317**	2.526
$GDP_t$	0.285**	2.368	0.305**	2.506
$INF_t$	-0.186***	-6.943	-0.182***	-7.067
$NRR_t$	-0.073**	-2.086	-0.070*	-2.007
Diagnostic tests				
R <sup>2</sup>	0.919		0.919	
Adj. R <sup>2</sup>	0.911		0.911	
SE of regression	0.096		0.096	
SSR	0.393		0.391	

Note: The optimal lag length is selected based on SIC. \*\*\*, \*\* and\* show significance at 1%, 5% and 10%, respectively.

The causality results obtained from the VECM approach are reported in Table 8. The findings show that financial globalization causes financial development in the long run. This result confirms the finding of Zaidi, Zafar, et al. (2019), who examine the causality link between globalization and financial development in APEC countries from 1990-2016. The study shows that globalization causes financial development. This result coincides with the results of Ahmed, Zhang, and Cary (2021) for Japan. On the contrary, this finding does not coincide with the results of Sethi, Chakrabarti, and Bhattacharjee (2020).

The findings also show that there exists a unidirectional causality from economic growth to financial development in the long run. This finding is similar to the results of Ahmed et al. (2021) for Japan. Our finding is not similar to the results of Song, Chang, and Gong (2021).

It is found that inflation and financial development cause one another in the long run. Our finding confirms the results of Satti, Shahbaz, Mujahid, and Ali (2013), who investigate the effect of financial development on inflation in Bangladesh from 1976Q1-2012Q4. This study presents that there exists bidirectional causality between the variables. Our finding coincides with the results of Yang (2019) for middle-income countries and Satti et al. (2013) for Bangladesh. On the contrary, Sanusi et al. (2017) show that inflation causes financial development in South Africa over the period 2007-2016.

It is also found that there exists a long-run bidirectional causal linkage between natural resource rent and financial development. This finding coincides with the result of Phuc Canh & Trung Thong (2020), who deal with the relationship between financial development and natural resource rent for 86 countries over the period of 2002-2017. The study shows that there exists bidirectional causality between the variables. Our result supports the findings of Faisal, Sulaiman, and Tursoy (2019) for Turkey. But our result is not consistent with the findings of Quixina and Almeida (2014). They obtain the unidirectional causality from oil rent to financial development in the Angolan economy for the period of 1995-2012.

**Table 8.** Causality results.

Dependent variables	Independent variables					
	Short-run					Long-run
	<i>F</i> -statistic(p-value)					(p-value)
	$\Delta FD$	$\Delta FGL$	$\Delta GDP$	$\Delta INF$	$\Delta NRR$	$ECT_{t-1}$
$\Delta FD$	-	-1.376 (0.176)	-1.585 (0.120)	-0.942 (0.351)	1.272 (0.210)	-0.636*** (0.000)
$\Delta FGL$	-1.534 (0.133)	-	1.346 (0.185)	-0.815 (0.419)	0.477 (0.635)	-0.076 (0.517)
$\Delta GDP$	1.277 (0.209)	-0.400 (0.691)	-	-0.698 (0.489)	-0.042 (0.966)	-0.088 (0.162)
$\Delta INF$	0.551 (0.584)	-0.212 (0.832)	0.670 (0.506)	-	-0.717 (0.477)	-0.353* (0.057)
$\Delta NRR$	-0.485 (0.630)	-0.602 (0.550)	-1.355 (0.183)	-0.500 (0.619)	-	-0.311*** (0.003)

Note: \*\*\* and \*\* denote significance at 1% and 5% levels, respectively.

## Conclusion

This study reveals the link between financial globalization and financial development in the existence of economic growth, inflation, and natural resources rent for the Turkish economy using the time series with structural breaks from 1970 to 2017. The variables' unit root properties are investigated using the Ng-Perron and Vogelsang-Perron tests, and the long-run relationship between the variables is examined through the ARDL bounds test and Hatemi-J cointegration approach. The long-run elasticities are estimated using the FMOLS and CCR methods. Additionally, we apply the VECM Granger causality approach to detect the causality relations between the variables.

The findings of the ARDL bounds test and Hatemi-J cointegration technique confirm a long-run relationship between the variables under the structural breaks. The results of FMOLS and CCR techniques show that financial globalization and economic growth significantly increase financial development in Turkey, but inflation and natural resources rent reduce financial development. The VECM analysis reveals a unidirectional causality from financial globalization and economic growth to financial development. In addition, inflation and financial development cause each other. A similar result is also found between natural resources rent and financial development.

The results suggest that financial globalization has a positive impact on financial development in Turkey. This finding confirms Mishkin's idea that globalization appears to be a vital factor in stimulating the development of the financial system. The important reason for the

positive effect of globalization on financial development in the Turkish economy could be that the Turkish economy has gradually started the liberalization process since the 1980s. Especially, Turkey has revised the investment incentive schemes to stimulate investment in related sectors in 2018.

The empirical findings can present important recommendations for policymakers. The Turkish government can facilitate the entry of banking and capital market into international markets. Moreover, for foreign participants, the quality of domestic bank services could be improved, and financial costs such as credit interest rates, warranties, and guarantees could be decreased. Turkish financial institutions can also diversify their financial products. Some policy suggestions can be presented: stimulating financial integration, removing government interventions in the financial market, and implementing several reforms that corroborate international creditors' rights and the stock market operations. These developments can speed up the development of the financial sector by increasing economic growth.

## References

- Abu, N., & Staniewski, M. W. (2019). Determinants of corruption in Nigeria: Evidence from various estimation techniques. *Economic Research-Ekonomska Istraživanja*, 32(1), 3058–3082. <https://doi.org/10.1080/1331677X.2019.1655467>
- Adams, S. (2008). Globalization and income inequality: Implications for intellectual property rights. *Journal of Policy Modeling*, 30(5), 725–735. <https://doi.org/10.1016/j.jpolmod.2007.10.005>
- Ahmed, Z., Zhang, B., & Cary, M. (2021). Linking economic globalization, economic growth, financial development, and ecological footprint: Evidence from symmetric and asymmetric ARDL. *Ecological Indicators*, 121, 1–12. <https://doi.org/10.1016/j.ecolind.2020.107060>
- Alkhatlan, K., & Javid, M. (2013). Energy consumption, carbon emissions and economic growth in Saudi Arabia: An aggregate and disaggregate analysis. *Energy Policy*, 62, 1525–1532. <https://doi.org/10.1016/j.enpol.2013.07.068>
- Asongu, S. (2014). Financial development dynamic thresholds of financial globalization. *Journal of Economic Studies*, 41(2), 166–195. <https://doi.org/10.1108/JES-03-2012-0039>
- Asongu, S. A. (2017). Assessing marginal, threshold, and net effects of financial globalisation on financial development in Africa. *Journal of Multinational Financial Management*, 40, 103–114. <https://doi.org/10.1016/j.mulfin.2017.05.003>
- Atil, A., Nawaz, K., Lahiani, A., & Roubaud, D. (2020). Are natural resources a blessing or a curse for financial development in Pakistan? The importance of oil prices, economic growth and economic globalization. *Resources Policy*, 67, 101683. <https://doi.org/10.1016/j.resourpol.2020.101683>
- Avcı, P. (2020). Küreselleşme ve finansal küreselleşme: Küreselleşmenin finansal piyasalara etkisi. In M. Öztürk (Ed.), *Finansal Dinamikler: Küreselleşme Sürecinde Finansal Gelişmeler ve Etkileri*. Ankara: Nobel Akademik Yayıncılık.
- Bai, J., & Perron, P. (1998). Estimating and testing linear models with multiple structural changes. *Econometrica*, 66(1), 47–78. <https://doi.org/10.2307/2998540>
- Balcilar, M., Gungor, H., & Olasehinde-Williams, G. (2019). On the impact of globalization on financial development: A multi-country panel study. *European Journal of Sustainable Development*, 8(1), 350. <https://doi.org/10.14207/ejsd.2019.v8n1p350>
- Bittencourt, M. (2011). Inflation and financial development: Evidence from Brazil. *Economic Modelling*, 28(1), 91–99. <https://doi.org/10.1016/j.econmod.2010.09.021>
- Çevik, E. İ., Atukeren, E., & Korkmaz, T. (2019). Trade openness and economic growth in turkey: A rolling frequency domain analysis. *Economies*, 7(2), 1–16.

- <https://doi.org/10.3390/economies7020041>
- Chen, L., Felipe, J., Kam, A. J. Y., & Mehta, A. (2021). Is employment globalizing? *Structural Change and Economic Dynamics*, 56, 74–92. <https://doi.org/10.1016/j.strueco.2020.09.003>
- Chen, Z. M., & Chen, G. Q. (2011). An overview of energy consumption of the globalized world economy. *Energy Policy*, 39(10), 5920–5928. <https://doi.org/10.1016/j.enpol.2011.06.046>
- Egger, H., & Fischer, C. (2020). Increasing resistance to globalization: The role of trade in tasks. *European Economic Review*, 126, 103446. <https://doi.org/10.1016/j.euroecorev.2020.103446>
- Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, 55(2), 251–276. <https://doi.org/10.2307/1913236>
- Faisal, F., Sulaiman, Y., & Tursoy, T. (2019). Does an asymmetric nexus exist between financial deepening and natural resources for emerging economy? Evidence from multiple break cointegration test. *Resources Policy*, 64, 101512. <https://doi.org/10.1016/j.resourpol.2019.101512>
- García, E. D. T. (2012). Financial globalization and financial development in Transition countries. *Economía: Teoría Práctica*, 36, 155–178. <https://doi.org/10.24275/ETYP/AM/NE/362012/Tovar>
- Ghosh, A. (2017). How does banking sector globalization affect economic growth? *International Review of Economics & Finance*, 48, 83–97. <https://doi.org/10.1016/j.iref.2016.11.011>
- Gregory, A. W., & Hansen, B. E. (1996). Residual-based tests for cointegration in models with regime shifts. *Journal of Econometrics*, 70(1), 99–126. [https://doi.org/10.1016/0304-4076\(96\)01685-7](https://doi.org/10.1016/0304-4076(96)01685-7)
- Guan, J., Kirikkaleli, D., Bibi, A., & Zhang, W. (2020). Natural resources rents nexus with financial development in the presence of globalization: Is the “resource curse” exist or myth? *Resources Policy*, 66, 101641. <https://doi.org/10.1016/j.resourpol.2020.101641>
- Gygli, S., Haelg, F., Potrafke, N., & Sturm, J.-E. (2019). The KOF Globalisation Index – revisited. *The Review of International Organizations*, 14(3), 543–574. <https://doi.org/10.1007/s11558-019-09344-2>
- Hacker, R. S., & Hatemi-J, A. (2008). Tests for causality between integrated variables using asymptotic and bootstrap distributions: Theory and application. *Applied Economics*, 38(13), 1489–1500. <https://doi.org/10.1080/00036840500405763>
- Harris, E. (1999). Impact of the Asian crisis on Sub-Saharan Africa. *Finance and Development*, 36(1), 14–17.
- Haseeb, A., Xia, E., Danish, Baloch, M. A., & Abbas, K. (2018). Financial development, globalization, and CO2 emission in the presence of EKC: Evidence from BRICS countries. *Environmental Science and Pollution Research*, 25(31), 31283–31296. <https://doi.org/10.1007/s11356-018-3034-7>
- Hatemi-J, A. (2008). Tests for cointegration with two unknown regime shifts with an application to financial market integration. *Empirical Economics*, 35(3), 497–505. <https://doi.org/10.1007/s00181-007-0175-9>
- Häusler, G. (2002). The globalization of finance. *Finance and Development*, 39(1), 10–12.
- Helhel, Y. (2017). Küreselleşme ve finansal gelişme arasındaki etkileşimin Türkiye ve BRICS ülkeleri için incelenmesi. *Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 9(20), 158–178. <https://doi.org/10.20875/makusobed.293046>
- Law, S. H., Tan, H. B., & Azman-Saini, W. N. W. (2015). Globalisation, institutional reforms and

- financial development in East Asian economies. *The World Economy*, 38(2), 379–398.  
<https://doi.org/10.1111/twec.12168>
- Li, J., Lu, Y., Song, H., & Xie, H. (2019). Long-term impact of trade liberalization on human capital formation. *Journal of Comparative Economics*, 47(4), 946–961.  
<https://doi.org/10.1016/j.jce.2019.08.002>
- Mishkin, F. S. (2009). Globalization and financial development. *Journal of Development Economics*, 89(2), 164–169. <https://doi.org/10.1016/j.jdevco.2007.11.004>
- Muye, I. M., & Muye, I. Y. (2017). Testing for causality among globalization, institution and financial development: Further evidence from three economic blocs. *Borsa Istanbul Review*, 17(2), 117–132. <https://doi.org/10.1016/j.bir.2016.10.001>
- Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics*, 37(17), 1979–1990. <https://doi.org/10.1080/00036840500278103>
- Nasreen, S., Mahalik, M. K., Shahbaz, M., & Abbas, Q. (2020). How do financial globalization, institutions and economic growth impact financial sector development in European countries? *Research in International Business and Finance*, 54, 101247.  
<https://doi.org/10.1016/j.ribaf.2020.101247>
- Ng, S., & Perron, P. (2001). LAG length selection and the construction of unit root tests with good size and power. *Econometrica*, 69(6), 1519–1554. <https://doi.org/10.1111/1468-0262.00256>
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326.  
<https://doi.org/10.1002/jae.616>
- Phillips, P. C. B. (1987). Time series regression with a unit root. *Econometrica*, 55(2), 277–301.  
<https://doi.org/10.2307/1913237>
- Phuc Canh, N., & Trung Thong, N. (2020). Nexus between financialisation and natural resources rents: Empirical evidence in a global sample. *Resources Policy*, 66, 101590.  
<https://doi.org/10.1016/j.resourpol.2020.101590>
- Quixina, Y., & Almeida, A. (2014). *Financial development and economic growth in a natural resource based economy: Evidence from Angola* (FEP Working Papers No. 542).
- Rajan, R. G., & Zingales, L. (2003). The great reversals: The politics of financial development in the twentieth century. *Journal of Financial Economics*, 69(1), 5–50.  
[https://doi.org/10.1016/S0304-405X\(03\)00125-9](https://doi.org/10.1016/S0304-405X(03)00125-9)
- Satti, S. L., Shahbaz, M., Mujahid, N., & Ali, A. (2013). *Impact of financial development and globalization on inflation: The role of remittance and economic growth in Bangladesh* (MPRA Paper No. 51675).
- Saud, S., Chen, S., Haseeb, A., & Sumayya. (2020). The role of financial development and globalization in the environment: Accounting ecological footprint indicators for selected one-belt-one-road initiative countries. *Journal of Cleaner Production*, 250, 119518.  
<https://doi.org/10.1016/j.jclepro.2019.119518>
- Sethi, P., Chakrabarti, D., & Bhattacharjee, S. (2020). Globalization, financial development and economic growth: Perils on the environmental sustainability of an emerging economy. *Journal of Policy Modeling*, 42(3), 520–535. <https://doi.org/10.1016/j.jpolmod.2020.01.007>
- Shahbaz, M., Mallick, H., Mahalik, M. K., & Hammoudeh, S. (2018). Is globalization detrimental to financial development? Further evidence from a very large emerging economy with significant orientation towards policies. *Applied Economics*, 50(6), 574–595.  
<https://doi.org/10.1080/00036846.2017.1324615>
- Shahbaz, M., Naeem, M., Ahad, M., & Tahir, I. (2018). Is natural resource abundance a stimulus

- for financial development in the USA? *Resources Policy*, 55, 223–232.  
<https://doi.org/10.1016/j.resourpol.2017.12.006>
- Song, C.-Q., Chang, C.-P., & Gong, Q. (2021). Economic growth, corruption, and financial development: Global evidence. *Economic Modelling*, 94, 822–830.  
<https://doi.org/10.1016/j.econmod.2020.02.022>
- Stock, J., & Watson, M. (1999). A comparison of linear and nonlinear univariate models for forecasting macroeconomic time series. In R. Engle & H. White (Eds.), *Cointegration, Causality and Forecasting: A Festschrift for Clive W.J. Granger* (pp. 1–44). Oxford: Oxford University Press. Retrieved from  
[http://www.economics.harvard.edu/faculty/stock/files/Granger\\_Festschrift\\_StockandWatson.pdf](http://www.economics.harvard.edu/faculty/stock/files/Granger_Festschrift_StockandWatson.pdf)
- Tornell, A., Westermann, F., & Martínez, L. (2004). *The positive link between financial liberalization, growth and crises* (NBER Working Paper No. 10293). Massachusetts.
- U.S. Department of State. (2020). *2020 investment climate statements: Turkey*. Ankara. Retrieved from  
<https://www.state.gov/reports/2020-investment-climate-statements/turkey/>
- Uygur, E. (2010). *The global crisis and the Turkish Economy* (Turkish Economic Association Discussion Paper No. 2010/3).
- World Bank. (2020). *World Development Indicators (2020)*. Washington. Retrieved from  
<https://databank.worldbank.org/source/world-development-indicators>
- Yang, F. (2019). The impact of financial development on economic growth in middle-income countries. *Journal of International Financial Markets, Institutions and Money*, 59, 74–89.  
<https://doi.org/10.1016/j.intfin.2018.11.008>
- Zaidi, S. A. H., Wei, Z., Gedikli, A., Zafar, M. W., Hou, F., & Iftikhar, Y. (2019). The impact of globalization, natural resources abundance, and human capital on financial development: Evidence from thirty-one OECD countries. *Resources Policy*, 64, 101476.  
<https://doi.org/10.1016/j.resourpol.2019.101476>
- Zaidi, S. A. H., Zafar, M. W., Shahbaz, M., & Hou, F. (2019). Dynamic linkages between globalization, financial development and carbon emissions: Evidence from Asia Pacific Economic Cooperation countries. *Journal of Cleaner Production*, 228, 533–543.  
<https://doi.org/10.1016/j.jclepro.2019.04.210>