Effect of Structural Break on Financial Development and Economic Growth Nexus in Middle-Income Countries in Asia: Moderating Role of Technological Advancements

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Abstract: Asian countries have experienced many financial catastrophes and pandemics in the past couple of decades. Therefore, evaluating the effect of structural breaks on economies has taken substantive attention in the empirical literature. Thus, this study aims to investigate the effect of structural breaks on the Financial Development (FD) and Economic Growth (EG) of middle-income countries in Asia. The study considered the global financial crisis of 2008 as a key structural break. The sample consisted of 24 middle-income countries while the sample period was 20 years from 2000 to 2019. Technological Advancement was considered a moderator variable that facilitate the smooth functioning of the FD and EG. Structural Break was identified using the "xtbreak" function and the effect was analyzed with panel unit root, panel homogeneity test, and short panel cointegration. The findings revealed that before the structural break, FD and moderator variables were the only significant variables but after the structural breaks, Human Capital (HC) and Private Consumption (PC) also have become significant. FD had a significant negative influence over EG before and after the structural break but the moderator variable had a positive influence. HC was not a significant factor before the structural break but has become significant after the economic downturn with a positive influence on EG. In contrast, PC shows a negative influence after the structural breaks. Hence, it guides the policymakers to decide on reducing investments for FD and direct funds to HC development and developing the technology. Moreover, they must consider making policy decisions to reduce PC too.

Keywords: *Economic Growth, Financial Development, Technological Advancements, Structural Breaks, Middle-income countries.*

1. Background of the Study

Examining the effect of the structural break on an economy has become a prioritized topic within the last couple of decades. It has taken considerable attention in both empirical and theoretical literature in economics and finance. Most school scholars claim that the effect of economic downturns makes significant negative consequences for most countries and most of society at large. With structural breaks, some countries went bankrupt while some economies just managed to survive. During the last four to five decades since 1973, the world has experienced several structural breaks. In 1973, the world experienced a drastic economic downturn with the oil crisis and stock market crash. Therein after there, several turmoil situations ascended in the global context until Covid 19 outbroken. It is hard to assess the political, economic, and social impact of structural breaks since the estimating exact effect is quite harder. There can be identified two types of impact in an economic downturn; first is the direct effect; when there is an economic downturn it firstly affects the financial system of the country and spread over to other sectors. The second is the indirect effect because, till the trading partner nations stand up after the economic bump.

Other countries have to wait and hold their economic activities. Estimating the indirect effect is much harder than assessing the direct effect. That is why many countries tend to take remedial actions to overcome the direct effect of structural breaks. It is quite hard to overcome the indirect effect of structural breaks because it has a spillover effect on other nations and the effect is worse than the direct effects of the economic downturn. So, countries need to keep an eye out for economic downturns and find ways to overcome the direct and indirect effects. In general, understanding, when there is an economic recession, the first and most significantly affected sector is the finance sector. The finance sector is considered the lifeblood of any economy. Hence, when the financial system collapse, the whole economic system gets collapses. Moreover, the financial system of a country is considered the lifeblood of an economy. Thus, understanding the association between Financial Development (FD) and Economic Growth (EG) is vital and has received considerable attention in the literature. Since, the early centuries before the start of the barter system, people have recognized the importance of having a good financial system and considered what the financial sector

plays.

A vital role in economic sustainability and development (Bist, 2018). Furthermore, many theories emerged beginning in the early nineteenth century to demonstrate the relationship and significance of a well-functioning financial system to an economy. One of the key theories is endogenous growth theory which explains how a well-functioning financial system makes it easy to attract investors and develop the nations. Besides financial development, technology is one of the key factors leading economies to high growth. After Economic downturns can be reversed if they consider technological advancements. There are ample examples all over the world to prove how economies achieve high economic development with technological advancements (Song & Appiah-Otoo (2022). Because of technological advancements, both the financial system and domestic production capacity get boosted. As suggested in (Kihomobo et al., 2021; Qamruzzaman & Jianguo, 2018), technological advancements in financial services produce miracle results for the country's economic development. With this, it can be said that technological advancements have a moderating effect on financial development and economic growth (Song & Appiah-Otoo (2022). Motivated by the above works of literature, this study aims to examine the effect of structural breaks on the FD and EG nexus with technological advancement plays a moderating role. The rest of this paper consists of six (6) sections; the literature review is presented in Section Two (2), followed by the methodology in Section Three (3). Section Four (4) makes the analysis and Section Five (5) explained the managerial implication while finally, Section Six (6) provides the conclusion.

2. Literature Review

This section focuses to explain the empirical background of the study with theoretical support.

Structural Breaks and Economic Development: Even though the structural break is not a new turn in the academic world, there is a significant literature gap in analyzing the effect of structural breaks on economic development and other variables. Especially in panel data analysis, there are only a couple of studies have been carried out under this theme (Mironov & Konovalova, 2019; Itoh et al., 2016). One of the significant studies in this area is "The Influence of Arab Spring Effect on Economic Growth in the Middle East Countries' by Beser & Kilic (2017). They discussed how the Arab Spring affects five (5) Middle East countries in terms of their political and economic condition. However, the study followed only the unit root test and the homogeneity test with fixed effect estimation to determine the effect. But panel data series is required to estimate the cointegration with advanced economistic analysis techniques since the data series shows the cross-sectional dependency. Same as Choi (2013) explained how the United States financial crisis spread over the economy in the United States of America (USA) and how it influences the Mortgage market and ultimately meltdown of the whole economic system in the USA. Further, Yazdi (2019) studied the causal relationship between international tourism development and economic growth with the structural break test and found that there is a significant effect of structural breaks in 2006, 2011 and 2012 on the economic condition, tourism receipts, physical capital, human capital and household consumption of Iran.

The study used only the unit root test and cointegration to estimate the effect of structural breaks. Thus, the real effect of structural breaks does not reflect in the analysis. Mironov and Konovalova (2019) investigated the effect of structural change on economic growth in Russia with the change in the economic condition of the world and have shown that maintaining a diversified economic policy works substantially to overcome economic downturns. However, there was no in-depth analysis was done to examine the effect of structural breaks on economic growth and macroeconomic stability. Further, Chibi et al. (2019) investigated the dynamics of fiscal policy in Algeria conserving the structural breaks. They revealed that there is a significant influence over the income sources and authorities must consider changing their decisions upon the effect of structural breaks in the economy. Investigated the effect of structural change on the output volatility of OECD countries and found that after the structural break in 2010, the output of the countries gets stabilized. The key technique of the study was the ARCH model and the findings suggested that government must focus on the new fiscal policy to maintain stabilized economic condition of OECD countries. Once more, Itoh et al. (2016) explained that under a structural break period, most economies face demographical and ecological crises as well. Reyes and Villasenor (2011) found that structural breaks can be associated with economic growth and result in a long-term decline in average growth.

Financial Development and Economic Growth: Financial Development can be simply defined as the development of the financial system of a country but in the broader sense, it is the development of financial services, financial products, and financial markets of a country. So, the key task of a sophisticated developed financial system is to provide accurate and timely information for investors and policymakers to get the most appropriate decisions. Thus, the whole economy of a country is depending on the decisions they take. Because making correct decisions minimize the risk of investments in wrong projects, allocates capital to the most appropriate places at appropriate levels maximizes corporate governance, pooling of domestic savings, and many more (IGI Global, 2021). Furthermore, efficient and effective fund allocation and fund transfer among surplus parties and deficit strengthen the economies (Bist & Bista, 2018; Guru & Yadav, 2018; Bongini, et al., 2016; Puatwoe & Piabuo, 2017). A well-equipped financial system will facilitate the private sector to obtain credit facilities which are one of the driving forces of long-run economic growth through new ventures, expanding businesses through capital market and bond markets and insurance sector development. (Hewage et al., 2022; Sharma & Kautish, 2020; Olayungbo & Quadri, 2019; Biplob & Halder, 2018; Puatwoe & Piabuo, 2017; Qamruzzaman & Jianguo, 2017; Pradhan et al., 2017). Tursoy and Faisal (2018) explained that financial depth has a positive influence on economic growth while inflation negatively affects growth in the short run.

Technological Advancement and Economic Growth: Technological advancement creates ample opportunities for investors and countries to enter into high-income projects and markets through the development of new products and strategies. Because, technological development reduces production costs via the declining cost of timely information and increases production efficiency and quality (Hewage et al., 2022; Kihomobo et al., 2021; Qamruzzaman & Jianguo, 2018). Furthermore, technological developments in financial services lead to bringing down capital costs by improving the efficiency of fund transfer facilities (Abeka et al., 2021; Khurana, 2018) and increasing the reliability and accuracy of the financial services which direct for fast and sustainable economic growth (Song & Appiah-Otoo, 2022).

3. Research Methodology

The Population of the Study: The study focuses on Middle-income countries in the Asian continent, where there are 32 countries under this cluster. Even though there are ample studies that can be found concerning investigating the effect of financial development over economic growth, still there is a literature gap to identify how structural breaks influence the relationship between FD and EG while technological advancement plays a moderating role.

Sample: Since the study considered middle-income countries in Asia, the sample consisted of 24 countries that were selected based on data availability during the sample period of 20 years from 2000 to 2019. The study selected the sample period depends based on two conditions; first is the data available to calculate the TA. The second condition is there is no significant economic downturn during the sample period. Because from 2020, the global economy experienced a dramatic economic collapse due to Covid 19 pandemic. Hence, the study was limited only to one structural break. Table 1 presents the name list of selected countries.

Table 1: Sample Countries

Lower Middle-Income Countries	Upper Middle-Income Countries
Bangladesh	Armenia
Bhutan	Azerbaijan
Cambodia	China
India	Georgia
Indonesia	Jordan
Iran	Kazakhstan
Kyrgyzstan	Lebanon
Mongolia	Malaysia
Nepal	Thailand
Pakistan	Turkey
Philippines	
Sri Lanka	

Tajikistan
Uzbekistan

Source: Author constructed.

Key Variables: The study focused to examine how structural beaks influence over to change the relationship between FD and EG. Apart from the key variables, there are two more control variables (Human capital and private consumption) were used. The list of variables, proxies used to measure the variables, and the data collection source with literature backup are presented in Table 2.

Table 2: Key Variables

Variable Name	Proxy and the Calculation Mechanism	Key Pieces of Literature	Data Collection Source
Economic Growth (EG)	Real Gross Domestic Production Per Capita Adjusted to Purchase Power Parity RGDP (PPP) and take the Real GDP Difference over two consecutive periods as a percentage of real DGP in the base year	Rahaman et al. (2020); Bist (2018); Tursoy & Faisal (2018) and Puatwoe & Piabuo, (2017)	World Development Indicators (WDI, 2021)
Financial development (FD)	Financial development was proxied by Financial Development Index which was calculated as financial market development and financial institutional development. considering how deep, accessible, and efficient are they.	Rahaman, et al. (2020); Haini (2020); Wang (2019); Swamy & Dharani (2019) and Bist (2018).	IMF Financial Development Time series
Human Capital (HC)	The economically active population (age above 15 years) as a percentage of the total population	Rahaman et al. (2020); Oyinlola & Adedeji (2019) and Bist (2018)	World Development Indicators (WDI, 2000 – 2019)
Private consumption	Households' final consumption expenditure (% of GDP)	Kaharudin & Ab-Rahaman (2022) and Edinak et al. (2022)	

Source: Prepared by authors.

General Model Specification: The study used a general model as follows;
$$\ln PRGDP_{it} = \beta_0 + \beta_{1i}FD_{it} + \beta_{1i}FD.TA_{it} + \beta_{1i}HC_{it} + \beta_{2i}PC_{it} + \varepsilon_{it} \tag{3.1}$$
Where; PRGDP presents the Per Capita Real Gross Domestic Production (in natural logarithm) as the proxy for economic growth while FD represents Financial Development. FD. TA presents the moderator variable that indicates the effect of technological advancements on Economic growth when combined with financial development and HC is Human Capital. PC presents the Private consumption while i present the cross sections and time.

Data Analysis Techniques

Estimating the Point of Structural Breaks: The study used the structural breaks testing method introduced by Ditzen, Karavias, and Westerlund (2021) to identify the structural break point in the data series. Generally, the structural breaks make asymptotical volatility in the pattern of data series. Therefore, Ditzen et al. (2021) introduced a new command to capture the stochastic changes in time series and panel data series. They introduced the "xtbreak" command to capture multiple structural breaks in the data series. The test has the asymptotically valid test to identify the structural breaks, break dates and confidence interval. The estimation includes several types of tests; the first is to examine no structural change against the specific number of changes in the data series and the second is to test the structural change against the unknown number of changes in the data series. Hence, this study occupied the "xtbreak" function to estimate the volatility in panel data series with the economic downturn in 2008.

Examining the Cross-Section Dependency: Cross-sectional dependency was estimated with the Breush-Pagan LM test, Pesaran scaled LM test, Bias-corrected scaled LM test, and Pesaran cross-section dependent test.

Homogeneity Test: Homogeneity across the individual countries was measured with 2013, Blomquist and Westerlund (2013) extended homogeneity test. The hypotheses of this test are;
H0: Slope coefficients are homogeneous.
Ha: Slope coefficients are not homogeneous.

Panel Unit Root Test: The study used Karavias and Tzavalis (2014) panel unit root estimation to examine the stationarity level of the data set. The key hypotheses under this test are;
H0: Panel time series contain unit roots.
Ha: Some or all of the panel time series are stationary.

Effect of Structural Breaks on Relationship: The study used the Blundell and Bond two-step System GMM technique to examine the effect of Structural breaks on the FD and EG nexus. Here the sample period was divided into Two (2) clusters pre structural break period and the post-structural break period.

4. Results

Pointing Out the Structural Breaks: The study occupied Ditzen, Karavias, and Westerlund (2021), "xtbreak" analysis to find the structural breaks in the data set. The test results are presented in Table 3.

Table 3: Structural Breakpoints

Number of Observations				**34**
Number of time intervals				20
SSR				4958.22
Trimming				0.15
Serial no.	Index	Date	(95% Confidence Interval)	
1	8	2007	2006	2008

Source: Author constructed using STATA Output.

The study found that in 2007, there was an economic downturn. Even though the Global Financial crisis happened in 2008, from 2007, there have been some indications in economic conditions in individual counties before they realized the real effect of the global financial crisis in 2008. This is a crucial finding since it indicates to the policymakers that before the actual crisis takes place, economic figures are presenting the economic catastrophe in advance. Therefore, it highlights that policymakers be alert to changes in economies to take precautionary actions before the disaster comes.

Testing Cross-Section Dependency: Since countries depend on each other due to several reasons like free trade agreements, foreign trading, political bindings, and cultural similarities it is important to identify the cross-sectional dependency of countries before selecting the appropriate analysis techniques. Thus, the study followed the cross-section dependency test and the results are shown in Table 4.

Table 4: Cross-section Dependency Test

	Breusch-Pagan LM	**Pesaran scaled LM**	**Bias-corrected Scaled LM**	**Pesaran CD**
EG	642.980***	15.620***	14.988 ***	13.923***
FD	2791.115***	107.050***	106.419***	32.825***
FD.TA	3926.753 ***	155.386***	154.755 ***	54.281***
HC	1709.274***	61.004***	60.372***	2.433***
PC	1111.175***	35.547***	34.916***	2.757**

Source: Author constructed using EViews output.

Table 4 confirms there is a cross-sectional dependency among individual countries. Here it used four cross-sectional dependency test types and all the tests prove all the variables show cross-sectional dependency.

Testing Cross-sectional Homogeneity: The study followed Blomquist and Westerlund (2013) homogeneity test with cross-sectional dependency to examine whether the cross-sections show homogeneity or heterogeneity. Because the data set shows cross-sectional dependency, it requires to use of homogeneity with cross-sectional dependency. The test results are shown in Table 5.

Table 5: Slope Homogeneity Test

	Statistic	P-Value
Delta	-6.928	0.000
Adjusted Delta	-3.464	0.001

HAC Kernel: Bartlett
With average bandwidth of 2
Variables partialled out: Constant
Cross-sectional Averaged variables: e.g.(2) fd(3) fdta(3) hc(3) pc(3)
Source: Author constructed using STATA Output.

Table 5 shows that the data set follows heterogeneity since the p-value for delta is less than 0.05. Furthermore, after adjusting for the degree of freedom also, the analysis found the p-value is less than 0.05 confirming that there is a heterogeneity in the data series. Moreover, the study followed the unit root test to move further with analysis.

Testing the Unit Root of Data Series: The study has done the panel unit root test with Karavias and Tzavalis (2014) panel unit root estimation. The results are shown in Table 6.

Table 6: Panel Unit Root

Number of panels	24	Aver. Number of periods	20
Number of breaks	1		
Cross-sectional dependency	Yes	Linear time trend	Yes
Cross-section heteroscedasticity	Yes	Normal Error	Yes
	Statistic	Asymptotic Critical value	P-value
Z-statistic	-6.3781	-1.6449	0.0000
Result: the null is rejected			
Known break date(s): 2007			
The significance level of the test: 0.05			

Source: Author constructed using STATA Output.

Table 6 confirms that there is no panel unit root after the structural break because the p-value is less than 0.05 which claims there are not enough shreds of evidence to accept the null hypothesis that the data set followed a unit root. Henceforward, the study moves forward to analyze the effect of structural breaks on the FD and EG nexus.

Evaluating the Effect of Structural Breaks on Financial Development and Economic Growth Nexus: The study followed the short panel data analysis technique to estimate the effect of a structural break over the Financial Development and Economic Growth Nexus. The structural break periods were determined using the previous literature and the IMF database and publications. Then to examine the actual period of the economic recession was estimated using the "xtbreak" function. To examine the effect of the structural break on the relationship between variables, the sample period was divided into two-time spans; before the structural break and after the structural break.

Examining the Relationship - Before the Structural Break (From 2000 to 2007): The study occupied Blundell and Bond's two-step system GMM technique to examine the relationship between FD and EG before

the structural break. The period is from 2000 to 2007 when there is no significant change in the economy due to structural break. The test results are shown in Table 7.

Table 7: Relationship before the Structural Break

Variable Statistics						
Group variable					Code	
Time variable					Year	
Number of instruments					12	
Number of groups					24	
Number of Observations					168	
Observation per group				Min	7	
				Average	7	
				Maximum	7	
F (5, 23)					56.60	
Prob > F					0.000	
Variable	Coef.	Robust Std. Err.	t-stat	P> |t|	[95% conf. Interval]	
EG (-1)	0.543	0.096	5.67	0.000	0.345	0.741
FD	-0.535	0.240	-2.23	0.036	-1.030	-0.039
FD.TA	1.304	0.551	2.36	0.027	0.163	2.444
HC	-0.062	0.307	-0.20	0.840	-0.697	0.572
PC	-0.146	0.090	-1.61	0.120	-0.332	0.040
Con	21.795	19.602	1.11	0.278	-18.755	62.346
Arellano-Bond test for (AR2) in first difference: Z= -1.00 Pr > Z					0.316	
Sargan test of over id. Restrictions: Chi2 (6) = 2.11 Pr> chi2					0.910	
Hansen test of over id. Restrictions: Chi2 (6) = 5.46 Pr> chi2					0.486	

Source: Author constructed using STATA Output.

Table 7 shows that only FD and moderator variables had a significant effect on the economic development of the cross-sectional countries before the structural breaks. F statistic shows that model is significant and there is no serial correlation since the Arellano and Bond statistic is greater than 0.05. Moreover, the number of instruments is at its optimum level. Consequently, the study recalculates the BB two-step system GMM to examine whether there is any change has taken place in the relationship between dependent and independent variables after the structural break. Therefore, the test results are shown in Table 8.

Table 8: Relationship after the Structural Break

Variable Statistics						
Group variable					Code	
Time variable					Year	
Number of instruments					16	
Number of groups					24	
Number of Observations					264	
Observation per group				Min	11	
				Average	11	
				Maximum	11	
F (5, 23)					20.64	
Prob > F					0.000	
Variable	Coef.	Robust Std. Err.	t-stat	P> |t|	[95% conf. Interval]	
EG (-1)	0.199	0.053	3.78	0.001	0.090	0.308
FD	-0.144	0.077	-1.88	0.073	-0.303	0.015
FD.TA	0.274	0.143	1.92	0.068	-0.022	0.570
HC	0.440	0.132	3.32	0.003	0.166	0.714
PC	-0.135	0.049	-2.75	0.011	-0.237	-0.034
Con	-13.306	8.744	-1.52	0.142	-31.394	4.783

Arellano-Bond test for (AR2) in first difference: Z= -0.03 Pr > Z	0.980
Sargan test of over id. Restrictions: Chi2 (6) = 13.40 Pr> chi2	0.202
Hansen test of over id. Restrictions: Chi2 (6) = 14.26 Pr> chi2	0.162

Source: Author constructed using STATA Output.

Table 8 presents the test results for the relationship after the structural breaks and found all the variables get significant after the structural break. Hence, it indicates with the structural break economies found that FD, HC, and PC are significant variables to EG while technological advancement works as a moderator to boost the economy. Moreover, FD and PC demonstrate a negative influence over economic growth while HC has a positive effect. Anyway, the moderator variable shows a positive relationship indicating that technological advancement plays a significant positive influence over the EG. Moreover, the F test confirms the model is significant enough to forecast and the number of instruments is appropriate. Further model does not show a serial correlation.

Managerial Implications and Recommendations: The findings of this study guide and recommend that the policymakers must pay attention to reducing investment in financial development activities and shift those funds to technological advancements and develop human capital to get long-term as well as short-term economic benefits. Furthermore, it is important to consider strategies to reduce domestic consumption because the increment of PC shows negative consequences to the economy in the long run and the short run.

5. Conclusion

This study aimed to examine whether there is any influence by the structural break to the FD and EG nexus in middle-income countries in Asia Further, TA was considered as the moderator variable while HC and PC were used as control variables. The empirical findings confirm that economic downturns make a significant influence on the EG and FD nexus while technological advancements are important even before and after the structural breaks. Furthermore, financial development showed a significant negative relationship with EG at all times (before and after the structural break). Even though HC and PC were not significant factors to EG before the structural break, they become significant after the economic downturns. Moreover, HC has a positive influence on EG while PC shows an inverse relationship with EG.

References

Abeka, M. J., Andoh, E., Gatsi, J. G. & Kawor, S. (2021). Financial development and economic growth nexus in SSA economies: The moderating role of telecommunication development. *Cogent Economics Finance,* 9(1). https://doi.org/10.1080/23322039.2020.1862395

Beser, M. & Kilic, N. O. (2017). The Influence of Arab Spring Effect on Economic Growth in the Middle East Countries: Structural Break Panel Data Analysis. *Eurasian Journal of Economics and Finance*, 5(3), 133-141.

Biplob, M. D. N. & Halder, P. (2018). Financial Sector Development and Economic Growth: Empirical Evidence from Bangladesh. *Asian Economic and Financial Review*, 8(6), 799-814. http://doi.org/10.18488/journal.aefr.2018.86.799.814

Bist, J. P. (2018). Financial development and economic growth: Evidence from a panel of 16 African and Non-African Low-Income countries. *Cogent Economics & Finance*, 6(1), 1-17. http://doi.org/10.1080/23322039.2018.1449780

Bist, J. P. & Bista, N. B. (2018). Finance–Growth Nexus in Nepal: An Application of the ARDL Approach in the Presence of Structural Breaks. *Journal of Decision Makers,* 43(4), 236-249. https://doi.org/10.1177/0256090918813211

Blomquist, J. & Westerlund, J. (2013). Testing slope homogeneity in large panels with serial correlation. *Economics Letters*, 121(3):374–378. DOI:10.1016/j.econlet.2013.09.012

Bongini, P., Iwanicz-Drozdowska, M., Smaga, P. & Witkowski, B. (2016). Financial Development and Economic Growth: The Role of Foreign-Owned Banks in CESEE Countries. *Sustainability*, 9, 335; https://doi.org/10.3390/su9030335

Ditzen, J., Karavias, Y. & Westerlund, J. (2021). Testing and Estimating Structural Breaks in Time Series and Panel Data in Stata, Discussion Papers 21-14, Department of Economics, University of Birmingham.

Hewage R. S., Peyman J., Othman N., Rahman N. B. A. & Zakaria S. (2022). An Overview on Relationship Between Financial Development and Economic Growth. *Review of Business and Finance Studies*, 13(1), 63-77.

Chibi, A., Chekouri, S. M. & Benbouziane, M. (2019). The dynamics of fiscal policy in Algeria: sustainability and structural change. *Economic Structures*, 8, 28; https://doi.org/10.1186/s40008-019-0161-3

Choi, J. W. (2013). The 2007-2010 U.S. financial crisis: Its origins, progressions, and solution. *The Journal of Economic Asymmetries*, 10, 67-77.

Edinak, E. A., Sayapova, A. R. & Shirov, A. A. (2022). Endogenization of Household Consumption in the Expanded Input–Output Model. *Studies on Russian Economic Development*, 33(1), 1-10.

Guru, B. K. & Yadav, I. S., (2018). Financial development and economic growth: panel evidence from BRICS. Journal of Economics, *Finance and Administrative Science,* 24(47), 113-126. http://doi.org/10.1108/JEFAS-12-2017-0125

Haini, H. (2020). Examining the Relationship Between Finance, Institutions, and Economic Growth: Evidence from the ASEAN Economies. *Economic Change and Restructuring,* 53, 519-542. http://doi.org/10.1007/s10644-019-09257-5

IGI Global. (2021). Strategic Infrastructure Development for Economic Growth and Social Change, 14, https://doi.org/10.4018/978-1-4666-7470-7.ch003

Itoh, M. & Rowthorn, R. & Ghosh, J., (2016). The structural change in the world economy with decay in advanced countries. *The Japanese Political Economy*, 42, 1-4

Kaharudin, I. H. & Ab-Rahman, M. S. (2022). Fiscal Policy Effects on Private Expenditure for Sustainable Economic Growth: A Panel VAR Study from Selected Developing Countries. *Sustainability*, 14(17), 10786.

Karavias, Y. & Tzavalis, E. (2014). Testing for unit roots in short panels allowing for a structural break. Computational Statistics & Data Analysis, *Elsevier*, 76(C), 391-407.

Khurana, N. (2018). A Study of Impact of Financial Technology on Banking Sector in India. *International Journal in Management and Social Science*, 6(8). ISSN: 2321-1784, http://ijmr.net.in

Kihomobo, S., Ahmed, Z., Chen, S., Adebayo, T. S. & Kirikkaleli, D. (2021). Linking financial development, economic growth, and ecological footprint: what is the role of technological innovation? *Environmental Science and Pollution Research,* 28(43), 61235-61245.

Mironov, V. & Konovalova, L. (2019). Structural changes and economic growth in the world economy and Russia. *Russian Journal of Economics*, 5, 1-29

Olayungbo, D. O. & Quadri, A. (2019). Remittances, Financial Development and Economic Growth in Sub-Saharan African Countries: Evidence from a PMG-ARDL approach. *Financial Innovation*, 5(9). http://doi.org/10.1186/s40856-019-0122-8

Oyinlola, M. A. & Adedeji, A. (2019). Human capital, financial sector development and inclusive growth in sub-Saharan Africa. *Economic Change and Restructuring*, 52(1), 43-66.

Pradhan, R. P., Arvin, M. B., Bahmani, S., Hall, J. H. & Norman, N. R. (2017). Finance and growth: Evidence from the ARF countries. *The Quarterly Review of Economics and Finance*, 66, 136–148. https://doi.org/10.1016/j.qref.2017.01.011

Puatwoe, J. T. & Piabuo, S. M. (2017). Financial Sector Development and Economic Growth: Evidence from Cameroon. *Finance Innovation,* 3(5). http://doi.org/10.1186/s40854-017-0073-x

Qamruzzaman, M. D. & Jianguo, W. (2017). Financial Innovation and Economic Growth in Bangladesh. *Financial Innovation*, 3(19). http://doi.org/10.1186/s40854-017-0070-0

Qamruzzaman, M. D. & Jianguo, W. (2018). Nexus between financial innovation and economic growth in South Asia: evidence from ARDL and nonlinear ARDL approaches. *Financial Innovation*, 4(20). https://doi.org/10.1186/s40854-018-0103-3

Rahaman, A., Khan, M. A. & Charfeddine, L. (2020). Financial development–economic growth nexus in Pakistan: new evidence from the Markov switching model. *Cogent Economics & Finance*, 8(1). https://doi.org/10.1080/23322039.2020.1716446

Reyes, P. M. & Villasenor, D. L. (2011). Trends, structural breaks and economic growth regimes in the states of Mexico, 1940-2006. *Paradigma economic,* 3(1), 5-36.

Sharma, R. & Kautish, P. (2020). Linkages between Financial Development and Economic Growth in the Middle-Income Countries of South Asia: A Panel Data Investigation, *Journal of Business Perspective,* 24(2), 140-150. https://doi.org/10.1177/0972262920923908

Song, N. & Appiah-Otoo, I. (2022). The Impact of Fintech on Economic Growth: Evidence from China.

Sustainability, 14, 6211. https://doi.org/10.3390/su14106211

Swamy, V. & Dharani, M. (2019). The dynamic of finance growth nexus in advanced economies. *International Review of Economics & Finance*, 64, 122–146.

Tursoy. & Faisal. (2018). Does financial depth impact economic growth in North Cyprus? *Financial Innovation*, 4(12), https://doi.org/10.1186/s40854-018-0096-y

Wang, A. (2019). An empirical study on the relationship between China's financial development and economic growth based on sensor technology. EURASIP Journal on Wireless Communications and Networking, 42. https://doi.org/10.1186/s13638-018-1322-z

Yazdi, S. K. (2019). Structural breaks, international tourism development and economic growth. *Economic Research-Ekonomska Istrazivahja,* 32(1), 1765-1776