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Article

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Full Length Article

Do institutional quality and financial development affect sustainable economic growth? Evidence from South Asian countries

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Abstract

Institutional quality and financial development are important pillars of sustainable economic growth; this study explains the role of institutional quality and financial development in green growth in the South Asian economies over the period 2000–2018 with data from the World Bank. This study examines long-run cointegration among the variables modeled using the cointegration techniques by Pedroni, Kao, and Westerlund. Our results of panel cointegration approaches reveal long-run cointegration between financial developments, institutional quality, and green growth. Further, the study employs fully modified ordinary least squares (FMOLS) and dynamic ordinary least squares (DOLS) to examine the role of institutional quality and financial development in green growth in the long run. Our findings reveal that institutional quality and financial development are driving factors in promoting green economic growth in the long run. This paper shows the important policy implications of promoting green growth in the South Asian economies.

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1. Introduction

The concept of green growth is an extension of economic growth; it suggests economic progress can be compatible with environmental protection and social sustainability (Bagheri, Guevara, Alikarami, Kennedy, & Doluweera, 2018; Dai, Xie, Xie, Liu, & Masui, 2016). Emerging evidence (Scott, McFarland, & Seth, 2013), indicates that developing countries have a positive relationship between economic growth and environmental degradation. Environment degradation

such as water depletion and wind erosion are a common phenomenon in the South Asian region, and almost 90 million hectares of land are affected by increased salinity in water available for agriculture. In particular, in Pakistan, erosion due to desertification causes land degradation on a large scale (Hasnat, Kabir, & Hossain, 2018). Moreover, frequent increases in carbon emissions, rising sea levels, rising temperatures, flooding, drought, and salinity have been observed in South Asian countries (Huq & Ayers, 2008). The impacts of economic development are extremely detrimental to the national economy and environment (Reid, Simms, & Johnson, 2007); avoiding these unwanted environmental threats create the need for sustainable economic development, which is only possible through green economic growth.

Green economic growth is a new concept proposed by the United Nations in its “Rio+20” conference on “sustainable

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development.” Green growth means an increase in economic activities such as the gross domestic product (GDP) in the short run as well as in the long run without sacrificing natural resources. For instance, [Jacobs \(2013\)](#) defines green growth as increased GDP with significant environmental protection. According to the Organization for Economic Cooperation and Development, green growth means higher economic growth and development without sacrificing the natural assets on which human well-being depends. Moreover, the World Bank (2012) defines green growth as growth that is efficient in its utilization of natural resources and minimizes pollution.

Therefore, green economic growth consists of a combination of low carbon emissions, macroeconomic growth, environmental protection, and social inclusion, which contextualize the concept of green growth within a framework of sustainable development goals (SDGs). Most of the SDGs are linked to the achievement of green growth (see [Table S1](#), available online).

Therefore, considering the importance of green growth, the question of “how to achieve green growth” has encouraged many researchers to explore this topic ([Chan, Yee, Dai, & Lim, 2016](#)).

Most of the existing studies identify financial development and institutional quality as the determinants of economic growth ([Anyanwu, 2014](#); [Upreti, 2015](#)), but only a few discuss the role of institutional quality in carbon emissions ([Song, Zhou, & Jia, 2019](#)).

Empirical research reveals that financial development promotes economic growth ([Bist, 2018](#); [Pan & Yang, 2019](#)), but its role in green economic growth is under researched. Based on economic theory, this study proposes that financial development increases green economic growth, as it enables industries to access advanced types of machinery that are environmentally friendly and make fewer contributions to environmental degradation ([Adams & Klobodu, 2018](#)). Moreover, the empirical research argues that governance affects economic growth ([Fayissa & Nsiah, 2013](#)), but few studies have investigated the role of institutional quality in economic growth and carbon emissions ([Salman, Long, Dauda, & Mensah, 2019](#)).

Therefore, this study contributes to the literature on green economic growth by empirically investigating the role of financial development and institutional quality using an appropriate measure of green growth, financial development, and institutional quality in the context of South Asian countries. We adopt the measurement of green economic growth used by [Sohag, Taşkın, and Malik \(2019\)](#) in which green growth = $GDP_t + EE_t - NRP_t - NFD_t - CO_{2t}$. GDP_t is the gross domestic product, EE_t indicates an education expenditure, and NRP_t is the monetary value of depleted minerals such as coal, crude oil, and natural gas; NFD is the monetary value of forest depletion, CO_2 is the monetary value of carbon dioxide emissions, and t is the time.

Moreover, three dimensions of financial development—liquid liabilities (% of GDP), the money supply (% of GDP), and domestic private credit to the banking sector (% of GDP)—are highly correlated with each other. So, to avoid multicollinearity

and biased estimators, we develop the index with the help of a means method ([Sviryzdenka, 2016](#)). Similarly, six dimensions of institutional quality—political stability, voice and accountability, control of corruption and regulatory quality, government, and rule of law—are highly correlated with each other; so, to produce unbiased results, we develop an index of institutional quality using a means method ([Singh & Pradhan, 2020](#)).

Therefore, this study is conducted to contribute to the existing literature and policy through an empirical investigation of the association between financial development, institutional quality, and green economic growth. Moreover, this study enhances the empirical literature by introducing an index of financial development and institutional quality to produce more reliable results. This study also enhances the literature regarding sustainable economic growth by using a newly developed measurement of green economic growth, which ensures concrete and measurable economic progress based on economic and environmental indicators. It also helps policy makers in designing sound policies, as this study links green growth with SDGs.

2. Literature review and hypothesis development

2.1. Financial development and green growth

Many studies have examined the contributions of financial development to economic growth and environmental performance. [Yang \(2019\)](#) divides middle-income economies into three groups: “trapped middle-income economies, graduated middle-income economies, and high middle-income economies”; financial development is a key factor that enhances economic growth. Yang also established the opposite causation: between economic progress and progress in the equity market for high-income economies. Using a panel of sixteen low-income economies, [Bist \(2018\)](#) examines the nexus between financial development, economic growth, and social sustainability and found a positive relationship between social progress, financial development, and economic growth. Similarly, [Masoud and Hardaker \(2012\)](#) use twelve years of data on forty-two emerging countries to test the association between financial development and social progress and show a positive association between the variables examined. Similarly, [Donelli and Chiriatti \(2017\)](#) look at the BRICS (Brazil, Russia, India, China, and South Africa) countries, and [Bayar \(2014\)](#) finds positive effects of financial development on economic growth in emerging countries.

Other researchers obtain conflicting and contradictory results from testing the relationship between financial development and environmental quality ([Charfeddine & Khediri, 2016](#)). [Adams, Klobodu, and Apio \(2018\)](#) examine the influence of financial progress on environmental quality and reveal a positive link between financial development and environmental quality. [Boutabba \(2014\)](#) investigates the effects of financial development on energy consumption, economic development, and environmental degradation in India and finds a significantly negative relationship between financial

development and carbon emissions because financial progress permits investors to use environmentally friendly technologies. Ozturk and Acaravci (2013) state that environmental performance can be enhanced through financial development because it enables industries to access advanced environmentally friendly technology. Similarly, Ahmed (2017) investigates the influence of financial development on renewable energy production and finds a positive relationship between financial development and renewable energy production. The study concludes that renewable energy production is very expensive; so, financial progress enables a country to produce renewable energy sources that are less significant contributors to environmental deterioration.

In contrast to these studies, Shahbaz, Shahzad, Ahmad, and Alam (2016) and Tamazian and Rao (2010) find positive effects of financial development on CO₂ emissions. Their study proposes that financial progress tends to increase industrialization, with a positive contribution to CO₂ emissions. Our review of the literature indicates that the focus of previous papers is the relationship between financial development, economic growth, carbon emissions, and social progress, but they ignore the effect of financial development on green economic growth. To the best of our knowledge, no prior study has tested the relationship between financial development and green economic growth. Therefore, this study is conducted to fill that gap.

2.2. Institutional quality and green growth

Various studies have investigated the impact of governance on environmental performance and the socioeconomic progress in a country. Raju, Balasubramaniam, and Srinivasan (2020) examine the impact of governance on economic development using data on South Asian countries. Their study finds a positive effect of governance on economic development. Abdelbary and Benhin (2019) examine the impact of governance on economic growth and human capital with data on Arab countries that covers the period 1995–2014. Their study indicates that governance has positive effects on human capital and economic growth. Samarasinghe (2018) examines the influence of governance on economic growth using control of corruption as a proxy for governance. His study reveals that an increase in economic growth of 6.9 percent is due to a 1 percent increase in control of corruption. Dluhopolskyi, Koziuk, Ivashuk, and Klapkiv (2019) state that the government of any country can organize appropriate drivers for enhancing environmental performance. Similarly, García-Sánchez, Cuadrado-Ballesteros, and Frias-Aceituno (2013) also demonstrate that higher government effectiveness leads to higher improvement in environmental quality because an effective government aims to achieve sustainable economic development.

Rodríguez-Martínez, García-Sánchez, Vicente-Galindo, and Galindo-Villardón (2019) discuss the relationship between institutional factors (government effectiveness and control of corruption) and environmental performance with cross-sectional data on 149 countries and find that institutional

quality has a direct impact on environmental performance. Numerous studies (e.g., Carlsson & Lundström, 2001) also find a positive impact of government effectiveness on environmental performance. Bernauer and Koubi (2009) empirically test the influence of political institutions on air quality using data on forty-two countries from 1971 to 1996. The result of the study indicates that democracy has a positive influence on air quality. Wang et al. (2009) examine the impact of governance on climate change in green growth using data from low-middle- and low-income countries. The study uses CO₂ emissions for measuring climate change in green growth. Their results reveal that governance significantly influences climate change and lead to the conclusion that good governance contributes positively to improving the quality of the environment. The study suggests that considerable economic and financial support from the global communities is needed for strengthening the environmental institutional capacities of emerging countries.

In sum, on the basis of the literature, we conclude that most papers emphasize the association among governance, economic growth, environmental performance, and social progress. However, the topic of the relationship between green growth and institutional quality is under researched. Therefore, the purpose of this study is to investigate the relationship between institutional quality and green growth using an appropriate measure of green growth.

3. Conceptual/theoretical model

The conceptual framework of the study is shown in Figure S1 (available online). We use two theoretical lenses to explain the relationship between financial development, institutional quality, and green economic growth: economic theory and the theory of environmental governance. Economic theory states that a strong and efficient financial system is necessary for economic growth. Moreover, a well-organized financial system can channel savings to its most productive and efficient uses.

These theories offer strong theoretical proof that green growth is enhanced by financial development and institutional quality. Our critical review of the existing literature confirms that green growth, in other words, is consistent with sustainable development (Fernando et al., 2019; Islam & Managi, 2019; Khoshnava et al., 2019), in three dimensions: economic progress, environmental protection, and social sustainability (Gazzola et al., 2019). The theory of environmental governance demonstrates that sustainability is achieved through environmental protection, for which a strong regime (i.e., government) is needed. Advocates of environmental governance theory have concluded that a direct relationship exists between government effectiveness and environmental quality because governance of a country consolidate activities for protecting the environment, which improves the environmental quality and thereby ultimately leads to sustainability, whereas economic theory indicates that capital is the most essential factor in sustainable economic growth and can be increased through capital accumulation, such as savings and

investment, which can be enhanced by development of the financial system.

Therefore, this study proposes that these theories could be useful for testing the underlying mechanism among the variables modeled. Based on environmental governance theory, the model proposes that the government of any country takes steps to raise the quality of the environment, which in turn enhances green growth and leads to economic sustainability. Furthermore, based on economic theory, this study proposes that financial development raises environmental quality and enhances social sustainability. It enables industries to access advanced types of machinery that contribute less to environmental degradation (Adams & Klobodu, 2018). It also improves the living standards of people, which leads to social sustainability (Rusydiana & Marlina, 2019).

3.1. Graphical illustration

Based on the empirical and theoretical review, Figure S2 (available online) graphically illustrates the relationship between financial development, institutional quality, and green growth. Figure S2 clearly picture that how the modeled variables are linked with green economic growth.

4. Data and methodology

4.1. Data and sample

The study empirically explores the contributions of financial development and institutional quality to green growth in selected South Asian countries, such as Pakistan, India, Bangladesh, Nepal, and Sri Lanka. For this purpose, we gathered data from the World Bank from 2000 to 2018. Three countries (Afghanistan, Bhutan, and the Maldives) are excluded from the study due to data unavailability. Institutional quality and financial development are used as independent variables whereas green growth is used as a dependent variable. Description and measurements of the variables are shown in Table S2 (available online).

4.2. Econometric techniques

4.2.1. Cross-sectional dependence

Current literature in panel data analysis emphasized that it is necessary to check the cross-section dependence among variables (Baltagi & Pesaran, 2007). The issue of cross-sectional dependence arises if the observations in N cross-sections in our panel are no longer independently drawn but disturb each other's outcomes. This is because the shock in one country can easily be transferred to another country through regional integration and international trade (Nazlioglu, Lebe, & Kayhan, 2011). Therefore, the study uses Breusch and Pagan (1980) and Pesaran (2004) tests of the likelihood of cross-sectional dependence (see the supplementary material available online: section 4.2.1).

4.2.2. Panel unit root

The panel unit-root test is used to determine the stationarity of panel data. Generally, panel unit-root tests are divided in to “first-generation unit-root tests” and “second-generation unit-root tests.” First-generation unit-root tests check the stationarity of the data under the critical assumption of individual cross-sectional independence. However, second-generation unit-root tests check the data's stationarity by taking into account the problem of individual cross-sectional dependence. So, the selection of panel unit-root tests is based on the results of cross-sectional dependence tests. This study uses Breusch and Pagan (1980) and Pesaran (2004) tests and finds cross-sectional dependence among the variables. Therefore, we use a cross-sectional Im-Pesaran-Shin (CIPS) test to check the stationarity of the data (see the supplementary material available online: 4.2.2 Unit Root Test).

4.2.3. Cointegration tests

Cointegration tests are used to examine the long-run relationship among the variables. We use the Pedroni (1999), Kao (1999), and Westerlund and Edgerton (2007) tests of cointegration to examine the long-run relationship among the variables (see the supplementary material available online: section 4.2.3).

4.2.4. Estimation techniques

The study uses fully modified ordinary least squares (FMOLS) and dynamic ordinary least squares (DOLS) models in estimating the coefficients of cointegrating vectors. These models are well known in the literature (Baltagi & Kao, 2000). FMOLS and DOLS are both useful approaches for determining consistent estimates of parameters, even in the presence of the heterogeneity and endogeneity (Latif et al., 2018). Both approaches use heteroskedastic standard errors, which allow the fitting of a model that contains heteroskedastic residuals, therefore, the results are free of heteroskedasticity and endogeneity (Yang, Ma, & Zhao, 2017).

FMOLS is a nonparametric approach that provides consistent estimates along with controls on endogeneity in the regressors and the issue of correlation (Sakyi, Villaverde, Maza, & Chittedi, 2012). Kao and Chiang (2000) illustrated that FMOLS can deal with these problems because the FMOLS estimator is developed after making the corrections for serial correlation and the issue of endogeneity in the estimator of ordinary least squares (OLS) (see supplementary material available online: section 4.2.4).

5. Empirical results

5.1. Descriptive statistics

Table S3 (supplementary material available online) shows the results of the descriptive statistics for all the variables used in the study. Our results reveal that the mean of green growth (GG) is -65.3155 , ranging from -106.2164 to -18.9770 . The

Table 1
Cross-sectional dependence.

Variables	Breusch-Pagan LM	Pesaran CD	Decision
GG	42.5323***	7.2744***	Cross-sectional dependence exists.
IQ	29.1934***	4.2311***	Cross-sectional dependence exists.
FD	58.0787***	5.9576***	Cross-sectional dependence exists.

Note: GG is green growth, IQ is institutional quality, and FD is financial development. *** significant at the 1% level.

average value of institutional quality (IQ) is 0.0069, with a maximum and minimum of -1.5331 and 1.7590 , respectively. The mean of financial development (FD) is 0.0468 , with a maximum and minimum of -1.4738 and 3.2664 , respectively. The [Jarque and Bera \(1987\)](#) test is used to check the normality of the residuals. The null hypothesis of the test is that “residuals are normally distributed.” Our results indicate that the residuals of GG are normally distributed whereas the residuals of IQ and FD are not normally distributed.

5.2. Cross-sectional dependence

[Table 1](#) shows the results of the [Breusch and Pagan \(1980\)](#) and [Baltagi and Pesaran \(2007\)](#) tests, which are applied to test the cross-sectional dependency of all the variables. Our results reveal the presence of cross-sectional dependency, as the null hypothesis of cross-sectional independence for all the variables is rejected at the 1 percent level of significance.

5.3. Unit-root test

[Table 2](#) elaborates the results of the CIPS unit-root test, which is conducted to test the stationarity of all variables at the level and first difference for the constant effect and trend. The test has a null hypothesis of nonstationary series. Our results show that all the variables are nonstationary at the level. However, the null hypothesis of nonstationary series is rejected, because the variables become stationary at the first difference at the 5 percent and 1 percent level of significance. Hence, all the variables are integrated of order 1.

5.4. Cointegration

[Table 3](#) shows the results of the cointegration tests. The study uses [Pedroni \(1999\)](#), [Kao \(1999\)](#), and [Westerlund and Edgerton \(2007\)](#) tests of the long-run association among variables. The results of the [Pedroni \(1999\)](#) cointegration test have

a null hypothesis of no cointegration among variables. Our results indicate that the null hypothesis is rejected in most of the cases. For example, within dimensions, the test statistics of rho, Philips Perron (PP) and Augmented Dicky Fuller (ADF) are significant at 5 percent and 1 percent, whereas, between dimensions, the statistics of the PP and ADF tests are significant at 1 percent. So, we conclude that long-run relationships exist among the variables. The results of the [Kao \(1999\)](#) cointegration test show that the null hypothesis of no cointegration is rejected at the 1 percent level of significance, indicating the presence of a long-run association among the variables. The results of the [Persyn and Westerlund \(2008\)](#) test reveal a long-run relationship among variables, as the null hypothesis of no cointegration is rejected at the level of 1 percent with the use of robust p values, which are calculated by bootstrapping. Based on the results of all these cointegration tests, we conclude that a long-run relationship exists among GG, FD, and IQ.

5.5. Results of FMOLS and DOLS

[Table 4](#) reveals the results of FMOLS and DOLS used to estimate the long-run coefficients and of testing the proposed hypotheses. The results of FMOLS reveal that the coefficient of IQ (4.7332^*) is positive and significant at the level of 1 percent, which shows that a one-unit increase in IQ tends to increase GG by 4.7332 units. Thus, H1 is confirmed. The coefficient of FD (3.9492^*) is also positive and significant at the level of 1 percent, indicating that a one-unit increase in FD tends to increase GG by 3.9492 units. Thus, H2 is also supported.

The results of DOLS are similar to the results of FMOLS. They show that the coefficient of IQ (9.3442) is significant at 1 percent, which shows that IQ positively contributes to GG. In particular, a one-unit increase in IQ tends to increase GG by 9.3442 units. Thus, H1 is accepted. The coefficient of FD (6.3453) is positive and significant at the level of 5 percent, indicating a positive relationship between FD and IQ. The results show that a one-unit increase in FD tends to increase GG by 6.3453 units. Hence, the results support H2.

6. Discussions and conclusion

Green growth in the economy is essential for achieving sustainable development. Previous studies revealed the positive contributions of institutional quality and financial development in economic growth ([Hassan, Sanchez, B., & Yu, 2011](#); [Valeriani & Peluso, 2011](#)) and reducing pollution emissions ([Zakaria & Bibi, 2019](#)), but ignored the

Table 2
Cross Sectional Im Pesara nd Shin (CIPS) Unit Root.

Variables	Level		First-Difference		Order of Integration
	Constant	Constant and trend	Constant	Constant and trend	
GG	−0.2463	−0.2524	−2.4742**	−3.6554***	I (1)
IQ	−1.8345	−1.7356	−2.4784**	−3.1336***	I (1)
FD	−1.2873	−1.8345	−2.9293***	−3.2412***	I (1)

Note: GG is green growth, IQ is institutional quality and FD is financial development. ** and *** are significant at the 5% and 10% level, respectively.

Table 3
Panel cointegration.

Pedroni (1999) Cointegration

	Within dimensions (Panel)				Between dimensions (Panel)			
	V	rho	PP	ADF	rho	PP	ADF	Decision
Statistic	−1.284	2.8085**	−3.35***	−4.793***	1.9326	−3.371***	−4.7324***	Cointegration exists.
p-value	0.9000	0.0590	0.0000	0.0002	0.9731	0.0004	0.0000	

Kao (1999) Cointegration

	ADF	Decision
Statistic	−3.4392***	Cointegration exists
p-value	0.0003	

Westerlund (2007) Cointegration

	G_t	G_a	P_t	P_a	Decision
Statistic	−19.6591***	−3.5362***	−9.2542***	−4.6242**	Cointegration exists.
p-value	0.000	0.1243	0.000	0.0476	
RP value	0.000	0.000	0.000	0.000	

Note: *, **, and *** significant at the level of 1%, 5%, and 10%, respectively.

Table 4
FMOLS and DOLS.

Variables	FMOLS		DOLS		Decision
	DV: GG		DV: GG		
	Coefficient	P-value	Coefficient	P-value	
IQ	4.7331	0.0000	9.3442	0.0000	H1 confirmed
FD	3.9492	0.0024	6.3453	0.0240	H2 confirmed
R^2	0.9818		0.9925		
Adjusted R^2	0.9793		0.9845		

contributions of institutional quality and financial development in green growth. The present study, therefore, examines the role of institutional quality and financial development in green economic growth. For this purpose, we studied data on South Asian countries from 2000 to 2018. Three countries (Afghanistan, Bhutan, and the Maldives) are excluded from the study due to data unavailability. Green economic growth is calculated by adapting the equation of [Sohag, Taşkın, and Malik \(2019\)](#). The study applied FMOLS and DOLS models to examine the empirical results. The study had interesting findings. First, the study revealed that institutional quality positively affects green economic growth, and the governments of South Asian countries are making continuous efforts to enhance economic growth and sustainability ([Stoeveer, 2012](#)). Moreover, institutional quality ensures legislation that helps to reduce CO₂ emissions as a result of economic activities, which ultimately leads to sustainable economic growth or green economic growth ([Azam, Liu, & Ahmad, 2020](#)). South Asian countries in the initial stages of growth and are considered booming economies. South Asian countries are largely dependent on natural resource exploitation for their growth, so only institutional quality, the correct policies, and their enforcement play an important role in sustaining natural capital and the environment and lead their economies to green economic growth.

Second, the study revealed the positive relation between financial development and green economic growth. Previous studies concluded that financial development improves environmental quality ([Charfeddine & Khediri, 2016](#)), as it enables industries to access advanced types of machinery that are environmentally friendly and contribute less to environmental degradation. Moreover, financial development enables the provision of energy to people, which, in turn, improves the quality of life of individuals and promotes social sustainability as well as economic sustainability ([Li, Appiah, & Korankye, 2020](#)).

This study has a few implications. First, the financial development of South Asian economies needs to be increased by encouraging investment and by promoting exports because financial development is an important determinant of green growth. Second, institutional quality needs to be improved, which is possible through transparency, the basis of improvement in institutional quality, and fighting against corruption.

Ethical approval

All scholarly contributions by other authors, tables, graphs, data sources, etc. are cited properly. No unethical content is added.

Consent to participate

All authors agree to participate in the revision stage of this paper and will appreciate the comments of the editor and reviewers.

Consent to publish

All authors give consent to publish this paper after due process by the editorial board.

Authors' contributions

Farhan Ahmed: Literature review, data collection, recommendation, and proofread (25%)

Shazia Kousar: Research idea, gap, introduction, recommendation, and proofread (25%)

Amber Pervaiz: Methodology, analysis, recommendations, and proofread (25%)

Alza Shabbir: Discussion, conclusion, final recommendations, and proofread (25%)

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Declaration of competing interest:

All authors do not have any interests that might be interpreted as influencing the research.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.bir.2021.03.005>.

References

- Abdelbary, I., & Benhin, J. (2019). Governance, capital and economic growth in the Arab Region. *Quarterly Review of Economics and Finance*, 73, 184–191.
- Adams, S., & Klobodu, E. K. M. (2018). Financial development and environmental degradation: does political regime matter? *Journal of Cleaner Production*, 197, 1472–1479.
- Adams, S., Klobodu, E. K. M., & Apio, A. (2018). Renewable and non-renewable energy, regime type and economic growth. *Renewable Energy*, 125, 755–767.
- Ahmed, K. (2017). Revisiting the role of financial development for energy-growth-trade nexus in BRICS economies. *Energy*, 128, 487–495.
- Anyanwu, J. C. (2014). Factors affecting economic growth in Africa: are there any lessons from China? *African Development Review*, 26(3), 468–493.
- Azam, M., Liu, L., & Ahmad, N. (2020). Impact of institutional quality on environment and energy consumption: Evidence from developing world. *Environment, Development and Sustainability*, 23, 1646–1667.
- Bagheri, M., Guevara, Z., Alikarami, M., Kennedy, C. A., & Doluweera, G. (2018). Green growth planning: A multi-factor energy input-output analysis of the Canadian economy. *Energy Economics*, 74, 708–720.
- Baltagi, B. H., & Kao, C. (2000). *Nonstationary panels, cointegration in panels and dynamic panels: A survey*. Syracuse University Center for Policy Research. Working Paper 16.
- Baltagi, B. H., & Pesaran, M. H. (2007). Heterogeneity and cross section dependence in panel data models: theory and applications introduction. *Journal of Applied Econometrics*, 22(2), 229–232.
- Bayar, Y. (2014). Financial development and economic growth in emerging Asian countries. *Asian Social Science*, 10(9), 8–17.
- Bernauer, T., & Koubi, V. (2009). Effects of political institutions on air quality. *Ecological Economics*, 68(5), 1355–1365.
- 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), 1449780.
- Boutabba, M. A. (2014). The impact of financial development, income, energy and trade on carbon emissions: evidence from the Indian economy. *Economic Modelling*, 40, 33–41.
- Breusch, T. S., & Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *Review of Economic Studies*, 47(1), 239–253.
- Carlsson, F., & Lundström, S. (2001). *Political and economic freedom and the environment: the case of CO2 emissions*. Goteborg: Department of Economics, Goteborg University.
- Chan, H. K., Yee, R. W., Dai, J., & Lim, M. K. (2016). The moderating effect of environmental dynamism on green product innovation and performance. *International Journal of Production Economics*, 181, 384–391.
- Charfeddine, L., & Khediri, K. B. (2016). Financial development and environmental quality in UAE: Cointegration with structural breaks. *Renewable and Sustainable Energy Reviews*, 55, 1322–1335.
- Dai, H., Xie, X., Xie, Y., Liu, J., & Masui, T. (2016). Green growth: The economic impacts of large-scale renewable energy development in China. *Applied Energy*, 162, 435–449.
- Dluhopolskyi, O., Koziuk, V., Ivashuk, Y., & Klupkiv, Y. (2019). Environmental welfare: Quality of policy vs. society's values. *Problemy Ekoro-zwoju*, 14(1), 19–28.
- Donelli, F., & Chiriatti, A. (2017). Turkish Civilian Capacity in Post-conflict Scenarios: The Cases of Bosnia and Herzegovina and Kosovo. *Journal of Global Analysis*, 7(1).
- Fayissa, B., & Nsiah, C. (2013). The impact of governance on economic growth in Africa. *Journal of Developing Areas*, 47(1), 91–108.
- Fernando, Y., Jabbour, C. J. C., & Wah, W. X. (2019). Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance: does service capability matter? *Resources, Conservation and Recycling*, 141, 8–20.
- Garcia-Sanchez, I. M., Cuadrado-Ballesteros, B., & Frias-Aceituno, J. (2013). Determinants of government effectiveness. *International Journal of Public Administration*, 36(8), 567–577.
- Gazzola, P., Del Campo, A. G., & Onyango, V. (2019). Going green vs going smart for sustainable development: Quo vadis? *Journal of Cleaner Production*, 214, 881–892.
- Hasnat, G. T., Kabir, M. A., & Hossain, M. A. (2018). *Major environmental issues and problems of South Asia, particularly Bangladesh* (pp. 1–40). Handbook of environmental materials management.
- Hassan, M. K., Sanchez, B., & Yu, J.-S. (2011). Financial development and economic growth: New evidence from panel data. *Quarterly Review of Economics and Finance*, 51(1), 88–104.
- Huq, S., & Ayers, J. (2008). *Climate change impacts and responses in Bangladesh*. Brussels, Belgium: Policy Department Economy and Science, European Parliament.
- Islam, M., & Managi, S. (2019). Green growth and pro-environmental behavior: Sustainable resource management using natural capital accounting in India. *Resources, Conservation and Recycling*, 145, 126–138.
- Jacobs, M. (2012). *Green growth: Economic theory and political discourse* (No. 92). London: Grantham Research Institute on Climate Change and the Environment.
- Jarque, C. M., & Bera, A. K. (1987). A test for normality of observations and regression residuals. *International Statistical Review/Revue Internationale de Statistique*, 55(2), 163–172.
- Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics*, 90(1), 1–44.
- Kao, C., & Chiang, M. H. (2000). On the estimation and inference of cointegrated regression in panel data. *Advances in Econometrics*, 15, 179–222.
- Khoshnava, S. M., Rostami, R., Zin, R. M., Štreimikienė, D., Yousefpour, A., Strielkowski, W., & Mardani, A. (2019). Aligning the criteria of green economy (GE) and sustainable development goals (SDGs) to implement sustainable development. *Sustainability*, 11(17), 4615.
- Latif, Z., Yang, M. K., Danish, Latif, S., Liu, X., Pathan, Z. H., et al. (2018). The dynamics of ICT, foreign direct investment, globalization and

- economic growth: Panel estimation robust to heterogeneity and cross-sectional dependence. *Telematics and Informatics*, 35(2), 318–328. <https://doi.org/10.1016/j.tele.2017.12.006>
- Li, F., Appiah, M., & Korankye, B. (2020). Financial development and economic sustainability in ECOWAS countries: The role of institutional quality. *ETIKONOMI*, 19(1), 41–50.
- Masoud, N., & Hardaker, G. (2012). The impact of financial development on economic growth. *Studies in Economics and Finance*, 29(3), 148–173.
- Nazlioglu, S., Lebe, F., & Kayhan, S. (2011). Nuclear energy consumption and economic growth in OECD countries: Cross-sectionally dependent heterogeneous panel causality analysis. *Energy Policy*, 39(10), 6615–6621.
- Ozturk, I., & Acaravci, A. (2013). The long-run and causal analysis of energy, growth, openness and financial development on carbon emissions in Turkey. *Energy Economics*, 36, 262–267.
- Pan, F., & Yang, B. (2019). Financial development and the geographies of startup cities: evidence from China. *Small Business Economics*, 52(3), 743–758.
- Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and statistics*, 61(S1), 653–670.
- Persyn, D., & Westerlund, J. (2008). Error-correction-based cointegration tests for panel data. *STATA Journal*, 8(2), 232–241.
- Pesaran, M. H. (2004). *General diagnostic tests for cross section dependence in panels*.
- Raju, A. S., Balasubramaniam, N., & Srinivasan, R. (2020). *Governance evolution and impact on economic growth: a south Asian perspective. Open Government: Concepts, Methodologies, Tools, and Applications* (pp. 2111–2139). India: IGI Global.
- Reid, H., Simms, A., & Johnson, V. (2007). *Up in smoke? Asia and the Pacific. Fifth report of the Working Group on Climate Change and Development*. London: New Economics Foundation.
- Rodríguez-Martínez, C. C., García-Sánchez, I. M., Vicente-Galindo, P., & Galindo-Villardón, P. (2019). Exploring relationships between environmental performance, e-government and corruption: A multivariate perspective. *Sustainability*, 11(22), 6497.
- Sakyi, D., Villaverde, J., Maza, A., & Chittedi, K. R. (2012). Trade openness, growth and development: evidence from heterogeneous panel cointegration analysis for middle-income countries. *Cuadernos de Economía*, 31(SPE57), 21–40.
- Salman, M., Long, X., Dauda, L., & Mensah, C. N. (2019). The impact of institutional quality on economic growth and carbon emissions: Evidence from Indonesia, South Korea and Thailand. *Journal of Cleaner Production*, 241, 118331.
- Samarasinghe, T. (2018). *Impact of governance on economic growth*. MPRA_paper_89834.
- Scott, A., McFarland, W., & Seth, P. (2013). *Research and evidence on green growth*. Report by the Overseas Development Institute for Evidence on Demand.
- Shahbaz, M., Shahzad, S. J. H., Ahmad, N., & Alam, S. (2016). Financial development and environmental quality: The way forward. *Energy Policy*, 98, 353–364.
- Singh, B. P., & Pradhan, K. C. (2020). Institutional quality and economic performance in South Asia. *Journal of Public Affairs*, Article e2401.
- Sohag, K., Taşkın, F. D., & Malik, M. N. (2019). Green economic growth, cleaner energy and militarization: Evidence from Turkey. *Resources Policy*, 63, 101407.
- Song, X., Zhou, Y., & Jia, W. (2019). How do economic openness and R&D investment affect green economic growth? Evidence from China. *Resources, Conservation and Recycling*, 146, 405–415.
- Stoever, J. (2012). On comprehensive wealth, institutional quality and sustainable development-quantifying the effect of institutional quality on sustainability. *Journal of Economic Behavior & Organization*, 81(3), 794–801.
- Sviryzdenka, K. (2016). *Introducing a new broad-based index of financial development*. International Monetary Fund.
- Tamazian, A., & Rao, B. B. (2010). Do economic, financial and institutional developments matter for environmental degradation? Evidence from transitional economies. *Energy Economics*, 32(1), 137–145.
- Upreti, P. (2015). Factors affecting economic growth in developing countries. *Major Themes in Economics*, 17(1), 37–54.
- Valeriani, E., & Peluso, S. (2011). The impact of institutional quality on economic growth and development: An empirical study. *Journal of Knowledge Management, Economics and Information Technology*, 1(6), 1–25.
- Wang, J., Mendelsohn, R., Dinar, A., Huang, J., Rozelle, S., & Zhang, L. (2009). The impact of climate change on China's agriculture. *Agricultural Economics*, 40(3), 323–337.
- Westerlund, J., & Edgerton, D. L. (2007). A panel bootstrap cointegration test. *Economics Letters*, 97(3), 185–190.
- Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and Statistics*, 69(6), 709–748.
- 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.
- Yang, L., Ma, X., & Zhao, Y. (2017). A condition-based maintenance model for a three-state system subject to degradation and environmental shocks. *Computers & Industrial Engineering*, 105, 210–222.
- Zakaria, M., & Bibi, S. (2019). Financial development and environment in South Asia: The role of institutional quality. *Environmental Science and Pollution Research*, 26(8), 7926–7937.