Dynamics of access to finance, financial development and sustainable economic development in developing economies

Bushra Zulfiqar
University Institute of Management Sciences
PMAS- Arid Agriculture University Rawalpindi, Pakistan

Wafa Naif Alwakid
College of Business, Department of Business
Jouf University, Sakaka, Saudi Arabia

Mahnoor Hanif
Maryam Manzoor
University Institute of Management Sciences
PMAS- Arid Agriculture University Rawalpindi, Pakistan

Keywords
Access to Finance, Developing World, Financial Development, Sustainable Development

Abstract

This paper assesses the interconnectedness between access to finance (ATF), financial development (FD) and sustainable economic development (SED). The study employed a sample of world developing economies and obtained data from the World Development Indicator Database (WDI) from 2010 to 2022. The paper incorporates the static and dynamic panel estimation models to test the proposed connection. The findings show the favourable impact of FD on SED suggesting that financial expansion across developing countries plays a crucial role in enhancing sustainable development. Additionally, a robust financial system facilitates the effective mobilization and allocation of cash towards investments in eco-friendly initiatives and infrastructure, expediting the preservation of natural resources and the protection of the environment. However, access to finance weakens the connection between FD and SED which implies that the limited access to finance in developing nations can increase the income gap, limit opportunities for entrepreneurship and wealth creation, and hinder efforts to address social inequality and alleviate poverty. Consequently, this limits the development of financial services necessary for sustainable economic growth. The findings have crucial policy implications for the financial regulators and policymakers of developing nations around the world. Such that the key to achieving long-term economic growth and bettering the lives of people in developing nations lies in removing barriers to financial inclusion and advancing inclusive financial development.

Introduction

Presently, the world is confronted with pressing societal, ecological, and economic challenges. Addressing poverty, managing climate change, reducing economic inequality, and mitigating the risks of crises all necessitate substantial financial resources and investments (Hunjra et al., 2022; Shahbaz et al., 2022). In addition to ecological challenges, the COVID-19 epidemic has exacerbated global economies by intensifying financial limitations (Ibrahim & Alagidede, 2020). Additionally, the persistent lack of adequate finance policies is a critical challenge (Arif et al., 2022; Sethi et al., 2020). Therefore, it is essential to explain the role of FD and socioeconomic aspects on the sustainable development of the economy.

Although the literature extensively explores the complex link between FD and economic growth, the FD-growth direct connection has been widely accepted, notwithstanding a few opposing viewpoints (Chowdhury, 2016; Mir et al., 2024). The financial services sector primarily contributes to long-term economic growth by driving savings rates, investment choices, and technical innovation (Levine, 2005; San Chia et al., 2022). Financial development stimulates economic growth by utilizing banks or equity markets to gather and consolidate savings, and then allocate those funds to sectors that are anticipated to yield favorable economic results (Beck and Levine, 2004). The micro and macro-prudential rules play a vital role

in sustainable development by directing funding towards structural change for environmentally friendly societies (Taddese et al., 2023). Several studies have critically assessed the impact of FD on SED by examining its function in financial transmission pathways (Dafermos et al., 2018; Demetriades and Rousseau, 2016). Additionally, Nabeeh et al. (2021) recognized that FD, fiscal policy, and credit are crucial aspects that contribute to the SED. Financial rules play a crucial role in properly managing and preventing any detrimental effects on the allocation of physical resources, hence safeguarding SED (Yiadom et al., 2024).

Recent studies have concentrated on the role of FD in economic growth. However, different studies have reported a favorable effect (Hunjra et al., 2022; Audi et al., 2022), while others have shown dissenting opinions (Boikos et al., 2022; Ishiwata and Yokomatsu, 2018). However, the amount of information available on the subject of FD and sustainable development in developing countries is still insufficient. These countries face depressed growth and an inability to accumulate funds because they save less. This hurdle in capital provision causes different problems of capital allocation among different industries. Conversely, although sustainable manufacturing is gaining momentum, many industries lag in terms of financing for the green transition which hinders long-term economic development (Farooq et al., 2024). These economies are primarily agrarian (Agriculture contributes to air and water pollution due to redundant technological structures) (Sharma and Ravindranath, 2019). Impoverished nations see financial inclusion as an important tool to mitigate the adverse effects of climate change disasters on the lives of their citizens. Improving lending policies may help farmers to proceed with financing thus they can adopt emerging technology to resolve sustainability issues (Hunjra et al., 2023; Singh and Dhadse, 2021). Financial inclusion, as voiced by McKibbine et al. (2020) and Shobande and Shodipe (2020), acts to promote saving and deposit activities, leading to profitable investment and improvement of welfare. However, emerging countries can hardly pass all financial requirements because of their low reserves, no or limited access to international loans, and low foreign direct investment (FDI). Given the limited financial resources of these countries, it is essential to investigate the link between FD, sustainable development, and credit access.

The majority of research has concentrated on the finance-growth nexus, however, there exists a void in the literature in exploring the impact of FD on the SED considering the sustainability factors such as depletion of natural resources and environmental degradation. Additionally, the existing literature on the finance-growth nexus centres around developed nations (Manigandan et al., 2024; Ishfaq et al., 2024; Arzova & Şahin, 2024) and lacks definitive conclusions, particularly in underdeveloped economies. In addition, prior studies do not assess the moderating influence of financial access and other socioeconomic factors on the linkage between FD and SED. To fill the gaps in the existing body of research, this research seeks to explore the nexus between FD and SED in developing nations. Furthermore, it aims to assess the contingent role of access to finance on the link between FD and SED in developing economies. The current work makes a three-fold scholarly contribution. Firstly, it takes into account the collective influence of FD on SED, while also considering the conditional influence of access to finance. Secondly, it utilizes both the static and dynamic panel estimating methods, specifically fixed effect and GMM to assess these relationships. Thirdly, it utilizes the data of 37 world developing nations from 2010 to 2022 to gain a well-rounded understanding of the relationship between access to finance, financial development and sustainable development.

Section 2 provides the conceptual framework, Section 3 discusses the data and methodology, results are provided in Section 4, and the conclusion is given in Section 5.

Literature Review

The debate on the connection between finance and economic development began in 1911 with the assertion that the progress of the financial sector is critical for economic development (Schumpeter, 2008). Patrick (1966) put up two significant assumptions regarding the finance and growth linkage: the supply-leading and demand-following hypothesis. Patrick contends that during the first phase of the nation's economic advancement, the financial sector plays a pivotal role in driving economic progress. As the country progresses towards attaining developed nation status, growth generates a need for the development of the financial sector. Financial development has critical role in promoting sustainable economic development through the provision of finances, effective resource allocation, and the

encouragement of innovation and entrepreneurship (Levine, 2005). Improved access to financing is one significant way financial development helps maintain economic growth. Banks and capital markets help allocate savings to investors. Greater access to credit helps firms to engage in productive activities like infrastructure, technology, and human capital, which are crucial for long-term economic growth (Levine, 2005). Many recent studies also found the positive impact of FD on SED (Ahmed et al., 2022; Dhahri et al., 2024; Guang-Wen et al., 2023; Manigandan et al., 2024). From the above literature, we hypothesize

H1: FD has a favourable impact on Sustainable Economic Development.

Although financial development can foster economic development, its advantages may not be felt evenly by all members of society. Access to financial services is often hindered for marginalized groups, small businesses, and villages, which limits their ability to engage in economic activities and prevents sustainable growth (Beck et al., 2007; Claessens and Perotti, 2007). Therefore, just having strong financial institutions does not ensure SED; rather, sustainability is facilitated by fair access to these systems. One important moderator of the connection between FD and SED is access to financing. It serves as a gateway, figuring out how much people and companies may gain from the potential presented by a sound financial system. Patrick's (1966) supply-side approach contends that the expansion of the financial sector is essential for economic expansion. The real economy will not be able to grow considerably without access to certain financial services and certain activities that a "liberalized" financial sector within a framework of appropriate institutions fulfils. However, the demand-side approach, holds that the financial sector cannot advance unless there is a legitimate economic sector that makes specific demands for financial products and services (Paun et al., 2019). From the above-mentioned literature, we hypothesize that:

H2: Access to finance positively moderates the relationship between FD and SED.

Conceptual Framework

Fig. 1 depicts the underlying conceptual framework of this research. FD refers to the expansion, depth, and effectiveness of the country's financial system which consists of the banking sector, capital markets and financial intermediaries. From the standpoint of Financial Development Theory, the financial system's theoretical foundations indicate that a sound financial system is a prerequisite for promoting economic growth and stability. A financial system that is well developed ensures effective allocation of capital, mobilisation of savings for productive investments and promotion of innovations and entrepreneurship. Hence, countries that have sound financial systems will be able to generate more sustainable economic development through better credit access, risk management, and investment opportunities and growth.

Access to finance describes the level of availability, affordability, and utilization of formal financial services by people and enterprises within an economy. Financial Inclusion Theory highlights that ensuring that all social groups in society gain access to formal financial services is crucial to the achievement of inclusive growth and poverty reduction. Finance access mediates the effect of FD on environmentally sustainable economic development by assisting in the distribution of FD advantages across various socioeconomic categories. Countries with significant financial inclusion tend to fully use financial systems for sustainable economic transformations, leading to inclusion of the households in productive economic activities and increased capital ownership among low-income populations. A vast body of scholarship examines the correlation between global tourism and factors such as natural resource availability, worldwide trade, foreign direct investment (FDI) and FD (Ngongang, 2015; Ahmed et al., 2022). There are divergent views on how the availability of natural resources affects economic growth given the large amount of research (Amiri et al., 2021; Udeagha & Breitenbach, 2023). To attain sustained economic growth, Badeeb et al. (2017) evaluate the possession of natural resources as natural assets, which include mineral substances, agricultural land, and access to water. The abundance of natural resources is believed to be beneficial to economic growth. Examining output volume and mineral reserves, Xue et al. (2020) found a positive correlation between resource availability and economic growth. However, the resource curse idea

holds that a wealth of natural resources does not always result in SED (Asif et al., 2020; Anthony-Orji et al., 2023). Ironically, as Dogan et al. (2020) noted, areas with an abundance of natural resources frequently remain underdeveloped or underprivileged. The resource curse idea was globally confirmed by Sachs and Warner (2001). The "paradox of poverty" holds that unstable strategic, socio-political, and economic variables cause nations with a wealth of natural resources—like fossil fuels and rare minerals—to build their economies slowly (Badeeb et al., 2017; Zhang and Liang, 2021). Corrupt practices and ambiguous natural resource valuations may cause a paradoxical lower level of development in some areas (Yang et al., 2019).

FDI helps money move beyond borders and encourages emerging countries to use environmentally friendly technology. Through the Pollution Halo Effect, FDI might contribute to sustainable growth theoretically. The Pollution Halo Hypothesis posits that FDI has a beneficial effect on environmental quality, as shown by Mert et al. (2020). The transfer of green technology, along with the influx of FDI and efficiency improvements, mitigates environmental degradation and enhances conditions for sustainable development. Trade openness is a measure of how closely a country trades internationally by exporting and importing goods and services. Global trade fosters SED in transition economies by facilitating the transfer of green technology, promoting exports of goods and services, and expanding their capacity (Essandoh et al., 2020; Musembi & Chun, 2020). Nevertheless, trade openness and sustainable economic development can be affected by issues like trade policies, infrastructure, and market access restrictions.

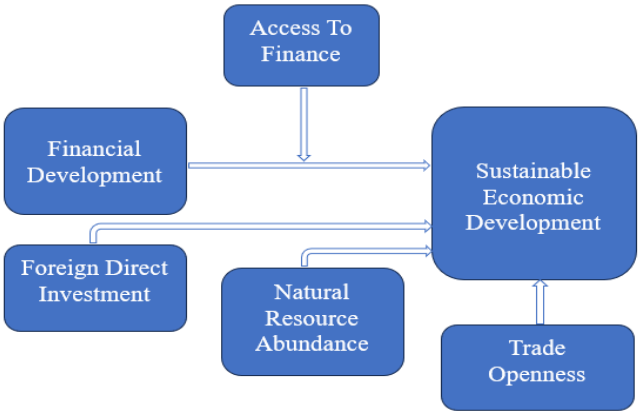

Fig. 1: Conceptual Framework

Research Methodology

This research utilizes a panel dataset comprising 37 developing nations spanning the period from 2010 to 2022. The primary focus is on the developing world where there is a significant presence of sustainable development concerns and notable differences in financial policies between countries. We obtain yearly data from the WDI repository of the World Bank. The choice for the chosen proxies is made following the extant literature (Xue et al., 2020; Hunjra et al., 2023; Udeagha & Breitenbach, 2023). To mitigate the issue of missing data, we have implemented a methodology that calculates the average over three years. The variable descriptions are presented in Table 1.

Table 1: Variables Description

Variable	Description	Symbol	Sources
Dependent Variable			
Sustainable Economic Development	Adjusted net savings, excluding particular emission damage (percentage GNI)	ANS	WDI
Independent Variable			
Financial Development	Financial Development Index prepared by the World Bank	FDINDX	WDI
Moderating Variable			

Access to Finance	No. of ATMs*100,000/country's adult population	ATM	WDI
	No. of Debit Card*1000/ country's adult population	NDC	WDI
Control Variables			
Foreign Direct Investment	FDI Net inflows	FDI	WDI
Natural Resource Abundance	Total natural resources rents (% of GDP)	TNR	WDI
Trade Openness	Trade (% of GDP)	TO	WDI

Note: ANS stands for adjusted net saving, and FDINDX is the proxy of independent variable financial development. ATM and NDC are the moderating variable proxies for access to finance denoting ATMs Per 100,000 Adults and No. of Debit Card Per 1000 Adults. FDI, TNR and TO represent foreign direct investment, national resource abundance and trade openness respectively.

The below models are tested to examine the proposed linkage between access to finance, financial development and sustainable development.

$$(ANS)_{i,t} = a_0 + \beta_1 (FDINDX)_{i,t} + \beta_2(FDI)_{i,t} + \beta_3(TNR)_{i,t} + \beta_4(TO)_{i,t} + \mu_{it} \quad (1)$$

$$(ANS)_{i,t} = a_0 + \beta_1 (FDINDX)_{i,t} + \beta_2(ATM)_{i,t} + \beta_3(FDINDX*ATM)_{i,t} + \beta_4(FDI)_{i,t} + \beta_5(TNR)_{i,t} + \beta_6(TO)_{i,t} + \mu_{it} \quad (2)$$

$$(ANS)_{i,t} = a_0 + \beta_1 (FDINDX)_{i,t} + \beta_2(NDC)_{i,t} + \beta_3(FDINDX*NDC)_{i,t} + \beta_4(FDI)_{i,t} + \beta_5(TNR)_{i,t} + \beta_6(TO)_{i,t} + \mu_{it} \quad (3)$$

$$(ANS)_{i,t} = a_0 + \beta_1 (ANS)_{i,t-1} + \beta_2 (ANS)_{i,t-2} + \beta_3 (FDINDX)_{i,t} + \beta_4 (FDI)_{i,t} + \beta_5 (TNR)_{i,t} + \beta_6 (TO)_{i,t} + \mu_{it} \quad (4)$$

$$(ANS)_{i,t} = a_0 + \beta_1 (ANS)_{i,t-1} + \beta_2 (ANS)_{i,t-2} + \beta_3 (FDINDX)_{i,t} + \beta_4 (ATM)_{i,t} + \beta_5 (FDINDX*ATM)_{i,t} + \beta_6 (FDI)_{i,t} + \beta_7 (TNR)_{i,t} + \beta_8 (TO)_{i,t} + \mu_{it} \quad (5)$$

$$(ANS)_{i,t} = a_0 + \beta_1 (ANS)_{i,t-1} + \beta_2 (ANS)_{i,t-2} + \beta_3 (FDINDX)_{i,t} + \beta_4 (NDC)_{i,t} + \beta_5 (FDINDX*NDC)_{i,t} + \beta_6 (FDI)_{i,t} + \beta_7 (TNR)_{i,t} + \beta_8 (TO)_{i,t} + \mu_{it} \quad (6)$$

Where ANS denotes adjusted net savings which is a proxy of dependent variable SED. FDINDX represents the financial development index which is the independent variable. Access to finance captured with ATM and NDC acts as a moderator in this study. However, FDI, TNR and TO are the control variables. *i* denote cross-section and *t* represents time.

The study applied both static (Fixed Effect) and dynamic (GMM) panel models for the estimation of the proposed hypothesis. Fixed effects are particularly important when there are observable characteristics for each entity which are unique for each entity and remain constant over time, and these characteristics are likely to influence the dependent variable (Han & Phillips, 2010). The analysis focuses on the development of entities across time, by separating the effects of the explanatory variables, from the effects of the residual time-invariant factors. Through the utilization of heterogeneity across the entity, fixed effects mitigate the possibility of omitted variable bias that could threaten cross-sectional study (Lee & Yu, 2014). This improves the level of cause-effect links that are relevant. Despite this, the system GMM proves to be a strong one in cases where there is fear of endogeneity, where the explanatory variables may be correlated with an error term. This connection can arise due to reverse causation where values of the dependent variable from the past influence current values or result from measurement errors. The system GMM solves this issue by using the previous values of the independent variables as the instruments to obtain unbiased estimates (Hong et al., 2023). Moreover, system GMM can handle dynamic models in which the dependent variable is dependent on its own past values. Hence, we applied the GMM system to do robustness testing.

Results and Discussion

Summary statistics are important in assessing the characteristics of the dataset reported in Table 2. The mean value of the adjusted net saving (6.5885) reflects that countries in the developing world have an average 6.58% level of SED. The average value of FD (0.1397) proxied with (FDINDEX) reflects financial

sector development in the selected developing nations. However, the average values of access to finance proxies ATM (11.71) and NDC (134.75) indicate that on average 11 out of 100,000 adults have ATM usage while 134 out of 1000 individuals possess debit cards in developing countries. However, developing nations have on average 3.47%, 9.32% and 59% of FDI, natural resource abundance and level of trade openness respectively.

Table 2: Descriptive Statistics

Variables	Obs.	Mean	Std.	Min	Max
ANS	481	6.5885	13.8376	-32.3665	43.3074
FDINDX	481	0.1397	0.0743	0.0281	0.5387
ATM	481	11.7160	0.2593	0.0500	89.9563
NDC	481	134.751	16.2908	3.2531	892.1747
FDI	481	3.4762	5.7961	-17.292	38.9428
TNR	481	9.3205	8.3937	0.4241	51. 8437
TO	481	59.7422	26.0544	2.6988	150.2086

Note: ANS stands for adjusted net saving, and FDINDX is the proxy of independent variable financial development. ATM and NDC are the moderating variable proxies for access to finance denoting ATMs Per 100,000 Adults and No. of Debit Card Per 1000 Adults. FDI, TNR and TO are the control variables representing foreign direct investment, national resource abundance and trade openness respectively.

Table 3 presents the statistics of correlation results among variables. The values within the matrix reveal that all variables have lower to moderate correlations where the least correlation is between FDI and ATM which is -0.0017 while the NDC and FDINDX pair have the highest correlation (0.5959) which is considered a moderate correlation. Thus, there is no issue of multicollinearity in the dataset.

Table 3: Correlation Analysis

	ANS	FDINDX	ATM	NDC	FDI	TNR	TO
ANS	1.0000						
FDINDX	0.4168	1.0000					
ATM	0.1221	0.2705	1.0000				
NDC	0.1665	0.5959	0.1359	1.0000			
FDI	-0.0852	-0.1334	-0.0017	-0.0618	1.0000		
TNR	-0.3012	-0.2113	-0.0327	-0.1165	0.1695	1.0000	
TO	-0.0652	-0.0378	0.1698	0.0247	0.1088	0.3120	1.0000

Note: ANS stands for adjusted net saving, and FDINDX denotes financial development. ATM and NDC denote ATMs Per 100,000 Adults and No. of Debit Card Per 1000 Adults. FDI, TNR and TO represent foreign direct investment, national resource abundance and trade openness respectively.

Likewise, Table 4 presents the results of the diagnostic test of multicollinearity. These results are also aligned with the results of correlation analysis that reveal no issue of multicollinearity. The values of VIF are below 5 and 1/VIF are greater than 0.20 indicating that data is free from collinearity.

Table 4: Variance Inflating Factor

Variable	VIF	1/VIF
FDINDX	1.72	0.5815
NDC	1.56	0.6411
TNR	1.18	0.8491
TO	1.16	0.8632
ATM	1.12	0.8910
FDI	1.05	0.9567

Note: ANS stands for adjusted net saving, and FDINDX denotes financial development. ATM and NDC denote ATMs Per 100,000 Adults and No. of Debit Card Per 1000 Adults. FDI, TNR and TO represent foreign direct investment, national resource abundance and trade openness respectively.

Table 5 provides the findings of fixed effect estimation where model I assesses the role of financial development on SED. While Models II and III examine the moderating role of access to finance proxies on

SED. The findings indicate that FDINEX is statistically significant at 5% and 10% in all of the three Models estimated with the fixed effect technique and positively impacts sustainable development. These findings aligned with Hunjra et al. (2022) and imply that a higher level of FD has a substantial positive impact on sustainable economic development in developing nations. Nevertheless, the interaction effect of the variables ATM*FINDEX and NDC*FDINDX has a negative moderating impact, hence weakening the connection between FD and sustainable economic development. The argument suggests that there are numerous advantages in terms of overall progress and improvement of the financial system, but these benefits will be impeded if the financial services are not accessible or inclusive to all individuals. These findings are aligned with the studies of Kara et al. (2021) and Dhahri et al. (2024). Additionally, among control variables, FDI positively enhances sustainable development in emerging nations and supports the Pollution Halo effect hypothesis indicating that FDI improves environmental quality and sustainable development (Udeagha & Breitenbach, 2023). Additionally, total natural resource is found detrimental to sustainable development in developing economies and validates the resource curse hypothesis in the context of developing countries (Zhang & Liang, 2023). However, the findings of trade openness remained statistically insignificant in all three models of Table 5.

Table 5: Results of Fixed Effect Estimation

Variables	Model I	Model II	Model III
FDINDX	2.1738**	1.0801***	1.9013***
	(1.98)	(3.03)	(2.67)
ATM	----	0.0780	----
		(0.562)	
ATM*FDINDX	----	-1.033**	----
		(-2.02)	
NDC	----	----	1.0287***
			(3.35)
NDC*FDINDX	----	----	-1.0372***
			(-3.13)
FDI	0.1583*	0.1630*	0.1590*
	(1.72)	(1.79)	(1.75)
TNR	-0.2423***	-0.2597***	-0.2166***
	(-3.20)	(-3.45)	(-2.86)
TO	-0.0505	-0.0653	-0.0426
	(0.216)	(-1.60)	(-1.05)
C	5.4238	3.8032	0.7666
	(1.36)	(1.90)	(0.18)
R-Square	0.2552	0.1582	0.2379
F-Stat	20.50	20.91	20.06
Prob> F-Stat	0.0000	0.0000	0.0000

Note: ANS stands for adjusted net saving, and FDINDX denotes financial development. ATM and NDC denote ATMs Per 100,000 Adults and No. of Debit Card Per 1000 Adults. FDI, TNR and TO represent foreign direct investment, national resource abundance and trade openness respectively.

The findings of system GMM estimation are presented in Table 6. The model I specifically examine the impact of FD on SED. Models II and III analyse the influence of access to finance proxies on SED, specifically focusing on their moderating role. The results demonstrate that FDINEX has a statistically significant impact on sustainable development in all three Models assessed using the GMM estimation technique, with significance levels of 5% and 10%. The findings suggest that an increased level of financial development significantly contributes to sustained economic growth in emerging countries (Hunjra et al., 2022). However, the interaction term of ATM*FINDEX and NDC*FDINDX negatively moderates and weakens the connection between FD and SED. It implies that a range of benefits in terms of general development and sophistication of the financial system will be realized but the realization of these benefits will be hindered if the accessibility or inclusiveness of the financial service fails to cater for all people (Kara et al., 2021; Dhahri et al., 2024). Moreover, when considering control factors, it is seen that FDI has a beneficial impact on SED in emerging nations. This finding supports the concept of the Pollution Halo effect, which suggests

that FDI contributes to improving environmental quality and promoting SED (Udeagha & Breitenbach, 2023). In developing economies, the presence of abundant natural resources has been proven to have a negative impact on sustainable growth. This supports the theory of the resource curse in the context of developing countries (Zhang & Liang, 2023). These findings are robust and aligned with our static panel estimation model assessed with the fixed effect technique. Nevertheless, the results regarding the impact of trade openness are found to be statistically significant in all three models but have a negative/inverse impact on sustainable development in developing economies in Table 6. These outcomes are aligned with the study of Musembi and Chun (2020).

Table 6: Results of Two-Step System GMM Estimation

Variables	Model IV	Model V	Model VI
L1	0.6414***	0.5632***	0.5966***
	(32.59)	(18.04)	(22.48)
L2	0.0902***	0.0982***	0.1108***
	(7.09)	(4.52)	(5.10)
FDINDX	-3.779	2.0432***	1.3926
	(-0.99)	(3.74)	(0.41)
ATM	----	0.3480***	----
		(5.07)	
ATM*FDINDX	----	-1.0012***	----
		(-5.02)	
NDC	----	----	0.0201**
			(2.01)
NDC*FDINDX	----	----	-0.0783**
			(-2.43)
FDI	0.1293***	0.0924**	0.1807***
	(4.32)	(2.37)	(4.61)
TNR	-0.2382***	-0.3294***	-0.2591***
	(-11.38)	(-8.46)	(-9.82)
TO	-0.0870***	-0.0660***	-0.0822***
	(-10.29)	(-5.92)	(-8.02)
C	9.2979***	0.0724	6.534*
	(8.93)	(0.03)	(1.68)
Sargan Value	26.8297	24.95	25.92
AR1 (P-value)	0.018	0.016	0.020
AR2 (P-value)	0.291	0.293	0.205

Note: ANS stands for adjusted net saving, and FDINDX denotes financial development. ATM and NDC denote ATMs Per 100,000 Adults and No. of Debit Card Per 1000 Adults. FDI, TNR and TO represent foreign direct investment, national resource abundance and trade openness respectively.

Financial development in developing nations is an important instrument for improving sustainable development. A stable financial system assists in the efficient gathering and deployment of capital through investment in environmentally friendly projects and facilities that speed up the conservation of natural resources and, thereby, preserve the environment (Hunjra et al., 2022; Audi et al., 2022). However, access to finance has a weak and negative moderating role on the relationship between FD and environmental sustainability, therefore suggesting that even though financial systems as a whole are contributing towards sustainable economic development through activities that mobilize savings, allocate capital to productive investments and manage risks, the benefits of those may not be equally shared. The inadequacy of access to finance those certain groups face might lead to a widening of the income gap, restriction in the opportunities for the creation of entrepreneurship and wealth and make it hard to support efforts to tackle social inequality and poverty alleviation, hence limiting the development of financial services for sustainable economic growth. One likely reason for this matter is even though financial system overhauling has enormously augmented the depth, scope, and performance of financial services, many economic strata specifically the vulnerable or the marginalized are still in a position to hardly access formal financial

services (Kara et al., 2021; Dhahri et al., 2024). The obstacles may include restricted physical access to bank branches and ATMs, high transaction fees, stringent conditions for the provision of credit and insurance products, and a lack of knowledge and awareness about financial issues.

The FDI has been positively shown to support sustainable development using the pollution halo effect, whereas total natural resource wealth is considered negative for sustainable development as presented by the resource curse hypothesis. FDI normally results in imported advanced technologies, management techniques and environmental standards that directly minimize pollution and resource depletion and hence can reduce environmental degradation and boost environmental enhancement (Amiri et al., 2021; Udeagha & Breitenbach, 2023). On the one hand, capital inflows generated by FDI can enhance economic growth, diversification, and employment, hence increasing incomes, social welfare, and human capital accumulation that contribute to sustainable development on the other hand. Conversely, the resource curse theory argues that countries that are endowed with abundant natural resources are prone to several economic distortions, governance challenges, and environmental degradation through the dependence on extractive industries, rent-seeking human activities, and mismanagement of resources revenues that these countries usually receive, ultimately undermining long term economic stability. Hence, though FDI is a tool which is capable of mitigating pollution and creating economic benefits, prudent management of natural resources must be the key to avoiding the destructive consequences of the "resource curse" and thus ensuring long-term sustainability (Badeeb et al., 2017; Zhang & Liang, 2023). Trade openness may have negative consequences for sustainable development in developing countries when it aggravates the situation with the environment due to increased resource exploitation and pollution from industries associated with export-oriented activities. Moreover, it may widen the income gap by boosting capitalization market sectors instead of small-scale producers, this can cause social problems which might lead to slow and undeveloped inclusive growth. Therefore, the increased the dependence on international market for essentials can increase the vulnerability to external shocks which can pose risks to economic stability and thus undermine long-term sustainability efforts.

Conclusion

This study demonstrates that financial development, access to finance, and sustainable economic development in countries in the developing world are closely related to each other. The study shows the positive link between FD and sustainable development, although the research has also brought to light the critical components of finance access to this link. It can be seen that an increase in the depth, breadth, and efficiency of the financial system contributes greatly to sustainable economic development; however, barriers to accessing formal financial services can hinder the realization of these benefits for some population segments.

Taking into consideration the outcomes of this research, there are many implications for policymakers, practitioners, and anyone who is involved in development activities. First and foremost, the goal is to develop policies and initiatives directed at widening financial inclusion and access to finance, primarily for underserved or marginalized communities. This could be through the development of financial infrastructure, financial literacy and awareness promotion as well as the implementation of targeted interventions to overcome the problems that prevent access. Furthermore, efforts to promote financial development should be made in combination with policies to reinforce financial inclusion and financial services accessibility in a bid to make sure that the benefits of financial growth are distributed equally across the whole society.

Limitations and Future Research

Future research could build on this research by studying the relationship between FD, access to finance, and sustainable economic development through the lens of institutional quality. Additionally, it could be beneficial to conduct a deeper study of the responsive effects of some financial inclusion mechanisms or measures aimed at proliferating inclusive development and growth. Longitudinal studies that focus on financial inclusion and development indicators changes over time are also crucial in assessing the impact of policy interventions and informing evidence-based decisions. Future research may include developed

countries for comparing the findings of developed and developing nations to design policy implications specific to these economies.

References

Ahmed, F., Kousar, S., Pervaiz, A. and Shabbir, A., 2022. Do institutional quality and financial development affect sustainable economic growth? Evidence from South Asian countries. *Borsa Istanbul Review*, *22*(1), pp. 189-196.

Amiri, H. and Arshadi, V., 2021. Investigating the Simultaneous Relationship between Resilience and Economic Growth Emphasizing Foreign Investment. *Quarterly Journal of The Macro and Strategic Policies*, *9*(Special Issue), pp. 160-184.

Anthony-Orji, O. I., Orji, A., Ogbuabor, J. E. and Uka, L. C., 2023. Money matters a lot: empirical analysis of financial development, financial inclusion and economic growth in Nigeria. *International Journal of Economic Policy in Emerging Economies*, *17*(1), pp. 100-117.

Arif, A., Sadiq, M., Shabbir, M. S., Yahya, G., Zamir, A. and Bares Lopez, L., 2022. The role of globalization in financial development, trade openness and sustainable environmental-economic growth: evidence from selected South Asian economies. *Journal of Sustainable Finance & Investment*, *12*(4), pp. 1027-1044.

Arzova, B. and Şahin, B. Ş., 2024. The Impact of Financial Development and Innovation on Green Growth: An Empirical Investigation on Emerging Countries. In *New Approaches to CSR, Sustainability and Accountability, Volume V* (pp. 257-273). Singapore: Springer Nature Singapore.

Asif, M., Khan, K. B., Anser, M. K., Nassani, A. A., Abro, M. M. Q. and Zaman, K., 2020. Dynamic interaction between financial development and natural resources: Evaluating the 'Resource curse ' hypothesis. *Resources Policy*, *65*, p. 101566.

Audi, M., Ali, A. and HAMADEH, H. F., 2022. Nexus Among Innovations, Financial Development and Economic Growth in Developing Countries. *Journal of Applied Economic Sciences*, *17*(4).

Badeeb, R. A., Lean, H. H. and Clark, J., 2017. The evolution of the natural resource curse thesis: A critical literature survey. *Resources Policy*, *51*, pp. 123-134.

Beck, T. and Levine, R., 2004. Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance*, *28*(3), pp. 423-442.

Beck, T., Demirgüç-Kunt, A. and Levine, R., 2007. Finance, inequality and the poor. *Journal of economic growth*, *12*, pp.27-49.

Boikos, S., Panagiotidis, T. and Voucharas, G., 2022. Financial development, reforms and growth. *Economic Modelling*, *108*, p. 105734.

Chowdhury, M., 2016. Financial development, remittances and economic growth: Evidence using a dynamic panel estimation. *Margin: The Journal of Applied Economic Research*, *10*(1), pp. 35-54.

Claessens, S. and Perotti, E., 2007. Finance and inequality: Channels and evidence. *Journal of comparative Economics*, *35*(4), pp.748-773.

Dafermos, Y., Nikolaidi, M. and Galanis, G., 2018. Climate change, financial stability and monetary policy. *Ecological Economics*, *152*, pp. 219-234.

Demetriades, P. O. and Rousseau, P. L., 2016. The changing face of financial development. *Economics Letters*, *141*, pp. 87-90.

Dhahri, S., Omri, A. and Mirza, N., 2024. Information technology and financial development for achieving sustainable development goals. *Research in International Business and Finance*, *67*, p. 102156.

Dogan, E., Altinoz, B. and Tzeremes, P., 2020. The analysis of 'Financial Resource Curse'hypothesis for developed countries: Evidence from asymmetric effects with quantile regression. *Resources Policy*, *68*, p. 101773.

Essandoh, O. K., Islam, M. and Kakinaka, M., 2020. Linking international trade and foreign direct investment to CO2 emissions: any differences between developed and developing countries? *Science of the Total Environment*, *712*, p. 136437.

Farooq, O., Jabbouri, I. and Naili, M., 2024. The nexus between economic policy uncertainty and access to finance: a study of developing countries. *International Journal of Managerial Finance*, *20*(1), pp. 222-246.

Guang-Wen, Z., Murshed, M., Siddik, A.B., Alam, M.S., Balsalobre-Lorente, D. and Mahmood, H., 2023. Achieving the objectives of the 2030 sustainable development goals agenda: Causalities between economic growth, environmental sustainability, financial development, and renewable energy consumption. *Sustainable Development*, *31*(2), pp.680-697.

Han, C. and Phillips, P. C., 2010. GMM estimation for dynamic panels with fixed effects and strong instruments at unity. *Econometric Theory*, *26*(1), pp. 119-151.

Hong, S., Su, L. and Jiang, T., 2023. Profile GMM estimation of panel data models with interactive fixed effects. *Journal of Econometrics*, *235*(2), pp. 927-948.

Hunjra, A. I., Azam, M., Bruna, M. G. and Taskin, D., 2022. Role of financial development for sustainable economic development in low middle income countries. *Finance Research Letters*, *47*, p. 102793.

Hunjra, A. I., Hassan, M. K., Zaied, Y. B. and Managi, S., 2023. Nexus between green finance, environmental degradation, and sustainable development: Evidence from developing countries. *Resources Policy*, *81*, p. 103371.

Ibrahim, M. and Alagidede, I. P., 2020. Asymmetric effects of financial development on economic growth in Ghana. *Journal of Sustainable Finance & Investment*, *10*(4), pp. 371-387.

Ishfaq, N., Qamri, G. M., Ajmal, Z., Khan, Q. R. and Akbar, A., 2024. Investigation of Causal Linkages Between Financial Development and Economic Growth: Evidence from Pakistan. *iRASD Journal of Economics*, *6*(1), pp. 10-26.

Ishiwata, H. and Yokomatsu, M., 2018. Dynamic stochastic macroeconomic model of disaster risk reduction investment in developing countries. *Risk Analysis*, *38*(11), pp. 2424-2440.

Kara, A., Zhou, H. and Zhou, Y., 2021. Achieving the United Nations' sustainable development goals through financial inclusion: A systematic literature review of access to finance across the globe. *International Review of Financial Analysis*, *77*, p. 101833.

Lee, L. F. and Yu, J., 2014. Efficient GMM estimation of spatial dynamic panel data models with fixed effects. *Journal of Econometrics*, *180*(2), pp. 174-197.

Levine, R., 2005. Finance and growth: theory and evidence. *Handbook of economic growth*, *1*, pp. 865-934.

Manigandan, P., Alam, M. S., Murshed, M., Ozturk, I., Altuntas, S. and Alam, M. M., 2024. Promoting sustainable economic growth through natural resources management, green innovations, environmental policy deployment, and financial development: Fresh evidence from India. *Resources Policy*, *90*, p. 104681.

McKibbin, W. and Vines, D., 2020. Global macroeconomic cooperation in response to the COVID-19 pandemic: a roadmap for the G20 and the IMF. *Oxford Review of Economic Policy*, *36*(Supplement_1), pp. S297-S337.

Mert, M. and Caglar, A. E., 2020. Testing pollution haven and pollution halo hypotheses for Turkey: a new perspective. *Environmental Science and Pollution Research*, *27*, pp. 32933-32943.

Mir, T. A., Gopinathan, R. and Joshi, D. P., 2024. Revisiting long-run dynamics between financial inclusion and economic growth in developing nations: evidence from CS-ARDL approach. *Journal of Financial Economic Policy*, *16*(2), pp. 176-193.

Musembi, G. R. and Chun, S., 2020. Long-run relationships among financial development, financial inclusion, and economic growth: empirical evidence from Kenya. *Global Business & Finance Review (GBFR)*, *25*(4), pp. 1-11.

Nabeeh, N. A., Abdel-Basset, M. and Soliman, G., 2021. A model for evaluating green credit rating and its impact on sustainability performance. *Journal of Cleaner Production*, *280*, p. 124299.

Ngongang, E., 2015. Financial development and economic growth in Sub-Saharan Africa: A dynamic panel data analysis. *European Journal of Sustainable Development*, *4*(2), pp. 369-369.

Patrick, H.T., 1966. Financial development and economic growth in underdeveloped countries. *Economic development and Cultural change*, *14*(2), pp.174-189.

Paun, C.V., Musetescu, R.C., Topan, V.M. and Danuletiu, D.C., 2019. The impact of financial sector development and sophistication on sustainable economic growth. *Sustainability*, *11*(6), p.1713.

Sachs, J. D. and Warner, A. M., 2001. The curse of natural resources. *European Economic Review*, *45*(4-6), pp. 827-838.

San Chia, P., Law, S. H., Trinugroho, I., Wiwoho, J., Damayanti, S. M. and Sergi, B. S., 2022. Dynamic linkages among transparency, income inequality and economic growth in developing countries: Evidence from panel vector autoregressive (PVAR) model. *Research in International Business and Finance*, *60*, p. 101599.

Schumpeter, J.A., 2008. The theory of economic development.

Sethi, P., Chakrabarti, D. and Bhattacharjee, S., 2020. Globalization, financial development and economic growth: Perils on the environmental sustainability of an emerging economy. *Journal of Policy Modeling*, *42*(3), pp. 520-535.

Shahbaz, M., Nasir, M. A. and Lahiani, A., 2022. Role of financial development in economic growth in the light of asymmetric effects and financial efficiency. *International Journal of Finance & Economics*, *27*(1), pp. 361-383.

Sharma, J. and Ravindranath, N. H., 2019. Applying IPCC 2014 framework for hazard-specific vulnerability assessment under climate change. *Environmental Research Communications*, *1*(5), p. 051004.

Shobande, O. A. and Ogbeifun, L., 2022. The criticality of financial development and energy consumption for environmental sustainability in OECD countries: evidence from dynamic panel analysis. *International Journal of Sustainable Development & World Ecology*, *29*(2), pp. 153-163.

Shobande, O. A. and Shodipe, O. T., 2020. Re-evaluation of world population figures: politics and forecasting mechanics. *Economics and Business*, *34*(1), pp. 104-125.

Singh, A. P. and Dhadse, K., 2021. Economic evaluation of crop production in the Ganges region under climate change: A sustainable policy framework. *Journal of Cleaner Production*, *278*, pp. 123413.

Taddese Bekele, D. and Abebaw Degu, A., 2023. The effect of financial sector development on economic growth of selected sub-Saharan African countries. *International Journal of Finance & Economics*, *28*(3), pp. 2834-2842.

Udeagha, C. and Breitenbach, M., 2023. Exploring the moderating role of financial development in environmental Kuznets curve for South Africa: fresh evidence from novel dynamic ARDL simulations approach. *Financial Innovation*, *9*(1), p. 5.

Xue, Y., Ye, X., Zhang, W., Zhang, J., Liu, Y., Wu, C. and Li, Q., 2020. Reverification of the "resource curse" hypothesis based on industrial agglomeration: Evidence from China. *Journal of cleaner production*, *275*, p. 124075.

Yang, S., Abdulahi, E., Haider, M. A. and Khan, M. A., 2019. Revisiting the curse: resource rent and economic growth of sub-sahara African countries. *International Journal of Economics and Financial Issues*, *9*(1), p. 121.

Yiadom, E. B., Mensah, L., Bokpin, G. A. and Dziwornu, R. K., 2024. Analyzing financial and economic development thresholds for carbon emission reduction: a dynamic panel regime-switching study across income levels. *Management of Environmental Quality: An International Journal*, *35*(1), pp. 18-37.

Zhang, C. and Liang, Q., 2023. Natural resources and sustainable financial development: Evidence from South Asian economies. *Resources Policy*, *80*, p. 103282.