

How to Cite This Article: Ayaz, B., Afeef, M., & Jan, S. (2023). The Nexus between Fintech and Financial Stability; Moderated Mediated by Financial Inclusion and Economic Vulnerability: Evidence from Cross-country Analysis. *Journal of Social Sciences Review*, 3(2), 1132–1144. <https://doi.org/10.54183/jssr.v3i2.357>



The Nexus between Fintech and Financial Stability; Moderated Mediated by Financial Inclusion and Economic Vulnerability: Evidence from Cross-country Analysis

Bushra Ayaz	PhD Scholar, Department of Management Sciences, Islamia College Peshawar, KP, Pakistan.
Mustafa Afeef	Associate Professor, Department of Management Sciences, Islamia College Peshawar, KP, Pakistan.
Shahid Jan	Associate Professor, Department of Management Sciences, Islamia College Peshawar, KP, Pakistan.

Vol. 3, No. 2 (Spring 2023)

Pages: 1132 – 1144

ISSN (Print): 2789-441X

ISSN (Online): 2789-4428

Key Words

Fintech, Financial Stability, Financial Inclusion, Economic Vulnerability

Corresponding Author:

Bushra Ayaz

Email: bayza@numl.edu.pk

Abstract: Financial innovations are essential for fostering economic expansion. The outcomes of studies looking into this connection have been conflicting. No research to yet made an attempt to investigate the potential mediating function of financial inclusion in articulating the link between innovations and growth. In order to provide a comprehensive understanding of how income inequality might be addressed in developing, least developed, and low-income nations, this study makes a unique addition by looking at the joint dynamics among the four constructs. In order to promote financial inclusion and economic progress, the findings suggested that governments should make investments in the technology infrastructure that the financial sector may use to deliver financial services.

Introduction

According to Daud, Khalid, and Azman-Saini (2022; Pantelieieva, Krynytsia, Khutorna, and Potapenko (2018), fintech is the technological integration of financial services and products to improve their delivery and consumer use. According to Pantelieieva, Khutorna, Lytvynenko, and Potapenko (Pantelieieva, Khutorna, & Potapenko, 2020), Fintech refers to technologically driven innovations in financial services that relate to novel business models and service providers, including products and processes. These innovations then have a direct impact on the quality of the financial services provided by both established players and new competitors in the market (Beck, 2020).

The direct links between fintech and financial stability have been the subject of extensive research, but the intermediary factors have received far less attention (Braggion, Manconi, & Zhu, 2017; Daud, Khalid, & Azman-Saini, 2022; Yousaf Khan, Ahmad, & Malik, 2021). Fintech models that go beyond direct partnerships have been urged to be studied in greater detail. These calls aim to provide information on how fintech affects financial stability and what factors might make these links stronger or weaker (Pantelieieva, Krynytsia, Khutorna, & Potapenko, 2018). Most empirical research has focused solely on direct relationships (Q. K. Nguyen, 2022). Researchers

cannot fully comprehend how fintech can influence several variables by researching the linkages in isolation from one another. Instead of focusing only on direct relationships, this study will try to understand the role of fintech within a more complicated mediated architecture. This will support efforts to incorporate fintech into more sophisticated theoretical models in response to field requests.

Theoretical background

Theory of Financial Intermediary

According to Brigham and Gapenski's (1993) study, financial service intermediaries allow businesses to move securities and cash as well as develop new and extra financial goods and services. Similar to this, the model put forth by Banerjee and Newman (1993) asserts that because of unfavourable credit market conditions, poor people are unable to provide loans for starting firms. By providing people with access to a variety of business opportunities and educational opportunities, which ultimately leads to increased overall income, the model further contends that greater accessibility to financial services will reduce poverty and other inequalities (Allen & Santomero, 2001; Andrieş, 2009).

Bank Led Theory

This hypothetical idea states that authorized financial institutions use retail intermediaries to distribute their financial goods and services (Woodford & Walsh, 2005). Retail agents deal with customers on behalf of the financial institution while delivering certain services, according to CGAP (2006). The major bank serves as the ultimate provider of financial services, while the institutions themselves manage the accounts of the clients (Kaufman, 1994). Retail agents carry out a variety of tasks for the banks, such as face-to-face interactions with customers and cash management tasks, such as cash-in and cash-out operations, in a similar way to how a bank teller would typically carry out these tasks

while withdrawing and depositing cash (Porteous, 2006).

Fintech and Financial Stability

The scientific community has been forced to do research in the area of financial sustainability at the global, international, and national levels as a result of the effects of the financial and economic crises of the 20th and 21st centuries as well as the expansion of FinTech (Giglio, 2021; Y. Khan, Ahmad, & Malik, 2022). Financial institutions, central banks, analytical companies, and financial and economic professionals have all expressed interest in this subject (Pantielieieva et al., 2018). The relevant institutions are motivated to construct suitable processes and methods of analysis in order to swiftly pinpoint the causes of threats to financial stability and to design and create an effective response to them. To support the chosen course of action in order to achieve the primary goal, in other words, is one of the major tasks of such employment (Vives,

In order to assess the prospects for the conditions of the financial sector and its vulnerabilities, the analysis of the financial stability of the economy to date has focused on looking at various types of interrelationships, spotting flaws and negative shifts, as well as economic, regulatory, and institutional indicators (Bayram, Talay, & Feridun, 2022)

H1: *The impact of fintech has a significant effect on financial stability in developing, least-developed and low-income countries.*

Financial Inclusion as Mediator

Accordingly, the CGAP (2018) suggests that the use of financial technology through digitization of financial services such as payments, savings, insurance, and remittances over the mobile money platform can make significant progress towards financial inclusion. Indeed, mobile phones can offer strong openings for progress to the majority of financially excluded households due to their ownership, especially in developing

countries where over 21 per cent of adults have mobile money accounts (Demirgüç-Kunt, Klapper, Singer, & Ansar, 2022). (Y. Khan, 2022; Okello Candiya Bongomin, Yourougou, & Munene, 2020) argues that the use of digital financial services like mobile money can increase access to finance among poor individuals because it reduces the cost of financial intermediation for banks and Fintech providers.

Financial inclusion is one such element, which is expected to shrink the inequalities and bring stability, reduce the information asymmetry, promote saving, increase the supply of credit to firms, reduce the cost of credit disbursement and risk and generate competitive advantage of well-informed banking and watchful lending and pricing while reducing moral hazard and poor investment (Domeher, Konadu-Yiadom, & Aawaar, 2022); however, may pave the way for possible failure too. Inclusive finance in a competitive and risk-taking environment with easy terms and lower return entice substantial borrowing and investment in riskier and illiquid assets, which bring vulnerabilities (Hanif, Khan, Jamal, Gul, & Zeeshan, 2023; Malik, bin Md Isa, bin Jais, Rehman, & Khan, 2022).

Competition stimulates banks to explore new markets, which will contribute to increased inclusion that may either lead to financial stability by increasing efficiency or instability by information asymmetry (Vives, 2017). On the other hand, in a concentrated market, banks with greater market power may act prudently and conservatively, which also may lead to financial stability or instability either by careful financial inclusion or sluggish financial development (Mindra & Moya, 2017).

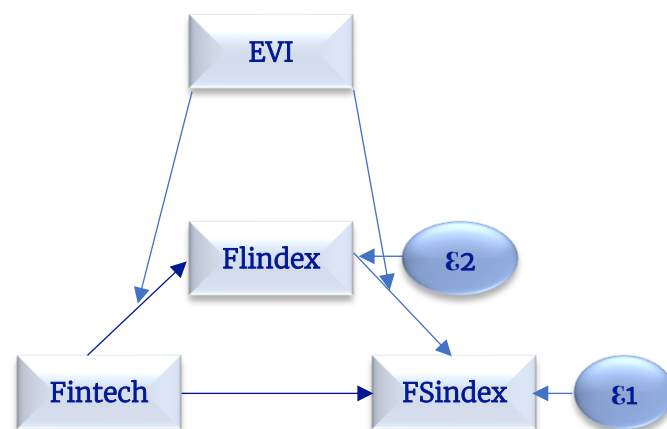
H2: *The financial inclusion effects significantly between economic vulnerability and financial stability.*

According to (Daud et al., 2022), financial system stability is a requirement for the national

financial system to operate effectively and efficiently, be able to endure internal and external vulnerabilities and be able to finance expansion through the distribution of funding sources. And stability in the economy at home International financial markets may increase a nation's economic vulnerability to outside financial shocks, but they may also decrease it by fostering financial development and assisting in better risk diversification (Gnangnon, 2022). Financial stability is greatly impacted by the vulnerability of economic policy, with financial systems acting as the primary determinants (Pantelieieva et al., 2018). Financial systems that are operating effectively help the movement of money from savers to investors and effectively distribute limited resources (Okello Candiya Bongomin & Ntayi, 2020).

H3: *Economic vulnerability has a significant effect on fintech and financial stability.*

Conceptual Framework



Source: Andrew Hayes (2015)

Model

To determine the impact of Fintech on financial stability moderated by EVI and mediated by financial inclusion, the following model has been developed and tested.

$$Flindex = iFI + a1 Fintech + a2EVI + a3Flindex * EVI + eFI \quad (1)$$

$$FSindex = iFS + c'Fintech + bFIindex + eFS \quad (2)$$

$$FSindex = iFS + c' Fintech + b1FIindex + b2 EVI + b3FIindex * EVI + eFS \quad (3)$$

FIindex is the Financial inclusion index, and FS is financial stability, EVI is economic Vulnerability.

Methodology

For the empirical analysis, data was collected from four main sources, namely: the Global Financial Inclusion Database (FIindex) and Financial Access Survey for the Fintech and Financial Inclusion Variables; Global Financial Development database for Financial Stability.

Independent Variable

Fintech: Fintech was measured by the use of mobile phones to pay bills in line with the work of (Asongu & Odhiambo, 2018) ;(Asongu & Nwachukwu, 2018), Asongu and Odhiambo (2019); (Demir, Pesqué-Cela, Altunbas, & Murinde, 2020)

Dependent Variable

Financial Stability: Financial stability, as evaluated by the financial stability index, is the dependent variable. Realizing that the financial system and the economy as a whole are intertwined, monitoring and measuring financial stability necessitates a thorough comprehension of the interaction between established and developing financial markets, as well as the wider effects of this interaction on the real economy (Brave & Butters, 2011). Financial stability indexes are one tool that has been created to assess this connection. To create FSI, researchers have had to adopt new approaches, particularly in advanced economies as well as developing economies (Daud et al., 2022; Kammoun, Loukil, & Loukil, 2020; Y. Khan, Ahmad, Awan, & e Ali, 2022; Mindra & Moya, 2017). In addition to non-performing loans, the ratio of bank capital to assets, and the ratio of liquid assets to deposits and other short-term funding, the Z-score for

overall bank riskiness is a frequently used indicator of financial stability as a dependent variable in the literature (Arner, Barberis, & Buckley, 2016; Jagtiani & John, 2018; Y. Khan, Saqib, & Ahmad, 2016).

Mediator Variable

Financial Inclusion: According to (Pantieliieva, Khutorna, Lytvynenko, & Potapenko, 2020), access, usage, and depth are three sub-indices that affect financial inclusion (availability). According to (Sarma, 2008), a system that maximizes all three of these sub-indices is considered to be financially inclusive. The Global Findex defines formal account users as those who have a bank account, use mobile banking services but do not have an account, or do not have a bank account because another family member already has one (Jagtiani & John, 2018). These individuals represent the physical point at which financial institutions provide their services. The infrastructure and human resources that customers of financial services have access to in order to conduct transactions are reflected in availability (Andrieş, 2009). It illustrates the breadth of financial inclusion's reach. Several factors are taken into account in this investigation. Bank deposits and domestic credit provided by banks to the private sector, both scaled by GDP, are these. It is consistent with the (Sha'ban, Girardone, & Sarkisyan, 2020) study in that it identifies use, access, and depth as the three sub-indices for financial inclusion.

Moderator Variable

Economic Vulnerability: The study has an economic vulnerability as a moderator. Hence, it was evaluated using a retrospective EVI is a weighted average of seven components, which are broken down into five sub-indices (size, specialization, location, trade shock, and natural shock), with two of these sub-indices measuring shock (natural and trade shocks) and three measuring exposure (size, specialization, location). The exposure index and the shock

index are simply arithmetically averaged to produce the EVI (C. P. Nguyen & Su, 2021).

Statistical Analysis

A Structural Equation Model (SEM) is a statistical framework for testing and estimating causal relationships among variables. SEMs are used to represent and test complex theoretical models,

and they combine aspects of both regression analysis and factor analysis (Bollen, 1989). Indexes can be made with the goal of simply expressing numerous dimensions for interpretation. In general, indexes can be used as a tool to reduce the raw size of enormous amounts of data while keeping critical information (Ott, 1978).

Results

Table 1

Descriptive Statistics and Correlation

Variables	N	Mean	Media	Std Dev
FI1	1510	689.370	639.330	537.190
FI2	1510	285.600	197.350	414.300
FI3	1510	34.708	29.570	32.670
FI4	1510	14.417	11.442	12.710
FI5	1510	44.990	40.225	29.810
FI6	1510	40.655	34.056	30.550
FS1	1510	11.269	11.032	4.226
FS2	1510	9.411	7.959	8.100
FS3	1510	17.784	16.609	10.750
FS4	1510	41.074	31.603	49.277
Fintech	1510	2.685	2.492	6.405
EVI	1510	34.268	32.990	9.702
FIInd	1510	0.231	0.185	1.850
FSInd	1510	0.328	0.203	1.345

Note: Descriptive statistics are included in the table. For the entire sample of 150 nations from 2011 to 2020, it provides summary statistics for the variables utilized in the analysis. FI is financial inclusion, and it is broken down into six indicators FI1 stands for the number of bank accounts. FI2 stands for a number of Loan accounts. FI3 stands for ATM/100000 adults. FI4 stands for branches/100000 adults. FI5 stands for Bank deposit (% GDP). FI6 stands for domestic credit to the private sector(%GDP), FS is financial stability, and it is broken down into four indicators FS1 stands for bank capital to total assets. FS2 stands for bank nonperforming loans to gross loans. FS3 stands for bank Z-score. FS4

stands for liquid assets to deposits and short-term funding. EVI is the economic vulnerability index, FIindex is the financial inclusion index, and FSIndex is the financial stability index.

Presents the descriptive statistics, which measures the central tendency and dispersion of each variable in the study. The table presents the values of six financial inclusion indicators, four values of financial stability indicators, Fintech, FIIndex, FSIndex and EVI for 150 countries for the years 2011 to 2020. Looking at financial inclusion indicators, the mean value of FI1 (number of bank accounts) (689.370 per 1,000 adults) is substantially higher than that of F2

(loan accounts 285.600 per 1000 adults). The mean of FI3 (number of ATMs) and FI4 (branches) across sample countries is approximately 34 and 14 per 100,000 adults, respectively. This exhibits that the usage indicator for financial inclusion provides more information than the access dimension. This can be explained by the necessity of the banking penetration sector, which is regarded to be the key driver of inclusive finance, for easy access to financial services and products. The data shows high variation in financial inclusion across the sampled countries, most noticeably in bank accounts and loan accounts. Regarding the statistical significance of the outreach dimension in constructing the composite financial inclusion index, increasing the number of banking branches and service outlets will make it simpler for people to get financial services. In terms of depth, domestic credit to the private sector accounts for around 40% of FI5 (bank deposits, which equal about 44% of GDP). The findings support the claim made by (Yue, Korkmaz, Yin, & Zhou, 2022) that particular areas in the sampled nations had the highest levels of financial inclusion. This is due to the fact that they are more developed than other regions in terms of business and industrial activity, and they have relatively better access to financing and government funding. These findings agree with the study by (I. Khan, Khan, Sayal, & Khan, 2022). These less developed countries will be able to

establish inclusive finance in the future thanks to Fintech, which appears to widen the distribution channels for basic financial services.

Considering Financial stability indicators, the mean FS1 (bank capital to total assets) is 11.200, noticeably higher than FS2 (bank non-performing loans), which is 9.411. Among the study countries, the mean values for FS3 (bank Z score) and FS4 (liquid assets to deposit and short-term funding) are about 17 and 41%, respectively. Overall, it can be said that the financial system is incredibly stable and quickly recovers from negative shocks and economic difficulties. The financial stability index's four sub-indices are reliable and resilient to shocks. It is compatible with (Malik et al., 2022)

The correlation matrix and variance inflation matrix are presented in Table 1. (VIF). The correlation is diagonal (perfect) across all of the variables in Table. The correlation matrices of the variables employed in our empirical models are displayed. Correlations with various indications suggest a range of movement directions. The average rule-of-thumb value of 0.8 proposed by Midi et al. (2010) is significantly below the correlation coefficients in all matrices. A variance inflation factor (VIF) analysis was also performed to further rule out multicollinearity. This suggests that multicollinearity has a low probability.

Table 2

Pca For Financial Inclusion

Component	Eigenvalue	Difference	Proportion	Cumulative
FI1	3.424	2.479	0.570	0.570
FI2	0.945	0.180	0.157	0.728
FI3	0.764	0.382	0.127	0.855
FI4	0.382	0.070	0.063	0.919
FI5	0.312	0.141	0.052	0.971
FI6	0.171	.	0.028	1.000

Note: This table presents principal components analysis or factor analysis of the financial inclusion. As FI1 stands for the number of bank accounts.FI2 stands for the number of Loan

accounts.FI3 stands for ATM/100000 adults.FI4 stands for branches/100000 adults.FI5 stands for Bank deposit to % GDP.FI6 stands for domestic credit to the private sector.

KMO and Barlett's Test for Financial Inclusion

KMO and Bartlett's Test

Kaiser –Meyer–Olkin measure of sample Adequacy=0.737

Bartlet's test of Sphericity:

Chi-Square=4496.185

DF =15

P-Value = 0.000

Author's Calculation

Table 3

Principal Component Analysis for Financial Stability

Component	Eigenvalue	Difference	Proportion	Cumulative
FS1	1.809	0.750	0.452	0.457
FS2	1.059	0.245	0.264	0.717
FS3	0.813	0.497	0.203	0.920
FS4	0.316	0.321	0.079	1.000

Note: Table 3 presents the principal components analysis or factor analysis of the financial stability. FS1 stands for bank capital to total assets.FS2 stands for bank nonperforming loans

to gross loans.FS3 stands for bank Z-score.FS4 stands for liquid assets to deposits and short-term funding.

KMO and Bartlet Test of Sphericity

KMO and Bartlett's Test of Sphericity

Kaiser –Meyer–Olkin measure of sample Adequacy=0.789

Bartlet's test of Sphericity:

Chi-Square=1,061.377

DF= 6

P-Value= 0.000

Author's Calculation

The Principle component analysis (PCA), using the relevant variables such as FI1, stands for the number of bank accounts.FI2 stands for the number of Loan accounts.FI3 stands for ATM/100000 adults.FI4 stands for branches/100000 adults.FI5 stands for Bank deposit to % GDP.FI6 stands for domestic credit

to the private sector for financial inclusion. FS1 stands for bank capital to total assets.FS2 stands for bank nonperforming loans to gross loans.FS3 stands for bank Z-score.FS4 stands for liquid assets to deposits and short-term funding for financial stability, as the number of observations is 1510 for the years 2011–2020. The choice of a

PCA is advantageous for the creation of the index because this methodology creates a cumulative relationship between the variables (Naik, 2017), which establishes the representative index of the financial inclusion index. Factor analysis is a data reduction technique that is used to explore relationships among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. The results of the factor analysis to construct a financial inclusion index and financial stability are described in the table. As the Eigenvalue of only one component or factor is more than 1, hence only that one component FI1 or factors is retained. FS1 and FS2 are 1.809 and 1.059.

The Kaiser-Meyer-Olkin (KMO) measure of sample adequacy is used to assess the applicability of factor analysis prior to conducting the study. A KMO score larger than 0.5 is regarded as plausible to do factor analysis because the KMO test demonstrates the strength of the partial correlation among variables. Bartlett's test of sphericity was performed to examine the correlation of the indicators (Bartlett, 1937). Factor analysis is appropriate. If the correlation matrix of the variables considerably deviates from the identity matrix and the p-value from Bartlett's test of sphericity is less than the selected significance threshold, then dimensionality reduction is possible (Kumar, 2013). The Kaiser-Meyer-Olkin test is significant for both Bartlett's test of sphericity, which tolerates factor and is greater than 0.6. (Tarek Bel Hadj & Adel Ghodbane.,2021)

When calculated eigenvalues were more than 1, the value of the eigenvalue was chosen by first

establishing the preliminary eigenvalues and linking them to the appropriate components and then computing the financial inclusion. When the eigenvalue was more than 1, the eigenvalue was taken into consideration. Only the principal components with a cutoff value lower than one were kept, and the components clarified the precise percentage of the total difference that was confined across all variables. The limited evidence of the other components is, therefore, just marginally significant because it is not reflected. The PCA was then calculated using these concepts as the bulks. The original eigenvalues for each relevant component were used to construct the financial inclusion index, which was created using Cicchiello et al. work.'s from 2021.

1st and 2nd Stage of Moderated Mediation

This research was conducted in two stages. Along the first phase, it was attempted to validate (or not) whether there were any direct effects of Fintech on financial stability in emerging, least-developed, and low-income countries based on low, high, low, middle, and upper-middle-income levels. In this first step, the potential moderating influence of EVI as well as the impact of Fintech on financial inclusion and, consequently, financial stability, have been examined. So, this phase enabled the testing of the already developed models 1 and 2. The second step involved analyzing how EVI acts as a moderator between financial inclusion and financial stability. In other words, the Eq. (3)-derived second-stage model has been validated.

Table 5

Stage I				
	FIIndex	FSIndex	Index Of Moderated Mediation	FSIndex
				Stage II
				(0.030)(-
		0.058***	(-0.208)	0.000,-
FIIndex			(-0.004,-0.000)	0.000)
		(0.035)		(0.067)
Fintech	0.014	-0.064		-0.065***

	(0.018)	(0.006)	(0.003)
EVI	-0.015**		0.007
	(0.007)		(0.005)
Fintech*EVI			
FIIndex*EVI	0.002		-0.050
	(0.004)		(0.195)
Constant	0.519**	0.172***	-0.251
	(0.242)	(0.017)	(0.103)
No of Observations	1510	1510	1510
R-Squared	0.085	0.368	0.387
F-value/Wald(Chi2)(p-value)	1.850(0.140)	48.420(0.000)	7.830(0.000)
Chow test(p-value)	34.770(0.000)	12.180(0.000)	11.730(0.000)
Breush-Pagan test(p-value)	3959.140(0.000)	1240.460(0.000)	1119.800(0.000)
Hausman Test(p-value)	11.270(0.014)	930.530(0.000)	635.390(0.000)
Wald test of Heteroscedasticity(p-value)	430000(0.000)	19919.850(0.000)	18847.000(0.000)

Note: The standard errors are in parenthesis, and the significance levels at 1%, 5%, and 10% are indicated by the symbols ***, **, *. Hausman, Breusch, Pagan, and Wald's tests of heteroscedasticity p-values are indicated in parenthesis.

The above table present moderated mediation of the variables present in the study. In stage 1, Fintech shows a positive insignificant relationship with FIIndex with a variation of 0.014. At the same time, EVI shows a negatively significant effect with mediator FIIndex with a variation of -0.015, which means that 1 unit negative change brings -0.015 unit decrease change in FIIndex. However, the FIIndex*EVI value is 0.002 has positive insignificant effects on FIIndex. The determination coefficients of R-squared are 0.085 in the case of FIIndex, which indicates variation. The results of the Chow and Breusch-Pagan tests indicated that the homoscedasticity null hypothesis was not valid. The findings demonstrated the existence of Heteroscedasticity by demonstrating that the variance of the residuals is influenced by the values of the independent variables. The Hausman test has been used to ascertain the

nature of the individual effects. The findings of the Hausman test of specification showed a significance level for fixed effects with a p-value less than 0.05. Following in the table FIIndex (0.058) is highly positively significant with FSindex, whereas Fintech (-0.064) is negatively significant. The intercept is positive and significant at 0.172.

Stage 2 shows that FIIndex (-0.008) and interacting path FIIndex*EVI (-0.005) have negative and insignificant relation with FSindex whereas, Fintech (-0.065) *** has negative but significant relation. EVI (0.007) has a positive but insignificant relationship with FSindex as Chow Test and Bresch Pagan Test show a significant level for acceptance of an alternate hypothesis. Hausman Test has been applied for the individual effect. A p-value of less than 0.005 was used to show the significance level for fixed effects in the results based on the Hausman 635.390(0.000) test of specification.

The results of estimates of Eq. (5) . (6), (7) and (8) of the first stage and second stage show the presence of moderated mediation in the table with a confidence level of -0.208 and lower limit

of -0.004 and upper limit of -0.000 in the first stage whereas, in the second stage, the confidence level is 0.03 and lower limit -0.000 and upper limit -0.000 .

Findings

The findings show that, in order to increase access and limit fintech use, it is necessary to increase people's general ability to use fintech (van Dijk, 2005). According to the findings, if people are unable to improve their cognitive or skills access [one of the kinds of Access (Yu et al., 2018)], the goal of financial inclusion can be derailed, and the use of FinTech can be hindered. Therefore, it is evident that a lack of fundamental digital literacy, which is linked to a lack of understanding of cognitive access, makes it difficult to achieve financial inclusion through the use of FinTech.

Another example of this is the growing perception that knowledge of and competence with the use of cutting-edge technology are necessary conditions for engaging in digital activities. The findings also demonstrate that lack of motivation is a different type of access that pertains to people's readiness to obtain, adopt, use, and learn. FinTech undermines financial inclusion and deepens the digital gap as a result of barriers to sophisticated motivational access (Yu et al., 2018; Solomon Odei-Appiah, Gamel Wiredu, and Joseph Kwame Adjei, 2022).

Table 1 provides descriptive statistics for 150 worldwide countries from 2011 to 2020 (full sample). The summary statistics for all the variables used in the primary regressions are shown in Table 1. We rely on publicly accessible data from each of the World Bank's Global Financial Development Database (GFD), World Development Indicators, and Findex inclusion data in addition to the Findex inclusion data (WDI) comparing the sample countries' FI1 (number of bank accounts), FI3 (number of ATMs), and FI4 (branches) financial inclusion indicators. FI5 (bank deposits of GDP, domestic

credit to the private sector) is measured in terms of volume.

In addition to nonperforming loans, liquid assets to deposits, and other short-term financing, the Z-score for total bank riskiness serves as a popular metric for the dependent variable of financial stability utilised in the literature (e.g., Berger, Klapper, & Turk-Ariss, 2009; Sahay et al., 2015). It is crucial to note that the banking system was used as a proxy for the financial system because banks are most likely to offer formal external financing for businesses and households, particularly in emerging markets (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011; see also Owen & Pereira, 2018 for a focus on borrowing and saving from commercial banks).

These results are consistent with those of A. DEMIR et al. found that countries with fewer or lower values are less likely to use Fintech to pay their bills (2020). Market inefficiencies and information asymmetry may jeopardise the best use of capital resources, and some enterprises and individuals may be excluded from the formal financial system, which would be adverse to equitable economic development. It is not surprising that there are issues with how finance and development interact on a global scale, particularly in areas where persistent economic inequality and financial exclusion exist. For instance, the UN 2030 Framework for Sustainable Development acknowledges that financial inclusion is essential to attaining decreasing inequality and the SDGs (SDG 10). El-Zoghbi, Klapper, and Hess (2016). 760,000 of the 1.7 billion adults who do have access to formal financial services around the world do not use them, according to the Global Findex database. This is true even if financial inclusion has made significant progress in recent years. According to Demirgüç-Kunt et al. (2018), common grounds for not having or using a financial institution account include high expenses, distance, and documentation requirements.

Conclusion

While the financial world is rapidly changing, traditional banks are attempting to continue their well-established course and find a unique approach to retain their customers. New technologies are modernizing the banking industry, which also increases efficiency and competition among financial operators. The financial technology revolution is not a fantasy. It is a feature of the new world order that is increasingly important. If companies wish to thrive in this new, interconnected world, they must adapt to the requirements of modern technology. The financial services industry focuses on innovations that have a significant social impact.

Understanding the FinTech industry's explosive growth is crucial for learning pertinent information about a world with a sustainable financial system. The outdated traditional banking industry is unable to meet the increasing demands of affluent customers globally. Despite its innovative language, fintech may offer efficient and effective solutions even for average people leading typical lives. The development of FinTech services depends on the most effective methods to guarantee high levels of customer satisfaction. The true meaning of the wind of change is the potential for significant financial sector breakthroughs based on the cutting-edge strategies, practices, and tools made available by FinTech services.

A digitally enabled financial innovation known as fintech creates new business models, applications, procedures, and financial products. They might, by default, have a significant effect on international financial institutions, markets, and service provision. Banks have a crucial role in the economy by acting as financial intermediaries. A number of abnormalities in the growth of banking activity have become apparent over time. The financial industry that uses cutting-edge technology to improve financial operations is known as fintech.

A dizzying number of opportunities are presented by the emergence of these cutting-edge financial technologies, which are replacing traditional financial-banking products and services. Modern technology is provided by FinTech organizations, companies, and firms to aid the financial sector's rapid expansion. In other words, as technology develops, users' requirements and conduct in financial banking change. In addition to mobility, ease of use, convenience, and transparency, these consumers also demand real-time services that are accessible 24 hours a day, seven days a week. They also need safety, security, and lower prices.

References

- Andries, A. M. (2009). Theories regarding financial intermediation and financial intermediaries – a survey. *USV Annals of Economics and Public Administration*, 9(2), 254–261. <http://annals.seap.usv.ro/index.php/annals/article/viewArticle/229>
- Arner, D. W., Zetzsche, D. A., Buckley, R. P., & Barberis, J. N. (2017). Fintech and Regtech: Enabling innovation while preserving financial stability. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3211708>
- Asongu, S. A., & Nwachukwu, J. C. (2018). Educational quality thresholds in the diffusion of knowledge with mobile phones for inclusive human development in sub-Saharan Africa. *Technological Forecasting and Social Change*, 129, 164–172. <https://doi.org/10.1016/j.techfore.2018.01.004>
- Asongu, S. A., & Odhiambo, N. M. (2018). Human development thresholds for inclusive mobile banking in developing countries. *African Journal of Science, Technology, Innovation and Development*, 10(6), 735–744. <https://doi.org/10.1080/20421338.2018.1509526>
- Bayram, O., Talay, I., & Feridun, M. (2022). Can Fintech promote sustainable finance? Policy lessons from the case of

- Turkey. *Sustainability*, 14(19), 12414. <https://doi.org/10.3390/su141912414>
- Bollen, K. A. (1989). *Structural equations with latent variables* (Vol. 210): John Wiley & Sons.
- Braggion, F., Manconi, A., & Zhu, H. (2017). Is FinTech a Threat to Financial Stability? Evidence from Peer-to-Peer Lending in China. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.2957411>
- Brave, S. A., & Butters, R. A. (2011). Monitoring financial stability: A financial conditions index approach. *Economic Perspectives*, 35(1), 22. <https://ssrn.com/abstract=1758783>
- Daud, S. N., Ahmad, A. H., Khalid, A., & Azman-Saini, W. (2022). FinTech and financial stability: Threat or opportunity? *Finance Research Letters*, 47, 102667. <https://doi.org/10.1016/j.frl.2021.102667>
- Demir, A., Pesqué-Cela, V., Altunbas, Y., & Murinde, V. (2020). Fintech, financial inclusion and income inequality: A quantile regression approach. *The European Journal of Finance*, 28(1), 86–107. <https://doi.org/10.1080/1351847x.2020.1772335>
- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). The global Findex database 2021. <https://doi.org/10.1596/978-1-4648-1897-4>
- Domeher, D., Konadu-Yiadom, E., & Aawaar, G. (2022). Financial innovations and economic growth: Does financial inclusion play a mediating role? *Cogent Business & Management*, 9(1). <https://doi.org/10.1080/23311975.2022.2049670>
- Giglio, F. (2021). Fintech: A literature review. *EUROPEAN RESEARCH STUDIES JOURNAL*, XXIV(Issue 2B), 600–627. <https://doi.org/10.35808/ersj/2254>
- Gnangnon, S. K. (2022). Effect of structural economic vulnerability on the participation in international trade. *Journal of Risk and Financial Management*, 15(9), 417. <https://doi.org/10.3390/jrfm15090417>
- Hanif, M., Khan, Y., Jamal, S., Gul, S., & Zeeshan, M. (2023). Role of corporate governance in industries facing difference levels of competition: Empirical evidence from Pakistan. *Winter 2023*, 3(1), 639–658. <https://doi.org/10.54183/jssr.v3i1.188>
- Jagtiani, J., & John, K. (2018). Fintech: The impact on consumers and regulatory responses. *Journal of Economics and Business*, 100, 1–6. <https://doi.org/10.1016/j.jeconbus.2018.11.002>
- Kammoun, S., Loukil, S., & Loukil, Y. B. (2020). The impact of FinTech on economic performance and financial stability in MENA zone. *Advances in Finance, Accounting, and Economics*, 253–277. <https://doi.org/10.4018/978-1-7998-0039-2.ch013>
- Khan, Y. (2022). The sophisticated role of accounting information system (AIS) on the performance of Small and medium-sized enterprises (SMEs): Evidence from an emerging economy. *Competitive Social Science Research Journal*, 3(2), 199–214. <https://cssrjournal.com/index.php/cssrjournal/article/view/273>
- Khan, Y., Ahmad, W., & Malik, F. (2022). THE INFLUENCE OF CORPORATE GOVERNANCE ON ACCOUNTING CONSERVATISM IN TOP NON-FINANCIAL FIRMS OF PSX: THE MODERATING ROLE OF AUDIT QUALITY. *Competitive Social Science Research Journal*, 3(1), 321–340.
- Khan, Y., Ahmad, W., Awan, S. H., & e Ali, M. S. (2022). Assessing the relevance of framing messages on backing intentions in crowdfunding social cause-related marketing campaign. *Journal of Social Sciences Review*, 2(4), 55–65. <https://doi.org/10.54183/jssr.v2i3.61>
- Khan, I., Khan, I., Sayal, A. U., & Khan, M. Z. (2021). Does financial inclusion induce poverty, income inequality, and financial stability: Empirical evidence from the 54 African countries? *Journal of Economic*

- Studies, 49(2), 303-314. <https://doi.org/10.1108/jes-07-2020-0317>
- Malik, A. H., Md Isa, A. H., Jais, M. B., Ur Rehman, A., & Ali Khan, M. (2022). Financial stability of Asian nations: Governance quality and financial inclusion. *Borsa Istanbul Review*, 22(2), 377-387. <https://doi.org/10.1016/j.bir.2021.05.005>
- Mindra, R., & Moya, M. (2017). Financial self-efficacy: A mediator in advancing financial inclusion. *Equality, Diversity and Inclusion: An International Journal*, 36(2), 128-149. <https://doi.org/10.1108/edi-05-2016-0040>
- Nguyen, Q. K. (2022). The effect of FinTech development on financial stability in an emerging market: The role of market discipline. *Research in Globalization*, 5, 100105. <https://doi.org/10.1016/j.resglo.2022.100105>
- Nguyen, C. P., & Su, T. D. (2021). Easing economic vulnerability: Multidimensional evidence of financial development. *The Quarterly Review of Economics and Finance*, 81, 237-252. <https://doi.org/10.1016/j.qref.2021.06.007>
- Okello Candiya Bongomin, G., & Ntayi, J. (2019). Trust: Mediator between mobile money adoption and usage and financial inclusion. *Social Responsibility Journal*, 16(8), 1215-1237. <https://doi.org/10.1108/srj-01-2019-0011>
- Okello Candiya Bongomin, G., Yourougou, P., & Munene, J. C. (2019). Digital financial innovations in the twenty-first century. *Journal of Economic and Administrative Sciences*, 36(3), 185-203. <https://doi.org/10.1108/jeas-01-2019-0007>
- Pantieliieva, N., Khutorna, M., Lytvynenko, O., & Potapenko, L. (2020). FinTech, RegTech and traditional financial intermediation: Trends and threats for financial stability. *Data-Centric Business and Applications*, 1-21. https://doi.org/10.1007/978-3-030-35649-1_1
- Pantieliieva, N., Krynytsia, S., Khutorna, M., & Potapenko, L. (2018). FinTech, transformation of financial intermediation and financial stability. 2018 *International Scientific-Practical Conference Problems of Infocommunications. Science and Technology (PIC S&T)*. <https://doi.org/10.1109/infocommst.2018.8632068>
- Sha'ban, M., Girardone, C., & Sarkisyan, A. (2019). Cross-country variation in financial inclusion: A global perspective. *The European Journal of Finance*, 26(4-5), 319-340. <https://doi.org/10.1080/1351847x.2019.1686709>
- Yousaf Khan, D., Ahmad, W., & Malik, F. (2021). Does Audit Quality Moderate the Nexus Between Corporate Governance and Accounting Earnings Quality in Emerging Economies? *Indian Journal of Economics and Business*, 20(4), 1779.
- Yue, P., Korkmaz, A. G., Yin, Z., & Zhou, H. (2022). The rise of digital finance: Financial inclusion or debt trap? *Finance Research Letters*, 47, 102604. <https://doi.org/10.1016/j.frl.2021.102604>