



Digital transactions and financial development: The moderating role of global integration across income levels

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ABSTRACT

This study examines the interaction between digital financial transactions (DFT) and financial development (FD) across 121 countries over the period 2003–2022, focusing upon the moderating role of global financial integration (GFI). Using two-step system generalised method of moments (GMM), Bootstrap Quantile-on-Quantile Regression, Nonlinear multilevel Mixed-Effects and D-K Fixed Effects models, this study explores the variations in this relationship across high-, upper-middle-, and low-income countries. The findings indicate that DFT and economic development positively influence FD, while bank risk demonstrates a negative influence. Governance quality positively influences FD, and while GFI also positively influences FD, it weakens the positive impact of DFT on FD globally. Interestingly, GFI strengthens the DFT-FD relationship in middle- and low-income economies, suggesting region-specific dynamics and the potential of GFI to counter structural barriers in these economies. This distinct interaction emphasises the need for customised policies that promote both digital financial inclusion and global financial integration that are aligned with country-specific economic contexts. Our study provides actionable insights for policymakers to foster sustainable financial development through customised digital and financial integration strategies.

1. Introduction

In today's technological era, digital financial transactions (DFT) and global financial integration (GFI) play a critical role in shaping the landscape of financial development (FD). The COVID-19 pandemic accelerated this transformation, presenting new opportunities and challenges. The [International Monetary Fund \(2021\)](#) noted that the rise in digitalization during COVID-19 has significant long-term implications for financial inclusion and stability. Understanding how FD is influenced by this digitalization is crucial. Our research explores the impact of digital transactions on FD and the moderating role of GFI. Existing literature highlights the importance of digital finance in promoting FD ([Kajol et al., 2022](#)). Studies show that the effect of DFT on economic growth can be moderated by monetary policy ([Jiang et al., 2022](#)). [Alshubiri et al. \(2019\)](#) found that information and communication technology, particularly

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mobile financial services, boosts financial development in the Gulf Cooperation Council (GCC) countries. [Feng et al. \(2023\)](#) reported that digital finance improves asset allocation and financialization of SMEs in China, while [Gao \(2023\)](#) noted that it enhances long-term firm transparency. Additionally, [Cengiz and Manga \(2023\)](#) showed that financial inclusion positively affects FD.

However, despite the extensive evidence, [Iheanacho et al. \(2023\)](#) found that the relationships among financial integration, capital market development, economic performance, and institutional quality remain unclear. Given the existing literature and previous discussions, the moderating role of GFI on the nexus between DFT and FD is still relatively unexplored. Therefore, it is crucial to investigate this moderating effect over time. As the financial services landscape evolves, understanding how digital transactions impact financial development and how global financial integration moderates this relationship is highly significant. This study aims to address this gap.

Our research offers a comprehensive analysis of the impact of digital financial transactions (DFT) on financial development (FD) across 121 countries from 2003 to 2022, categorized by income levels. Utilising advanced analytical techniques such as correlation, cointegration, and the system GMM method, this study delves into the intricate interactions between digital transactions, financial development, and global financial integration (GFI). Our research is motivated by the need to understand how digitalization, accelerated by the COVID-19 pandemic, reshapes financial landscapes and contributes to sustainable development. This investigation is significant as it addresses the moderating role of GFI on the relationship between DFT and FD, which remains underexplored. Specifically, our research address two important questions. The first question is how does DFT influence FD in high income as well in the middle and low income economies respectively? The second question is how does GFI moderate the relationship between DFT and FD in high income as well in the middle and low income economies respectively?

Our study's contributions are manifold. We provide empirical evidence on the positive impact of DFT on FD as well as providing highlights on the different effects of GFI across different income classifications. Our research also provides policy insights for enlarging financial development through digitalization and global integration. Specifically, the research examines low and high-income countries separately to provide specific insights into how income levels influence these dynamics.

The paper is organised as follows: Section 2 presents a literature review and hypothesis development. Section 3 details the research model, measurements, and data analysis techniques. Section 4 discusses the research results and descriptive statistics. Section 5 concludes with policy implications, emphasising the importance of digital and global financial integration for sustainable financial development.

2. Literature review

The realm of digital finance encompasses online banking, mobile payment platforms, cryptocurrency, blockchain technology, and other financial innovations ([European Commission, 2022](#)). Digital finance aims to enhance efficiency and accessibility for individual and corporate customers ([Ozili, 2023](#)). Digital financial transactions (DFTs) are pivotal in promoting financial inclusion, especially for underserved populations. They enable cheap, efficient, and secure transactions, particularly for low-monetary value transactions that are impractical for traditional banking systems ([Lee et al., 2023](#); [Sapovadia, 2018](#)).

Despite the benefits, DFTs introduce new risks such as cybersecurity threats and scams ([Ozili, 2018](#)). The evolving nature of digital finance warrants ongoing research to understand its societal and economic impacts ([Kajol et al., 2022](#)). DFTs can stimulate economic growth by promoting financial inclusion, enhancing access to capital markets, increasing market efficiency, and improving information transmission ([World Bank, 2016](#)). This contributes to the positive relationship between DFTs and financial sector development as well as to the overall economic growth ([Ozili, 2018](#)).

On the other hand, financial development (FD) is the expansion of the financial system in a country or region, significantly influencing economic growth, stability, and prosperity ([World Bank, 2016](#)). Proper financial systems stimulate growth through efficient resource allocation, savings enhancement, and investment encouragement ([Levine, 1997](#)). Studies show a bidirectional relationship between FD and economic growth, particularly in middle-income countries ([Abbas et al., 2022](#); [Nguyen et al., 2022](#)). FD also reduces information asymmetry between borrowers and lenders, increases transparency, and enhances credit reporting systems, thereby fostering trust in financial transactions ([Asongu et al., 2016](#)). Moreover, FD improves access to capital, boosts business activities, encourages entrepreneurship, fosters innovation, and reduces poverty ([Dutta & Meierrieks, 2021](#)). However, rapid FD without stringent regulations can lead to financial crises ([Ozili, 2018](#)).

Similarly, global financial integration (GFI) refers to the interconnectivity between national financial systems globally, marked by cross-border capital movement and financial market integration ([Lane & Milesi-Ferretti, 2017](#)). GFI impacts FD, with the effects varying depending on the type of financial inflows ([Taghizadeh-Hesary et al., 2019](#)). GFI can enhance FD by leveraging wider markets, accessing international capital, and benefiting from cross-border collaborations ([Kose et al., 2003](#)). However, the effectiveness of DFT in generating FD depends on broader economic and institutional contexts, such as trade openness, national income levels, and governance quality ([Taghizadeh-Hesary et al., 2019](#)). The inclusion of Global Financial Integration (GFI) in this study is justified by its multifaceted impact on capital flows, financial innovation, economic resilience, and financial inclusion. As financial systems become increasingly linked via technology and cross-border transactions, GFI provides a critical perspective to understand the relationship between DFI and FD. This makes it a very useful variable to analyse how countries can utilise digital finance and global integration to achieve sustainable financial development.

Having understood the definition of the key variables as well as the key issues and findings related to them, based upon the research by [Li et al. \(2024\)](#), it can be argued that the country's income level significantly influence the relationship between DFT and FD in that country. High income countries possess the advantage of having state-of-the-art information and communication technology (ICT) infrastructure, better quality and robust regulations as well as possessing higher fintech innovations. All these provide conditions for

an expected positive relationship between DFT and FD. On the other hand, middle and low income countries experience constraints and challenges with respect to ICT infrastructure, legal capacity as well as insufficient fintech innovations, which restricts the effectiveness of DFTs. Hence, under such conditions, the relationship between DFT and FD is expected to be negative. Similarly, based upon the same study, it can be argued that the country's income level also determines how GFI moderates the relationship between DFT and FD. High income nations are in a better position to take advantage of GFI as a result of their state-of-the-art ICT infrastructure, better quality regulations and higher fintech innovations. Therefore, in these countries, it is expected that GFI positively moderates the relationship between DFT and FD. Conversely, middle and low income countries encounter significant barriers towards their ICT infrastructure, possess poorer quality regulations as well as lower fintech innovations. In these countries, it is expected that GFI negatively moderates the relationship between DFT and FD.

2.1. Hypotheses development

2.1.1. The effect of digital financial transactions on financial development and the moderating role of global financial integration

Digital finance, covering electronic financial services and products, enhances financial inclusion, promotes access and efficiency, and stimulates economic growth (Al-Smadi, 2023; Jiang et al., 2022; Ozili, 2018). It also supports financial development by creating job opportunities and boosting the economy (Khera et al., 2021). Additionally, Aduba et al. (2023) provides indirect evidence that DFTs supported by financial technology (FinTech) possess a significant positive relationship with financial development and this positive effect is stronger in countries with weak financial systems and low financial inclusion. Based upon their study, it can also be argued that DFTs are able to democratize access to financial services. However, without sufficient necessary safeguards, new risks such as cyber risks and the risk of credit default can arise which can reduce the credibility of DFT in generating FD as well as becoming detrimental to their own real economies (Aduba et al., 2023). Similarly, based upon the study by Li et al. (2024), it can be argued that the relationship between DFT and FD is a function of the level of income of the country. High income countries possess more sophisticated ICT infrastructure. Hence, DFT becomes more efficient in these countries which leads to higher FD through the enlargement of their financial services' access, higher financial inclusion as well as reduced transaction costs. Conversely, in middle- and low-income countries, ICT infrastructure is lacking which inhibits the effectiveness of DFTs. In these countries, poor ICT infrastructure and lower internet usage as well as weaker mobile access restricts the ability of financial institutions to enlarge their DFT services, hence, slowing FD. Hence, in high income economies, DFT drives FD and therefore, it is expected that there is a positive relationship between DFT and FD. However, in middle- and low-income nations, it is expected that there is a negative relationship between DFT and FD. In these countries, poorer ICT infrastructure and lowers internet adoption as well as weaker mobile usage restrict the capabilities of financial institutions (FIs) to enlarge their services which potentially leads to lower FD. This suggests that there is a need for more investments in ICT infrastructure in these middle and lower income countries in order to strengthen their DFT-FD nexus. Based upon all these discussions, we conclude that higher DFT is expected to increase FD in high income economies and lower FD in the middle and low income economies. Hence, the following hypothesis is developed.

H1. There is a positive relationship between digital financial transactions and financial development in high income economies

H2. There is a negative relationship between digital financial transactions and financial development in the middle- and low-income economies

GFI, involving a country's openness to international capital flows, enhances the effects of DFT on FD by leveraging wider markets, accessing international capital, as well as benefiting from cross-border collaborations (Kose et al., 2003; Taghizadeh-Hesary et al., 2019). Furthermore, based upon the study by Li et al. (2024), it can be argued that high income countries usually possess strong ICT platforms which provides support for smoother DFTs as well as integration with global financial networks. High speed internet, effective mobile services and effective digital platforms in these countries allow them to engage in cross-border financial transactions more efficiently, thus enabling them to better capitalize on the benefits of GFI. Conversely, middle- and low-income countries experience infrastructure challenges which restrict effective DFTs and digital connections across borders. These countries also experience restricted broadband access and weak mobile networks which hinders their DFTs' flow of capital to foreign countries and vice versa as well as mitigating the moderating effects of GFI. Basically, high-income nations can capitalize on global financial networks to increase the effectiveness of the effects of their DFTs on their FD. On the contrary, middle- and low-income nations need to improve their ICT infrastructure in order to capitalize on the benefits of GFI. Based upon all these discussions, we conclude that GFI is expected to have a positive moderating effect on the relationship between DFT and FD in high income economies and a negative moderating effect on the relationship between DFT and FD in the middle- and low-income economies. Hence, the following hypothesis is developed.

H3. Global financial integration has a significant positive moderating effect on the relationship between digital financial transactions and financial development in high income economies.

H4. Global financial integration has a significant negative moderating effect on the relationship between digital financial transactions and financial development in the middle- and low-income economies.

3. Research methodology

This study examines the effect of digital financial transactions (DFT) on financial development (FD), considering the moderating role of global financial integration (GFI) across 121 countries from 2003 to 2022. A detailed list of countries is provided in [Appendix A](#).

DFT serves as the independent variable, FD as the dependent variable, and GFI as the moderating variable. The analysis includes control variables such as economic development, bank risk (measured by non-performing loans), governance, and year-fixed effects. To provide deeper insights, the data is segmented into 44 high-income countries, 33 upper-middle-income countries, and 44 low and lower-middle-income countries. The variables and data sources are detailed in [Table 1](#).

This study employed two-step system generalised method of moments (GMM) as a main method, which further compare Bootstrap Quantile-on-Quantile Regression. The system GMM is best when you do not know the distribution of the variables and data is the strongly balanced panel where N as a country groups are more than the time. Moreover, second-generation unit root and cointegration test outcomes lead to the application of System GMM to see the dynamic nature of the variables. In the System GMM AR1 (Arellano-Bond) reveals no autocorrelation and AR2 second-order difference confirms the absence of serial correlation in the first-order difference. Hansen's value, Sargan, Wald test Chi-square confirm the model fitness. Moreover, the two-step system GMM supports the instruments' legitimacy as System GMM auto generates the instruments by counting year effects through i. year and controlling factors. Hence, Two-step system GMM is best suited in this case of global and income group panel dataset and based on the CSD, Unitroot dependent variable is the first difference and long-term cointegration existence. Moreover, the outcomes are robustly checked through Nonlinear multilevel Mixed-Effects and D-K Fixed Effects models to explore the variations in this relationship across high-, upper-middle-, and low-income countries.

4. Results and discussion

4.1. Results of baseline statistics

[Table 2](#) displays descriptive statistics: means, standard deviation, observations (2420, 880, 660, 880), and min/max values. With data from 121, 44, 33, and 44 countries over 21 years, observations appear normal and suitable for subsequent analysis. The mean and Std. Dev. Variables indicate that there is no dispersion in the variables, central tendency level is accurate, and the data is normal and fit to use. A description of all samples is demonstrated in [Table 2](#).

The next analysis is a pairwise correlation among variables that is presented in [Table 2](#). The digital financial transaction is 38.9% correlated with financial development, while global financial integration is 60.8% correlated with financial development. On the other side, economic development, bank risk, and governance are 16.2%, −19.2% and 75.1% correlated with financial development. The association among the variables for the income group level is also depicted in [Table 3](#).

The Variance inflation factor (VIF) results are shown in [Table 4](#), (a normal variance inflation factor). The values of VIF for the global, high, upper, and middle-lower income countries indicate that the values are less than the threshold value 5.00 and indicate that there is no multicollinearity issues.

[Table 5](#) shows cross-sectional dependency (CSD) and second-generation unit root test results. Pesaran and Friedman tests with random/fixed effects confirm data reliability. CIPS and CADF indicate mixed variable orders: DFT, GFI, Bank Risk are I (1), while financial development, economic development, and governance are I (0).

4.2. Results for cointegration tests

[Table 6](#) shows the cointegration results which are estimated through the Westerlund test for cointegration. The Westerlund test for cointegration test and Pedroni test for cointegration shows that all panels are cointegrated. The details are shown below in [Table 6](#).

4.3. Results of system GMM and bootstrap quantile regression

4.3.1. Impact of DFT and GFI on FD (global)

The results of the impact of DFT on FD are shown in [Table 7](#). Column 1 presents the direct effect, while Column 2 shows the moderating role of GFI. Using the 2-step system GMM, the lag of FD is positive and significant in both columns (0.827 [$p < 0.01$] and

Table 1
Measurement of variables.

Variable	Description	Data Source
Financial Development	An index representing the development of financial markets and institutions.	IMF
Digital Financial (Banking) Transactions	Value of mobile and internet banking transactions (during reference year) (% of GDP)	IMF
Global Financial Integration	PCA Index of Financial Globalization (Including Factors), Financial Globalization (Including Institutions), and Trade. Moreover, Financial Globalization (Including Factors).	World Bank World Bank & IMF UNCTAD
Economic Development	Proxied by ANS, plus particulate emission damage	World Bank
Bank Risk (Bank non-performing Loans)	Bank nonperforming loans to total gross loans (%).	IMF
Governance	PCA index of 6 WGI Indicators	World Bank
Year Fixed Effect	Formulated as i.year effect	Authors Calculations

Table 2
Outcomes of descriptive statistics analysis.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Global (121 countries)					
Financial Development	2420	0.366	0.246	0.030	1.000
Digital Financial Transactions	2418	3.652	2.321	−3.507	8.239
Global Financial Integration	2420	0.000	1.424	−2.850	7.264
Economic Development	2084	5.189	7.444	−3.507	26.585
Bank Risk	2420	1.297	0.846	−2.526	4.09
Governance	2420	0.000	1.000	−1.635	1.733
High Income (44 countries)					
Financial Development	880	0.591	0.212	0.110	1.000
Digital Financial Transactions	880	5.399	1.321	−1.171	8.239
Global Financial Integration	880	0.000	1.372	−3.439	10.47
Economic Development	880	7.041	8.562	−2.526	26.585
Bank Risk	880	4.309	5.601	0.080	47.75
Governance	880	1.064	0.537	−0.626	1.733
Upper Income (33 countries)					
Financial Development	660	0.320	0.163	0.060	0.740
Digital Financial Transactions	660	3.851	1.859	−1.661	6.611
Global Financial Integration	660	0.000	1.186	−2.241	3.779
Economic Development	660	−0.357	5.238	−11.455	20.430
Bank Risk	660	5.367	7.427	−3.219	24.657
Governance	660	5.879	7.296	0.950	59.760
Low and Lower-Middle-Income (44 countries)					
Financial Development	880	0.176	0.118	0.030	0.610
Digital Financial Transactions	880	1.755	1.948	−3.507	6.579
Global Financial Integration	880	0.000	1.267	−2.368	3.934
Economic Development	880	2.62	3.375	−3.507	21.511
Bank Risk	880	5.706	4.352	0.860	37.25
Governance	880	−0.782	0.514	−1.635	0.391

Table 3
Findings of pairwise correlations analysis.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Global						
FD	1.000					
DFT	0.610***	1.000				
GFI	0.608***	0.537***	1.000			
ED	−0.052**	0.101***	0.114***	1.000		
BR	−0.192***	−0.073***	−0.136***	0.016	1.000	
GOV	0.751***	0.554***	0.712***	−0.019	−0.219***	1.000
High Income						
FD	1.000					
DFT	0.171***	1.000				
GFI	0.272***	0.018	1.000			
ED	−0.436***	0.003	−0.170***	1.000		
BR	−0.229***	0.021	−0.158***	0.042	1.000	
GOV	0.587***	0.146***	0.448***	−0.418***	−0.328***	1.000
Upper Income						
FD	1.000					
DFT	0.319***	1.000				
GFI	0.136***	−0.160***	1.000			
ED	−0.172***	−0.236***	0.122***	1.000		
BR	−0.134***	−0.070*	0.153***	0.072*	1.000	
GOV	0.364***	0.071*	0.126***	−0.373***	−0.286***	1.000
Low and Lower-Middle-Income						
FD	1.000					
DFT	0.407***	1.000				
GFI	0.111***	0.323***	1.000			
ED	−0.105***	0.158***	−0.193***	1.000		
BR	−0.076**	0.036	−0.127***	−0.057	1.000	
GOV	0.183***	0.077**	0.140***	−0.212***	0.048	1.000

0.832 [$p < 0.01$]). DFT has a positive, significant impact on FD (0.024 [$p < 0.05$]). Economic development positively affects FD (0.019 [$p < 0.01$]), while bank risk has a negative impact (−0.048 [$p < 0.01$]). Governance positively impacts FD (0.02 [$p < 0.01$]). In Column 2, GFI has a positive impact (0.019 [$p < 0.01$]), but the interaction term [DFT*GFI] negatively affects FD (−0.07 [$p < 0.01$]). Diagnostic tests confirm the validity of the GMM model.

Table 4
Outcomes of variance inflation factor.

	Global	High Income	Upper Income	Low/Lower-Middle-Income
	VIF	VIF	VIF	VIF
DFT	1.761	1.037	1.08	1.216
	2.397	1.255	1.118	1.307
GFI				
	1.065	1.235	1.264	1.145
ED				
	1.265	1.143	1.14	1.051
BR				
	2.396	1.686	1.338	1.081
GOV				
	1.907	1.271	1.188	1.16
Mean VIF				

Table 5
Findings of CSD test and Unit root tests.

Test	Random Effect		Fixed Effect	
Pesaran Test	71.568***		76.094***	
Friedman Test	256.177***		276.969***	
Variables	CIPS		Decision	
	I (0)	I (1)	CADF	Decision
	I (0)	I (1)	I (0)	I (1)
FD	−2.654***	–	−2.112***	–
DFT	−2.013	−3.944***	2.132	−3.061***
FGI	−1.959	−4.319***	1.711	−3.045***
ED	−2.309***	–	−2.093***	–
BR	−1.453	−3.351***	−1.642	−1.990***
GOV	−1.913	−4.367***	−1.911**	–

Note: ***p < 0.01 (1%), **p < 0.05 (5%), *p < 0.1 (10%).

Table 6
Results for tests for cointegration.

Detail	Value	Accepted/Rejected
Westerlund test for cointegration		
Variance ratio	−2.8424 ***	Ha: All panels are cointegrated (Accepted)
Number of panels (Total): 121		
Cointegrating vector: Panel specific		
Pedroni test for cointegration		
Modified PP test	6.2278***	Ha: All panels are cointegrated (Accepted)
PP test	−12.9950***	
ADF test	−12.6439***	
Panels (Total) = 121		CV: Panel specific Kernel: Bartlett Trend (Time): Included Lags (Newey-West): 2.00 AR parameter: Panel specific
means of panel: Included		
Periods (Avg) = 18.975		
Lags (Augmented): 1		
CS means removed		

Note: ***p < 0.01 (1%), **p < 0.05 (5%), *p < 0.1 (10%).

The main model of the two-step system GMM, as shown by the diagnostic test results in columns 1 and 2 of Table 7, confirms that the residual estimated model meets the necessary assumptions. This also suggests that the model's outcomes are satisfactory, ensuring their validation and accuracy. The estimated findings reveal no autocorrelation and absence of serial correlation in the first-order difference, with the AR1 p-value (Arellano-Bond) being below 5.00%. Simultaneously, the AR2 p-value in the second-order difference exceeds 5.00%. Additionally, as seen in column 5, the value of N is greater than T (i.e., $N > T$, such as $121 > 21$), indicating that using the two-step system GMM is suitable. The Wald test Chi-square and F-statistics results show a p-value under 1%, meaning the variables in the Wald-Chi square test are significant, affirming the model's suitability for use. Furthermore, in this analysis, the Hansen statistic is 46.85 and 69.50, with p-values of 0.1731 and 0.2354, respectively, aligning with Roodman (2009) standards. According to Roodman (2009), Hansen's value should range between 0.10 and 0.25, though it can reach 0.30. The Sargan test value is also not significant. Besides, the number of instruments should be fewer than the group count. With 50 and 76 instruments, which are fewer than the 121 groups, it further supports the legitimacy of the two-step system GMM instruments. Overall, the diagnostic test results

Table 7

Results of digital financial transactions on financial development: Moderating effect of global financial integration: Global level countries Sys-GMM and bootstrap quantile-on-quantile regression.

Variables	(1)	(2)	(3)	(4)
	System GMM (1–2)		Bootstrap Quantile Regression (3–4)	
	DFT=> FD	GFI=>FD	DFT=> FD	GFI=>FD
Financial Development (t-1)	0.827*** (0.030)	0.832*** (0.019)		
Digital Financial Transactions (DFT)	0.024** (0.002)	0.024*** (0.001)		
DFT ²			0.003*** (0.001)	0.007*** (0.001)
Global Financial Integration (GFI)		0.019*** (0.008)		0.034*** (0.011)
DFT*GFI		−0.070*** (0.012)		−0.002*** (0.001)
Economic Development (ED)	0.019*** (0.005)	0.016*** (0.006)	0.002*** (0.001)	0.003*** (0.002)
Bank Risk (BR)	−0.048*** (0.008)	−0.029*** (0.010)	−0.005*** (0.001)	−0.003** (0.001)
Governance (Gov)	0.020*** (0.005)	0.014*** (0.003)	0.103*** (0.009)	0.137*** (0.013)
Year Dummy	Yes	Yes	–	–
Constant	0.046*** (0.014)	0.052*** (0.021)	0.722*** (0.024)	0.519*** (0.025)
AR-1 (P-value)	−6.908 (0.0000)	−6.896 (0.0000)		
AR-2 (P-value)	0.862 (0.389)	0.789 (0.430)		
Sargan Test	98.06	116.1		
P-value (Sargan)	0.2296	0.2356		
Hansen Test	46.85	69.50		
P-value (Hansen)	0.1731	0.2354		
J.Stat (Instruments)	50	76		
Wald Test/CHI2	57,568	142,665	3900.13	4003.52
P-value (CHI)	0.0000	0.0000	0.0000	0.0000
Pseudo R2			0.3765	0.3886
Quantile			95	95
Rep			20	20
No. of observations	2298	2298	2418	2418
Number of Countries	121	121	121	121

Note: SE in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.

Note: In Bootstrap Quantile to make Variable Non-linear we have taken independent variable square root.

indicate that all assumptions are met and confirm the estimation technique's precision and dependability.

Furthermore, in Table 7 column 3 and 4, Nonlinear outcomes are accessed through the Bootstrap Quantile regression. The independent variable and interaction term analysis by taking (Digital Financial Transactions)² (square). The outcomes of the Quantile-on-Quantile Regression at threshold 95 and 20 reps confirm the validity of the main models results through system GMM. This comparison endorses the accuracy and reliability of the results at the global level. The overall outcomes suggest that at the global level, digital financial transactions and financial globalisation boost the development of financial markets and the inclusivity of financial institutions. The detailed results of global level are reported in Table 7.

4.3.2. Impact of DFT and GFI on FD – (high-income countries)

Table 8 presents the impact of DFT on FD in high-income countries. In Column 1, using the 2-step system GMM, the lag of FD is positive and significant (0.528 [p < 0.01]). DFT has a significant positive impact on FD (0.036 [p < 0.05]). Economic development positively affects FD (0.019 [p < 0.01]), while bank risk has a negative impact (−0.048 [p < 0.01]). Governance positively impacts FD (0.02 [p < 0.01]). In Column 2, the lag of FD is positive and significant (0.832 [p < 0.01]). DFT has a significant positive impact on FD (0.024 [p < 0.05]), but the interaction term [DFT*GFI] negatively affects FD (−0.07 [p < 0.01]). Diagnostic tests confirm the validity of the GMM model.

The main GMM two-step system model of high-income level confirmed that the estimated residual model met the necessary assumptions. This also indicates that the results are accurate. The estimated results show that there is no autocorrelation in the first-order difference and there is no serial correlation in the first-order difference. Moreover, the AR2 value of the second order difference is greater than 5.00%. Furthermore, N is larger than T (N > T, 44 > 21), indicating the use of two-step GMM systems. The results of the Chi-square and F statistics tests show that the p-value is less than 1%, which means that the variables in the Wald-Chi square test are significant, which proves that the model is appropriate for use. Furthermore, the Hansen statistic was 14.64, 12.78, and had a p-value of 0.262, and 0.244, respectively, in accordance with standards. The Sargan test value also fills the criteria. In addition, the number of instruments is lower than the number of groups. It further supports the legitimacy of the two-step system of GMM instruments, with 36

Table 8

Results of digital financial transactions on financial development: Moderating effect of global financial integration: High-income countries Sys-GMM approach.

Variables	(1)	(2)	(3)
	System GMM (1–2)		Bootstrap Quantile Regression
	DFT=> FD	GFI=>FD	GFI=>FD
Financial Development (t-1)	0.528*** (0.071)	0.577*** (0.076)	
Digital Financial Transactions (DFT)	0.036*** (0.004)	0.035*** (0.004)	
DFT ²			0.004*** (0.000)
Global Financial Integration (GFI)		0.033** (0.014)	0.169*** (0.015)
DFT*GFI		−0.005** (0.002)	−0.006*** (0.001)
Economic Development (ED)	−0.024*** (0.011)	−0.024*** (0.008)	−0.010*** (0.002)
Bank Risk (BR)	−0.013** (0.006)	−0.007* (0.004)	−0.005*** (0.001)
Governance (GOV)	0.043** (0.017)	0.043** (0.017)	0.113*** (0.018)
Year Dummy	Yes	Yes	–
Constant	0.222*** (0.047)	0.181*** (0.036)	0.683*** (0.028)
AR1 (P-value)	−4.320 (0.0000)	−4.234 (0.0000)	
P-value (AR2)	1.765 (0.1775)	1.737 (0.2823)	
Sargan Test	27.58 (6.37%)	36.05 (10.20%)	
Hansen Test (P-value)	14.64 (0.262)	12.78 (0.244)	
J.Stat (No. of Instruments)	36	40	
Chi2 (Wald Test) P-value	39,589 (0.000)	153,970 (0.000)	
Pseudo R2			0.2506
Quantile			95
Rep			20
No. of Obs	809	809	880
Number of Countries	44	44	44

Note: SE in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.

Note: In Bootstrap Quantile to make Variable Non-linear we have taken independent variable square root.

and 40 instruments, and fewer than 44 groups. Overall, the results of the diagnostic test demonstrate that all hypotheses are met and confirm the precision and reliability of the estimation technique.

Furthermore, in Table 8 columns 3 and 4, Nonlinear outcomes are accessed through Bootstrap Quantile regression. The independent variable and interaction term analysis by taking (Digital Financial Transactions)² (square). The outcomes of the Quantile-on-Quantile Regression at threshold 95 and 20 reps confirm the validity of the main model results through system GMM. This comparison endorse the accuracy and reliability of the results at global level. The overall outcomes suggest that at high-income level digital financial transactions improve the level of financial development in high-income countries. However, the moderate role suggests that high income countries should focus more on financial globalisation. The detailed results of global level are reported in Table 8.

4.3.3. Impact of DFT and GFI on FD – (upper-middle-income countries)

Table 9 presents DFT's impact on FD in upper-middle-income countries. In Column 1, using 2-step system GMM, the lag of FD is positive and significant (0.895 [p < 0.01]). DFT significantly impacts FD positively (0.103 [p < 0.01]). Economic development has no significant impact (0.003 [p > 0.05]), while bank risk is insignificant (−0.016 [p > 0.05]). Governance positively affects FD (0.017 [p < 0.01]). In Column 2, the lag of FD is positive and significant (0.956 [p < 0.01]). DFT positively impacts FD (0.018 [p < 0.01]), but the interaction term [DFT*GFI] positively affects FD (0.008 [p < 0.01]). Economic development is insignificant (0.009 [p > 0.05]), while bank risk is insignificant (−0.001 [p > 0.05]). Governance positively affects FD (0.016 [p < 0.01]). Diagnostic tests confirm GMM validity. Overall, in upper middle-income countries both digital financial transactions and financial globalization contributed towards the financial development.

Overall, the results of the diagnostic test confirm the reliability, no autocorrelation, no serial correlation of the estimation technique and met the necessary assumptions such as AR1, AR2, Sargan, Hansen Test statistics. In addition, the number of instruments is lower than the number of groups. The results of the Wald-Chi square show that the p-value is less than 1% which proves that the models are appropriate and fit for use. Furthermore, in Table 9, column 3, nonlinear outcomes are accessed through the bootstrap quantile regression where independent variable and interaction term analysis is done by taking (Digital Financial Transactions)² square. The outcomes of the Quantile-on-Quantile Regression at threshold 95 and 20 reps confirm the validity of the main model results through system GMM. This comparison endorses the accuracy and reliability of the results at global level. The overall outcomes suggest that at

Table 9

Results of digital financial transactions on financial development: Moderating effect of global financial integration: Sys-GMM and bootstrap quantile regression at upper-middle-income countries.

Variables	(1)	(2)	(3)
	System GMM (1–2)		Bootstrap Quantile Regression
	DFT=> FD	GFI=>FD	GFI=>FD
Financial Development (t-1)	0.895*** (0.034)	0.956*** (0.035)	
Digital Financial Transactions (DFT)	0.103*** (0.024)	0.018*** (0.007)	
DFT ²			0.011*** (0.001)
Global Financial Integration (GFI)		0.005* (0.003)	0.035*** (0.008)
DFT*GFI		0.011* (0.008)	0.018** (0.003)
Economic Development (ED)	0.009 (0.003)	0.009 (0.003)	0.007 (0.001)
Bank Risk (BR)	−0.016 (0.015)	−0.001 (0.001)	−0.004 (0.001)
Governance (Gov)	0.017** (0.008)	0.016** (0.006)	0.061*** (0.007)
Year Dummy	Yes	Yes	–
Constant	0.030*** (0.010)	0.024** (0.011)	0.350*** (0.012)
AR1 (P-value)	−3.812 (0.0001)	−3.887 (0.0001)	
AR2 (P-value)	−0.434 (0.665)	−0.459 (0.646)	
Sargan Test (P-value)	4.844 (0.564)	11.14 (0.346)	
Hansen Test	5.676	8.686	
P-value (Hansen)	0.260	0.262	
J.Stat (No. of Instruments)	30	28	
Chi2 (Wald Test)	527,042	871,728	
P-value (Chi)	0	0	
Pseudo R2			0.3171
Quantile			95
Rep			20
No. of Obs	556	626	659
Number of Countries	33	33	33

Note: Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.

Note: In Bootstrap Quantile to make Variable Non-linear we have taken independent variable square root.

the Upper-Middle-Income level digital financial transactions and financial globalisation confirm the improvement in financial development.

4.3.4. Impact of DFT and GFI on FD – (low and lower-middle-income countries)

Table 10 illustrates DFT's impact on FD in Low and Lower-Middle-Income countries. In Column 1, using 2-step system GMM, the lag of FD is significant (0.839 [p < 0.01]). DFT significantly impacts FD positively (0.013 [p < 0.10]). Economic development negatively affects FD (−0.016 [p < 0.05]), while bank risk is significant and negative (−0.023 [p < 0.05]). Governance positively affects FD (0.008 [p < 0.01]). In Column 2, the lag of FD is significant (0.865 [p < 0.01]). DFT's impact on FD is insignificant (0.014 [p < 0.01]), but [DFT*GFI] positively affects FD (0.011 [p < 0.01]). Economic development is insignificant (0.017 [p > 0.01]), while bank risk is significant and negative (−0.019 [p < 0.05]). Governance positively affects FD (0.008 [p < 0.01]). Diagnostic tests confirm GMM validity.

Overall, AR1, AR2, Sargan, and Hansen Test diagnostic results confirm the reliability, no autocorrelation, no serial correlation of the estimation technique and met the necessary assumptions. The number of instruments are less than the groups and Wald-Chi square proves that the models are fit for use. Furthermore, in Table 10 column 3 shows the results of Bootstrap Quantile-on-Quantile regression Nonlinear outcomes by taking independent variable and interaction term analysis square root with threshold 95 and 20 reps. The outcomes confirm the validity of main models and ensure that digital financial transactions and financial globalisation improve by boosting financial development. This comparison endorses the accuracy and reliability of the results at a low-lower income level.

4.4. Robustness check results D-K Fixed Effect and Nonlinear multilevel Mixed-Effects for global and income group sample

Table 11 presents the Robustness check model using the D-K Fixed Effect and Nonlinear multilevel Mixed-Effects for DFT's impact on FD globally. In Column 1, DFT significantly affects FD positively (0.006 [p < 0.10]). Economic development positively influences

Table 10

Results of digital financial transactions on financial development: Moderating effect of global financial integration: Sys-GMM at low and lower-middle-income countries.

Variables	(1)	(2)	(3)
	System GMM (1–2)		Bootstrap Quantile Regression
	DFT=> FD	GFI=>FD	GFI=>FD
Financial Development (t-1)	0.839*** (0.030)	0.865*** (0.025)	
Digital Financial Transactions (DFT)	0.013* (0.001)	0.014 (0.013)	
DFT ²			0.003 (0.002)
Global Financial Integration (GFI)		0.001 (0.001)	0.030 (0.021)
DFT*GFI		0.011* (0.003)	0.014** (0.002)
Economic Development (ED)	−0.016** (0.007)	0.017 (0.016)	0.016 (0.013)
Bank Risk (BR)	−0.023** (0.011)	−0.019* (0.010)	−0.015** (0.004)
Governance (Gov)	0.008** (0.004)	0.008** (0.003)	0.019** (0.005)
Year Dummy	Yes	Yes	–
Constant	0.033*** (0.009)	0.028*** (0.006)	0.478*** (0.030)
AR1 (P-value)	−4.034 (0.0003)	−3.995 (0.0006)	
AR2 (P-value)	−0.730 (0.465)	−0.746 (0.455)	
Sargan Test	12.11 (0.1595)	21.67 (0.1169)	
Hansen Test	7.617 (0.268)	8.449 (0.285)	
J.Stat (No. of Instruments)	30	36	
Chi2/Wald Test (P-value)	25,711 (0.000)	92,957 (0.000)	
Pseudo R2			0.180
Quantile			95
Rep			20
No. of Obs	836	836	652
Number of Countries	44	44	44

Note: Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.

FD (0.009 [p < 0.10]), while bank risk has a negative and significant impact (−0.008 [p < 0.05]). Governance positively impacts FD (0.006 [p < 0.01]). In Column 2, DFT significantly impacts FD positively (0.009 [p < 0.01]), while GFI has a significant impact (0.013 [p < 0.01]). However, [DFI*GFI] negatively affects FD (0.013 [p < 0.01]). Column 3 and 4 confirm the validity of all key variable's robustness. Economic development and governance have significant impacts. Diagnostic tests confirm the model's validity with high F-stat and R-squared values.

Table 12 presents the Robustness check model using the D-K Fixed Effect for DFT's impact on FD in high-income countries. In Column 1, DFT significantly affects FD positively (0.006 [p < 0.10]). Economic development negatively influences FD (−0.004 [p < 0.10]), while bank risk has a significant negative impact (−0.006 [p < 0.10]). Governance positively impacts FD (0.031 [p < 0.01]). In Column 2, DFT significantly impacts FD positively (0.013 [p < 0.01]), while GFI has a significant impact (0.069 [p < 0.01]). However, [DFI*GFI] negatively affects FD (−0.011 [p < 0.01]). Economic development and governance have significant impacts. Diagnostic tests confirm the model's validity with high F-stat and R-squared values.

Table 12 displays the Robustness check model using the D-K Fixed Effect for DFT's impact on FD in Upper-Middle-Income Countries. In Column 3, DFT significantly affects FD positively (0.010 [p < 0.01]). Economic development and Bank Risk show insignificant impacts, while governance positively impacts FD (0.011 [p < 0.05]). In Column 4, DFT significantly impacts FD positively (0.005 [p < 0.01]), while GFI has a significant impact (0.037 [p < 0.01]). However, [DFI*GFI] negatively affects FD (0.006 [p < 0.01]). Economic development has an insignificant impact, while Bank Risk significantly impacts FD (0.009 [p < 0.05]). Governance positively impacts FD (0.004 [p < 0.01]). Diagnostic tests confirm model validity with high F-stat and R-squared values.

In Table 12, the D-K Fixed Effect model reveals DFT's impact on FD for Low and Lower-Middle-Income in Column 5. DFT significantly affects FD positively (0.010 [p < 0.10]). Economic development and Bank Risk have negative and significant impacts, while governance positively impacts FD (0.008 [p < 0.01]). In Column 6, DFT significantly impacts FD positively (0.009 [p < 0.01]), while GFI has a significant impact (0.010 [p < 0.01]). However, [DFI*GFI] positively affects FD (0.010 [p < 0.01]). Economic development has an insignificant impact, while Bank Risk significantly impacts FD (0.009 [p < 0.10]). Governance positively impacts FD (0.011 [p < 0.01]). Diagnostic tests validate the model's robustness with high F-stat and R-squared values.

Table 11

Outcomes of Robustness Check model of Global Level Countries: D-K Fixed Effect and Nonlinear multilevel Mixed-Effects models.

Dependent Variable:	(1)	(2)	(3)	(4)
	D-K Fixed (1–2)		Nonlinear multilevel Mixed-Effects models (3–4)	
	DFT=> FD	GFI=>FD	DFT=> FD	GFI=>FD
Digital Financial Transactions (DFT)	0.006*** (0.001)	0.009*** (0.001)	0.029*** (0.002)	0.028*** (0.002)
Global Financial Integration (GFI)		0.013** (0.005)		0.019*** (0.003)
DFT*GFI		−0.023*** (0.009)		−0.027*** (0.006)
Economic Development (ED)	0.009* (0.004)	0.006* (0.002)	0.008*** (0.001)	0.009*** (0.001)
Bank Risk (BR)	−0.008* (0.005)	−0.012* (0.005)	−0.002*** (0.001)	−0.002*** (0.001)
Governance (Gov)	0.006*** (0.002)	0.005*** (0.001)	0.145*** (0.004)	0.133*** (0.005)
I.year effect	Yes	Yes	Yes	Yes
Constant	0.306*** (0.004)	0.311*** (0.004)	0.267*** (0.007)	0.275*** (0.007)
Insigma			−1.895*** (0.014)	−1.904*** (0.014)
Observations	2418	2418	2418	2418
F-stat/Wald Chi	206.33	450.02	3900.13	4003.52
Prob > F	0.0000	0.000	0.0000	0.0000
R-squared	0.4842	0.5144		
Log likelihood			1151.6467	1171.913
Residual SS			54.612214	53.70439
Number of Countries	121	121	121	121

Note: Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.

Table 12

Outcomes of robustness check model: D-K fixed effect for high-income, upper-middle-income, low and lower-middle-income countries.

Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)
	High-Income (1–2)		Upper-Middle-Income (3–4)		Low and Lower-Middle-Income (5–6)	
	FD	FD	FD	FD	FD	FD
Digital Financial Transactions (DFT)	0.013* (0.007)	0.013** (0.005)	0.010*** (0.001)	0.005*** (0.001)	0.010*** (0.003)	0.009 (0.010)
Global Financial Integration (GFI)		0.069*** (0.018)		0.037*** (0.006)		0.010 (0.012)
DFT*GFI		−0.011*** (0.003)		0.006*** (0.001)		0.010*** (0.003)
Economic Development (ED)	−0.004* (0.002)	−0.011* (0.006)	0.002 (0.004)	0.003 (0.004)	−0.006* (0.004)	0.014 (0.013)
Bank Risk (BR)	−0.006* (0.003)	−0.009* (0.005)	−0.006 (0.009)	−0.004 (0.009)	−0.008* (0.004)	−0.008** (0.004)
Governance (Gov)	0.031*** (0.014)	0.013*** (0.002)	0.011* (0.006)	0.009** (0.004)	0.009*** (0.003)	0.011*** (0.004)
i.year effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.460*** (0.052)	0.467*** (0.045)	0.304*** (0.012)	0.285** (0.005)	0.173*** (0.009)	0.176*** (0.009)
Observations	849	849	582	582	652	652
F-stat	416.96	396.09	393.17	437.07	181.11	208.32
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.3954	0.4192	0.3951	0.4277	0.3030	0.3899
Countries	44	44	33	33	44	44

Note: Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.

5. Conclusion and policy implications

This study provides important insights into the complex interactions between digital financial transactions (DFT), financial development (FD), and the moderating role of global financial integration (GFI) across different levels of income. The findings shows that the effect of DFT on FD is distinct, with both positive and negative interactions depending upon the levels of income and the extent of global financial integration. The mixed findings of this study emphasises the contextual nature of DFT's impact. It also suggest that country-specific factors, such as ICT infrastructure, regulatory quality, and institutional strength, may play a decisive role in

determining the results of this study. Our study shows that high-income economies demonstrated a positive and significant relationship between DFT and FD, which aligns with the hypothesis (H_1). One possible explanation for this is that the availability of advanced ICT infrastructure, robust financial institutions, and high levels of financial inclusion within these economies may have facilitated the success of digital financial transactions in driving FD. On the contrary, middle- and low-income countries showed differing results, with the expected negative hypothesis (H_2) not being supported by low-income countries. However, while DFT did not negatively affect FD, the relationship is statistically weaker or neutral, highlighting the constraints in infrastructure and regulatory frameworks that could reduce the effectiveness of digital transactions. These mixed results in low-income economies suggest that while digital transactions may create financial access, other barriers, such as unreliable networks, low digital literacy, and possibly limited financial product offerings, can undermine DFT's impact on FD. This points to the need for complementary investments beyond digital infrastructure alone, such as capacity building and financial literacy programmes. Additionally, the findings of our study confirmed that GFI positively moderates DFT-FD in high-income economies (H_3), supporting the idea that global financial integration enhances the effectiveness of digital transactions by facilitating cross-border flows and enlarging market access. Interestingly, GFI did not exhibit a significant negative moderating effect in middle- and low-income economies (H_4). Instead, it marginally increased the DFT-FD relationship, which was unexpected. This divergence from the hypothesis could reflect the gradual integration of emerging markets into global financial networks, suggesting that these countries are increasingly benefiting from external financial integration, even if the full potential remains unrealised due to infrastructure constraints. One possible explanation for this is that the hypothesised negative influence of GFI in low-income countries may not have materialised due to ongoing globalisation efforts as well as international financial flows, such as remittances and development assistance, which may have offset infrastructure gaps. However, limited regulatory frameworks and volatile economic conditions continue to constrain these benefits.

Given the distinct results, policy interventions must be customised to cater to the economic context of different income groups. Policymakers can utilise this study's findings to design targeted strategies that address the unique challenges and opportunities within high-income, upper-middle-income, and low-income economies. High-income economies should encourage continuous innovation in digital finance via supportive regulatory frameworks which promote fintech startups and cross-border payment systems. They should utilise GFI more effectively by fostering international financial partnerships and aligning national policies with global financial standards. This will enable these countries to fully capitalize on cross-border transactions and global market flows. Policymakers in these countries should also mitigate risks associated with digital finance, such as cybersecurity threats and data privacy issues, to maintain trust in their financial systems. Upper-middle-income economies should enhance ICT infrastructure to bridge gaps that inhibit DFT's effectiveness, ensuring wider access to mobile banking and internet financial services. They should also implement regulatory frameworks that attract foreign investment while balancing financial openness with local economic stability. Policymakers in these economies should also encourage financial literacy programmes to increase usage and confidence in digital financial platforms, which will accelerate FD through higher adoption rates. As for low- and middle-income economies, they should invest in digital infrastructure and mobile networks to lay the foundation for broader financial inclusion. Governments can partner with international donors and multilateral agencies to finance these infrastructure projects, ensuring long-term sustainability. They should promote financial literacy campaigns to empower individuals and businesses to use digital financial services effectively, closing the knowledge gap that limits the uptake of digital platforms. They should also strengthen their institutional frameworks and regulatory capacity to manage the risks associated with DFT, such as fraud and credit default while creating an enabling environment for fintech innovations. They should also encourage international financial integration through remittance flows and development finance by reducing transfer costs and improving access to international markets.

To implement the findings of this research, policymakers in different economies must adopt a context-sensitive approach, leveraging digital financial transactions and global financial integration in the following ways. First, they should promote public-private partnerships (PPPs) to expedite digital infrastructure development in middle- and low-income economies, ensuring that the benefits of DFT are equitably distributed. Second, they should encourage cross-border collaborations between financial institutions, facilitating smoother integration into global financial networks. Third, they should adopt regulatory sandboxes to test fintech innovations in a controlled environment, promoting innovation while safeguarding stability. Fourth, they should align policies with international frameworks for digital finance and cross-border payments, ensuring smooth financial flows and reduced transaction costs. Fifth, they should develop targeted financial inclusion strategies customised to vulnerable populations, such as rural communities and small businesses, to maximise the impact of DFT on FD in low-income economies.

Lastly, the findings from this study emphasise the need for differentiated policy frameworks across different income levels, highlighting that digital financial transactions and global financial integration have the potential to drive financial development when supported by robust infrastructure, governance, and financial literacy efforts. Policymakers should align their efforts with global financial trends while focusing on domestic capacity-building initiatives to ensure that financial development remains inclusive, resilient, and sustainable across all income groups. Last but not least, future research could investigate how DFT and GFI influence specific sectors such as agriculture, retail banking, etc.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

APPENDIX A. List of Countries

Group Sr.	Country Name	Category	Group Sr.	Country Name	Category
1	Australia	High Income	62	Iraq	Upper-Middle Income
2	Austria	High Income	63	Jamaica	Upper-Middle Income
3	Bahrain	High Income	64	Jordan	Upper-Middle Income
4	Belgium	High Income	65	Kazakhstan	Upper-Middle Income
5	Brunei Darussalam	High Income	66	Lebanon	Upper-Middle Income
6	Canada	High Income	67	Libya	Upper-Middle Income
7	Chile	High Income	68	Malaysia	Upper-Middle Income
8	Croatia	High Income	69	Mexico	Upper-Middle Income
9	Cyprus	High Income	70	Namibia	Upper-Middle Income
10	Czech Republic	High Income	71	Paraguay	Upper-Middle Income
11	Denmark	High Income	72	Peru	Upper-Middle Income
12	Estonia	High Income	73	Russian Federation	Upper-Middle Income
13	Finland	High Income	74	South Africa	Upper-Middle Income
14	France	High Income	75	Thailand	Upper-Middle Income
15	Germany	High Income	76	Turkey	Upper-Middle Income
16	Greece	High Income	77	Ukraine	Upper-Middle Income
17	Hungary	High Income	78	Algeria	Lower-Middle Income
18	Ireland	High Income	79	Angola	Lower-Middle Income
19	Israel	High Income	80	Bangladesh	Lower-Middle Income
20	Italy	High Income	81	Bolivia	Lower-Middle Income
21	Japan	High Income	82	Cameroon	Lower-Middle Income
22	Kuwait	High Income	83	Congo, Rep.	Lower-Middle Income
23	Latvia	High Income	84	Cote d'Ivoire	Lower-Middle Income
24	Lithuania	High Income	85	Egypt, Arab Rep.	Lower-Middle Income
25	Luxembourg	High Income	86	Ghana	Lower-Middle Income
26	Netherlands	High Income	87	Haiti	Lower-Middle Income
27	New Zealand	High Income	88	Honduras	Lower-Middle Income
28	Norway	High Income	89	India	Lower-Middle Income
29	Panama	High Income	90	Iran, Islamic Rep.	Lower-Middle Income
30	Poland	High Income	91	Kenya	Lower-Middle Income
31	Portugal	High Income	92	Mongolia	Lower-Middle Income
32	Qatar	High Income	93	Morocco	Lower-Middle Income
33	Romania	High Income	94	Myanmar	Lower-Middle Income
34	Saudi Arabia	High Income	95	Nicaragua	Lower-Middle Income
35	Singapore	High Income	96	Nigeria	Lower-Middle Income
36	Slovakia	High Income	97	Pakistan	Lower-Middle Income
37	Slovenia	High Income	98	Papua New Guinea	Lower-Middle Income
38	South Korea	High Income	99	Philippines	Lower-Middle Income
39	Spain	High Income	100	Senegal	Lower-Middle Income
40	Sweden	High Income	101	Sri Lanka	Lower-Middle Income
41	Switzerland	High Income	102	Tanzania	Lower-Middle Income
42	United Kingdom	High Income	103	Tunisia	Lower-Middle Income
43	United States	High Income	104	Vietnam	Lower-Middle Income
44	Uruguay	High Income	105	Zimbabwe	Lower-Middle Income
45	Albania	Upper-Middle Income	106	Burkina Faso	Low Income
46	Argentina	Upper-Middle Income	107	Congo, Dem. Rep.	Low Income
47	Armenia	Upper-Middle Income	108	Ethiopia	Low Income
48	Azerbaijan	Upper-Middle Income	109	Gambia, The	Low Income
49	Belarus	Upper-Middle Income	110	Guinea	Low Income
50	Botswana	Upper-Middle Income	111	Guinea-Bissau	Low Income
51	Brazil	Upper-Middle Income	112	Madagascar	Low Income
52	Bulgaria	Upper-Middle Income	113	Mali	Low Income
53	China	Upper-Middle Income	114	Mozambique	Low Income
54	Colombia	Upper-Middle Income	115	Niger	Low Income
55	Dominican Republic	Upper-Middle Income	116	Sierra Leone	Low Income
56	Ecuador	Upper-Middle Income	117	Sudan	Low Income
57	El Salvador	Upper-Middle Income	118	Syrian Arab Republic	Low Income
58	Gabon	Upper-Middle Income	119	Togo	Low Income
59	Guatemala	Upper-Middle Income	120	Uganda	Low Income
60	Guyana	Upper-Middle Income	121	Zambia	Low Income
61	Indonesia	Upper-Middle Income			

Data availability

Data will be made available on request.

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