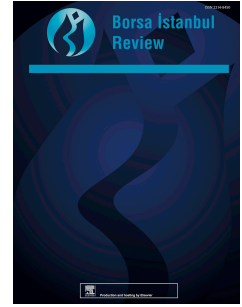


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## **Justice and Finance: Does Judicial Efficiency Contributes to Financial System Efficiency?**

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# Justice and Finance: Does Judicial Efficiency Contribute to Financial System Efficiency?

## ABSTRACT

Efficient financial systems play a crucial role in promoting economic growth and development. This study explores the impact of judicial efficiency (JE) on financial system efficiency (FSE) and its components, financial institutions efficiency (FIE) and financial markets efficiency (FME), across 108 countries over the period from 2004 to 2020. Utilizing a fixed effect regression for our baseline analysis and a two-stage least squares (2SLS) regression to address endogeneity, we find robust evidence that JE has a positive and significant effect on FSE and its components, FIE and FME. Moreover, we find that JE's positive impact on FSE and its components holds across different levels of per capita income, including high-income, low-income, and emerging market economies. Our findings, which are confirmed by several robustness checks, highlight the universal importance of a well-functioning, efficient judicial system in driving FSE regardless of a country's economic context. The results show that countries should prioritize reforms to strengthen judicial institutions and enhance efficient contract enforcement. An efficient legal framework and judicial process are conducive to creating an environment in which an efficient financial system can develop, paving the way for sustainable economic growth.

**Keywords:** Judicial Efficiency, Financial System Efficiency, Financial development, Property right, Contract enforcement

## 1 INTRODUCTION

An efficient financial system is vital to the economic growth and development that countries around the world seek (Diallo, 2018; Taddese Bekele & Abebaw Degu, 2023). An efficient financial system lowers transaction costs, and helps to allocate resources effectively and optimize resource use, which boosts economic performance (Greenwood & Jovanovic, 1990; Levine, 1997). Moreover, efficient financial systems are less vulnerable to financial crises and support financial and economic stability (Yuan, Wu, & Liu, 2022), which are of paramount importance to an economy. The literature emphasizes that even if a financial sector is sufficiently large and widely accessible, its contribution to economic growth would not be optimal if financial institutions are inefficient and wasteful (IMF Svirydzenka, 2016). In short, the benefits of an efficient financial system are immense.

Promoting financial system efficiency (FSE) could therefore be a key strategy that helps countries achieve optimum economic growth and development with their available resources, especially those that face challenges in this area. Considering the importance of FSE, a vast body of finance and economics research has investigated and identified its many determinants (see, Nisar Ahmad, Naveed, Ahmad, & Butt, 2020; Voghouei, Azali, & Jamali, 2011).

Other studies have identified various institutional characteristics as important drivers of FSE. Since the publication of seminal studies by Rafael La Porta, Lopez-De-Silanes, Shleifer, and Vishny (1997); Rafael La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), a large body of literature has confirmed that legal rules regarding contract enforcement, creditors' rights, and property rights and their enforcement have a significant effect on financial system development. Recently, Khan, Gu, Khan, and Bhatti (2022) corroborated this and showed that a robust institutional environment significantly promotes the depth, access, and efficiency of a country's financial system. Pistor, Raiser, and Gelfer (2000) emphasize the difference between the quality

47 of laws on paper and their enforcement in practice, revealing that the latter exerts a more  
48 significant influence on the financial sector.

49 Despite significant advances in our understanding of the importance of legal, regulatory,  
50 and institutional factors in fostering FSE, one critical aspect remains underexplored: the efficient  
51 enforcement of rules through the judiciary. As a formal mechanism for enforcing contracts and  
52 protecting property and creditors' rights, judicial efficiency (JE) holds untapped potential to  
53 enhance FSE, warranting further investigation.

54 Given this background, we investigate the effect of JE, defined as the speed and cost of a  
55 nation's court system, on FSE. JE refers to the delivery of justice by the courts and the judicial  
56 system in a timely and cost-effective manner. A judiciary that provides timely and cost-effective  
57 (affordable) justice is essential to creating a favorable environment in which the financial sector  
58 can flourish. An efficient judicial system ensures effective enforcement of contracts, creditors'  
59 rights, and property rights, lowers transaction costs, and may enhance FSE.

60 This study contributes to the literature by exploring how JE affects FSE. Most existing  
61 studies emphasize aspects of a legal system (i.e., laws pertaining to contracts, creditors' rights,  
62 and property rights protection) that relate to financial system development and efficiency but  
63 overlook the crucial role of efficient enforcement of these laws in FSE. This study bridges  
64 addresses this gap by highlighting the significance of JE in shaping FSE and emphasizes the  
65 important role of enforcement efficiency in FSE. Moreover, we provide more reliable evidence  
66 on the nexus of JE and FSE by utilizing a more direct and comprehensive measure of JE and  
67 FSE, in contrast to previous studies that rely on subjective and indirect indicators of law  
68 enforcement. Additionally, we use the largest available international sample and reliable  
69 estimators that address endogeneity and provide important causal evidence.

70 We find robust evidence that JE has a positive and significant effect on FSE and its  
71 components, namely financial institutions efficiency (FIE), and financial markets efficiency  
72 (FME). Furthermore, the positive impact of JE on FSE and its components holds true across  
73 different levels of economic development, including high-income, low-income, and emerging  
74 market economies. Hence, this study highlights the universal importance of a well-functioning  
75 judicial system in driving FSE. The results show that countries should prioritize reforms that  
76 strengthen their judicial institutions and enhance contract enforcement mechanisms. An efficient  
77 legal framework and efficient judicial processes create a conducive environment for financial  
78 system development, paving the way for sustainable and high-quality economic growth.

79 The remainder of this study is structured as follows: In Section 2, we develop hypotheses  
80 based on the theoretical and empirical literature. Section 3 outlines the econometric strategy,  
81 variables, and data sources used in the analysis and Section 4 presents and discusses the results.  
82 Finally, in Section 5, we conclude the study and provide policy implications.

83

## 84 **2 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT**

85 The role of institutions in financial system operations, which has been widely discussed  
86 in the literature, can be broadly divided into theoretical and empirical studies. The theoretical  
87 foundations for understanding the linkages between JE and FSE are rooted in New Institutional  
88 Economics (NIE) transaction cost theory (Coase, 1998), and law and finance theories (Rafael La  
89 Porta et al., 1998) Transaction cost theory focuses on the costs of conducting economic  
90 transactions, including information acquisition, negotiations, and contracts enforcement. The  
91 core tenet of NIE is that information is incomplete, unequally distributed, and costly to acquire.  
92 D. North (1981); D. C. North (1990) and other institutional economists, such as Groenewegen,

93 Spithoven, and Van Den Berg (2010) provide a comprehensive overview of NIE transaction cost  
94 theory, exploring how institutions evolved to mitigate uncertainties arising from information  
95 asymmetries and transaction costs.

96 Institutions play a crucial role in influencing economic and financial activities by  
97 enforcing contracts, protecting property rights, and reducing transaction costs. Information  
98 asymmetry and transaction costs are common in financial institutions and markets, which  
99 undermines FSE. Hence, an efficient judicial system that supports effective contract enforcement  
100 and safeguards property rights could serve as a vital catalyst in promoting FSE. Rafael La Porta  
101 et al. (1997); Rafael La Porta et al. (1998) emphasize that sound legal and regulatory institutions  
102 firmly enforce contracts and protect creditors' and property rights, thus playing a pivotal role in  
103 fostering financial system development.

104 These theoretical arguments are corroborated by numerous empirical studies. For  
105 example, Acemoglu and Johnson (2005) demonstrate that a high-quality institutional  
106 environment, characterized by robust rights protections, reduces contract enforcement costs and  
107 lowers the risk of expropriation. Under such conditions, investors and other suppliers of capital  
108 are more likely to contribute to the development of a strong financial sector. Their empirical  
109 evidence strongly corroborates this assertion. In a similar vein, Dima, Barna, and Nachescu  
110 (2018) document that robust legal institutions, including an independent judiciary, protects  
111 creditors and property rights, enhancing the function of financial system. Simply put, upholding  
112 law and order, ensuring contract enforcement, and maintaining a fair and predictable legal  
113 system significantly benefit a country's financial sector. Law, Kutan, and Naseem (2018)  
114 contend that a sound institutional environment triggers the growth-enhancing role of financial  
115 sector development. Furthermore, the quality of institutions enhances financial sector  
116 development by curbing expropriation risk (Herger, Hodler, & Lobsiger, 2008). (Naved Ahmad  
117 & Ali, 2010; Ellahi et al., 2021); H. Khan, Khan, and Zuojun (2020); (Muhammad Asif Khan,  
118 Kong, Xiang, & Zhang, 2019) report similar findings.

119 One stream of the literature focuses specifically on the role of institutions in enhancing  
120 the efficiency of various components of a financial system. A well-functioning institutional  
121 environment can promote competition by attracting foreign participants to the local financial  
122 sector, enhancing the financial system's efficiency (Staikouras, Mamatzakis, & Koutsomanoli-  
123 Filippaki, 2008). Lensink, Meesters, and Naaborg (2008) rigorously analyze a diverse sample of  
124 2,095 banks in various countries to explore the influence of institutional quality on the financial  
125 efficiency of foreign banks. Their findings underscore the substantial impact of institutional  
126 quality in enhancing the efficiency of foreign banks. Moreover, Naghavi and Lau (2014) show  
127 that an intriguing interaction between the institutional environment and financial liberalization  
128 further augments financial market efficiency.

129 Considering the importance of judicial institutions in enforcing contracts and protecting  
130 property rights, studies also focus on the role of JE in promoting the efficiency of financial  
131 sector. A notable analysis by Laeven and Majnoni (2005) delves into the judiciary's impact on  
132 bank lending spreads using a cross-country sample. Their findings demonstrate that strong  
133 judicial enforcement of contracts significantly reduces the cost of financial intermediation for  
134 both households and businesses. This underscores the importance of a robust and efficient  
135 judicial system in promoting accessible and cost-effective financial services for an economy.  
136 Contract enforcement by the judicial system is found to have significant effect on credit markets  
137 by directly impacting the risks and costs associated with credit transactions (Hoang, 2003). In a  
138 cross-country analysis Cooray (2011) finds that government quality, assessed through

139 governance and legal origin, positively impacts financial sector and efficiency. Ximeng and  
 140 Zhiwen (2023) investigate the effect of judicial independence on financial markets in context of  
 141 emerging market economies and show that judicial independence fosters development of  
 142 financial markets. Based on the findings in the theoretical and empirical literature, we develop  
 143 the following hypothesis: *Judicial efficiency (JE) significantly promotes financial system*  
 144 *efficiency (FSE).*

### 145 3 Methodology

#### 146 3.1 Econometric strategy

147 The aim of this study is to examine how JE influences FSE across 108 countries over the  
 148 period from 2004 to 2020. The sample used depends on data availability for the variables chosen  
 149 for the study. We apply a fixed effect regression model as the baseline estimation method to  
 150 account for omitted variable bias, which may arise when one or more unobserved factors affect  
 151 both the dependent and explanatory variables. Previous comparable empirical studies also use  
 152 fixed effect regression for this reason. Based on the literature, we specify the following baseline  
 153 econometric model:

$$154 FSE_{it} = \beta_0 + \beta_1 JE_{it} + \beta_n X_{it} + \varepsilon_{it} \quad Eq. (1)$$

155 where FSE is the dependent variable,  $\beta_0$  is a constant,  $\beta_1$  is the coefficient of independent  
 156 variable JE,  $\beta_n$  represents the coefficients of a set of control variables  $X$ , consisting of economic  
 157 growth (GDP\_PC), size of the financial sector (DC\_PC), quality of governance (QoG), trade  
 158 openness, financial openness, human capital, inflation, and government size.  $\varepsilon_{it}$  is the error term,  
 159 and the subscripts  $i$  and  $t$  represent country and time, respectively.

160 We note there may be an endogeneity problem between JE and FSE, resulting from the  
 161 potential reverse causality between them, which would bias the fixed effect regression results. To  
 162 address this issue, we use the Two-Stage Least Squares (2SLS) method and, following Shah,  
 163 Shah, Smith, and Labianca (2017), we use the number of crimes per 10 million people in the  
 164 country (Crime\_Rate) as an instrument for JE. The rationale for choosing this instrument is that  
 165 the overall crime rate should be directly correlated with JE but not with FSE. We use this  
 166 instrument throughout the study to control for endogeneity.

167 The 2SLS model is specified below:

$$168 FSE_{it} = \beta_0 + \beta_1 \overline{JE}_{it} + \beta_n X_{it} + \varepsilon_{it} \quad Eq. (2)$$

169 Where,  $\overline{JE}$  is the instrumented or predicted value of JE obtained from the first-stage  
 170 regression using Crime\_Rate as the instrument variable. The remaining variables in Equation 2  
 171 are consistent with the definitions provided for Equation 1.

#### 174 3.2 Variables and data

175 This study explores how JE affects FSE using a sample of 108 countries for the period  
 176 from 2004 to 2020 (see Appendix A for the list of countries). Following Shah et al. (2017), JE,  
 177 the main explanatory variable, is measured using two proxies from the World Bank's "Doing  
 178 Business" database. These proxies are (i) JE\_Time which represents the number of days it takes  
 179 to resolve a judicial case, from the initiation of the case to implementation of the final court  
 180 decision. We take the inverse of JE\_Time as a primary measure of JE, following Shah et al.  
 181 (2017). The rationale for this approach is based on the assumption that speedier courts are

182 preferable to slower ones, even if they incur higher costs; and (ii) JE\_Cost which quantifies the  
 183 costs associated with a court trial, encompassing court fees, enforcement costs, and average  
 184 attorney fees, as a percentage of the total amount claimed. This measure is used as an alternative  
 185 proxy, for a robustness check.

186 FSE is the dependent variable in this study. To capture FSE comprehensively, we employ  
 187 a recent index provided by the International Monetary Fund ([IMF Svirydzenka, 2016](#)). This  
 188 index measures financial efficiency using two components; one for FIE and another for FME.  
 189 Both the FIE and FME indices have values that range from zero to one. Following the existing  
 190 literature, we average the FIE and FME indices and rescale the result to a base of 100, obtaining  
 191 an index that represents overall FSE. This method is similar to the one used in related studies  
 192 such as [Muhammad Atif Khan et al. \(2022\)](#). By using this method, we aim to offer a  
 193 comprehensive and reliable measure of FSE that is consistent with previous research efforts in  
 194 this field. For further detail on this index please see ([IMF Svirydzenka, 2016](#)).

195 We include several control variables in the model, namely economic growth (GDP\_PC),  
 196 financial sector size (DC\_PC), governance quality (QoG), trade openness, financial openness,  
 197 human capital, inflation, and government size. Economic growth is measured as GDP per capita  
 198 (in constant 2015 USD), financial sector size is the amount of domestic credit in the private  
 199 sector as a percent of GDP, and QoG is measured using governance quality index created using a  
 200 principal component analysis on these six governance indicators: control of corruption,  
 201 government effectiveness, political stability, regulatory quality, rule of law, and voice and  
 202 accountability. Each indicator ranges from  $-2.5$  to  $2.5$ , where a higher score indicates stronger  
 203 governance quality, and a lower score shows weaker quality. Trade openness is the total of all  
 204 imports and exports as a percent of GDP, financial openness is measured as the ratio of foreign  
 205 direct investment to GDP, human capital is proxied using the percent of gross primary school  
 206 enrollment, inflation is the annual growth rate of the GDP implicit deflator which shows the rate  
 207 of price change in the economy as a whole, and government size is proxied by government  
 208 expenditures as a percent of GDP. We obtain data for these variables from the World Bank's  
 209 World Development Indicators (WDI). Definitions and data sources for these variables are  
 210 shown in Table 1.

211

212

*Table 1. Definitions of the variables and data sources*

<b>Variables</b>	<b>Definitions</b>	<b>Data source</b>
Financial Markets efficiency (FME)	Measures how well a country's financial markets facilitate the exchange of financial assets, diversify risks, and allocate capital using the FME index compiled by <a href="#">IMF Svirydzenka (2016)</a> .	<a href="#">(IMF Svirydzenka, 2016)</a>
Financial institutions efficiency (FIE)	Measures how well a country's financial intermediaries facilitate the exchange of financial assets, diversify risks, and allocate capital, using the FIE index compiled by <a href="#">(IMF Svirydzenka, 2016)</a> .	<a href="#">(IMF Svirydzenka, 2016)</a>
Financial system Efficiency (FSE)	Derived by averaging the efficiency indices of financial institutions and financial markets (FIE and FME) compiled by <a href="#">(IMF Svirydzenka, 2016)</a> .	
Judicial Efficiency (JE_Time)	The inverse of the number of days taken to resolve a judicial case, spanning from the initiation of the case to the implementation of the final court decision,	World Bank's "Doing

	following <a href="#">Shah et al. (2017)</a>	Business” database
JE_Cost	Costs associated with a court trial, encompassing court fees, enforcement costs, and average attorney fees, as a percentage of the total claim amount.	World Bank’s “Doing Business” database
Economic Growth (GDP_PC)	GDP per capita, in constant 2015 USD.	WDI
Financial sector size (DC_PS)	Domestic credit in the private sector as a % of GDP.	WDI
Quality of Governance (GoG)	Measured using the governance quality index generated using a Principal Component Analysis based on voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption.	WGI
Trade openness	Total value of all imports and exports as a % of GDP.	WDI
Financial openness	Measured using the amount of foreign direct investment, net inflows (% of GDP).	WDI
Human Capital	Percent of the country’s gross primary school enrollment.	WDI
Inflation	Annual growth rate of the GDP implicit deflator, which shows the rate of price changes in the economy.	WDI
Government Size	Government expenditures as a % of GDP.	WDI
Legal origin	The legal tradition of the commercial code the country inherited, the variable is equal to 1 if legal origin is English Common Law, 2 if it is French Commercial Code, 3 if it is socialist/communist law, 4 if it is the German Commercial Code, and 5 if it is the Scandinavian Commercial Code.	<a href="#">(R. La Porta, Lopez-de-Silanes, Shleifer, &amp; Vishny, 1999)</a> and CIA Factbook
Latitude	The country’s absolute latitude of a country, used as a proxy for geographic location.	QoG standard data set
Culture	The religious fractionalization measure of <a href="#">Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003)</a> .	QoG standard data set

213

214

## 4 RESULTS AND DISCUSSION

### 4.1 Baseline results

215 To analyze the effect of JE on FSE we use a regression with country and year fixed  
 216 effects and robust standard errors as our baseline analysis. The results, reported in Table 2, show  
 217 JE has a significant positive impact on overall FSE, as well as on its two components, FIE and  
 218

219 FME. These findings are consistent with the theoretical and empirical literature that highlights  
 220 the role of JE in reducing transaction costs, enhancing contract enforcement, protecting property  
 221 rights, and fostering trust and confidence among market participants. For example, La Porta et al.  
 222 (1998), Beck et al. (2003), and Levine (2005) show that countries with better legal systems have  
 223 more developed financial markets and institutions, as they can mitigate the problems of  
 224 asymmetric information, moral hazard, and adverse selection, and promote financial  
 225 intermediation and innovation. Several empirical studies corroborate these arguments and  
 226 support our results (for instance, see [Cooray, 2011](#); [Laeven & Majnoni, 2005](#); [Shah et al., 2017](#)).

227 This result provides compelling evidence that an efficient judicial system is a key driver  
 228 of FSE. By fostering a conducive environment for economic transactions, an efficient judiciary  
 229 lays the foundation for a resilient and flourishing financial sector, supporting sustainable  
 230 economic growth. The positive effects of JE on FIE and FME further emphasize the importance  
 231 of the judicial system in shaping specific components of the financial sector. Effective judicial  
 232 enforcement of contracts empowers financial institutions to allocate resources more efficiently  
 233 and make informed lending decisions ([Pezone, 2023](#)). For example, our results support findings  
 234 in ([Bae & Goyal, 2009](#); [Laeven & Majnoni, 2005](#)) that show the cost of financial intermediation  
 235 for households and firms can be reduced by enhancing JE and the judicial enforcement of debt  
 236 contracts. In sum, our results indicate that improving JE can enhance the efficiency of the  
 237 financial system as a whole, as well as its main components: FIE and FME.

238  
239

*Table 2. Effect of JE on FSE: Baseline results*

	(1)	(2)	(3)
VARIABLES	FSE	FIE	FME
JE_Time	.036** (.016)	.011** (.005)	.091*** (.03)
GDP_PC	.03*** (.009)	.053*** (.01)	-.002 (.017)
DC_PS	.008* (.004)	.019*** (.004)	-.004 (.008)
QoG	.013** (.006)	.004 (.006)	.021* (.011)
Trade Openness	.012* (.007)	-.01 (.008)	.036*** (.013)
Financial Openness	.006*** (.001)	0 (.001)	.012*** (.002)
Human Capital	.008 (.018)	-.008 (.019)	.036 (.033)
Inflation	.002* (.001)	.001 (.001)	.003 (.002)
Govt._Exp	-.018 (.017)	.019 (.018)	-.053* (.031)
Constant	-.231 (.172)	.029 (.179)	-.506 (.313)
Country fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	1524	1524	1524
Number of countries	108	108	108
Adj.R_Squared	.162	.168	.162

F-Stat 35.10\*\*\* 38.10\*\*\* 33.11\*\*\*

*Note: This table reports baseline fixed effect regression estimates. FSE is overall financial system efficiency, FIE is financial institutions' efficiency and FME is financial markets' efficiency. Robust standard errors are in parentheses that clustered at country level. \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$*

240

## 241 4.2 2SLS Estimation

242 We apply 2SLS using the number of crimes committed per 10 million people in a country  
 243 (Crime\_Rate) as an instrument for JE, following [Shah et al. \(2017\)](#). The results are reported in  
 244 Table 3. The rationale for choosing this instrument is that overall, the crime rate is expected to be  
 245 directly correlated with the JE but not with the FSE. As can be seen in Table 3, the first-stage  
 246 regression shows that Crime\_Rate has a significant negative relationship with JE, confirming the  
 247 validity of the instrument. The diagnostics statistics reported in Table 3, i.e., the Cragg-Donald F-  
 248 statistic and Kleibergen–Paaprk LM statistic, reinforce the validity of the instrument and bolster  
 249 the reliability of our results.

250 The second-stage regression results confirmed our baseline findings and show that the  
 251 instrumented JE positively affects FSE and its components, FIE and FME. These results are  
 252 robust and support the presence of a causal relationship between JE and JSE and its components.  
 253 The results imply that an efficient judicial system enhances FSE by facilitating contract  
 254 enforcement, reducing information asymmetry, and increasing investor confidence. These factors  
 255 improve the efficiency of financial intermediation and resource allocation by financial system,  
 256 leading to better outcomes for households and businesses. A reliable judiciary helps financial  
 257 institutions make better lending decisions, manage risks, and allocate resources more optimally.  
 258 A robust judiciary also boosts the attractiveness of a country's financial markets by enhancing  
 259 investor protections and reducing uncertainty. These qualities increase market liquidity,  
 260 participation, and access to capital. Therefore, we conclude that JE positively influences FSE.  
 261 These findings highlight the critical role of a well-functioning judicial system in promoting  
 262 financial growth and stability, and indicate that policymakers should prioritize initiatives to  
 263 improve JE to create a favorable environment for a country's financial ecosystem. The positive  
 264 impact of JE on both JIE and FME demonstrates the multifaceted benefits of a strong judiciary  
 265 for the health of the financial sector.

266

*Table 3. The effect of JE on FSE: 2SLS Results*

	(1)	(2)	(3)	(4)
	JE	FE	FIE	FME
	First stage	Second stage	Second stage	Second stage
Instrument	-.008*** (.001)			
JE_Time(Instrumented)		.263*** (.038)	.148*** (.03)	.385*** (.053)
GDP_PC	.027* (.015)	.025*** (.007)	-.004 (.004)	.058*** (.012)
DC_PS	-.014 (.012)	.067*** (.008)	.035*** (.004)	.102*** (.015)
QoG	.006 (.013)	.017*** (.007)	-.003 (.005)	.043*** (.012)

Trade Openness	.168***	-.137***	-.037***	-.25***
	(.018)	(.011)	(.007)	(.019)
Financial Openness	-.006	-.005	.001	-.012*
	(.005)	(.003)	(.002)	(.006)
Human Capital	-.164**	-.091***	.007	-.214***
	(.075)	(.033)	(.025)	(.058)
Inflation	.026***	-.003	-.004*	0
	(.006)	(.003)	(.002)	(.005)
Govt._Exp	.163**	-.066*	-.087***	-.051
	(.071)	(.037)	(.024)	(.069)
Constant	6.262***	-.656*	-.168	-1.06*
	(.564)	(.352)	(.273)	(.606)
Fixed effects	Yes	Yes	Yes	Yes
Observations	1117	1117	1117	1117
Adj.R-Squared	.354	.221	.112	.417
F-Stat	36.11***	66.50***	27.9***	64.04***
Under Identification test:				
Kleibergen-Paap rk LM statistic		57.630	57.630	57.630
P-value		0.0000	0.0000	0.0000
Weak identification test				
Cragg-Donald Wald F statistic		128.898	128.898	128.898
Kleibergen-Paap rk Wald F statistic		73.087	73.087	73.087

*Note: This table reports the results of 2SLS estimation. FSE is overall financial system efficiency, FIE is financial institutions' efficiency and FME is financial markets' efficiency. Robust standard errors are in parentheses. \*, \*\*, and \*\*\* indicate level of significance at 10%, 5% and 1% respectively.*

### 267 4.3 Heterogeneity analysis: Income group classification

268 The sample used in our study is heterogeneous with respect to per capita income level.  
 269 The literature shows that countries with different wealth levels have different financial systems  
 270 and structures. Asongu (2012) argues that wealth affects both the quality of institutions  
 271 environment and financial system operations. Richer countries can afford better institutions and  
 272 have a greater demand for financial services than poorer countries. Therefore, we also delve into  
 273 the relationship between JE and FSE across various per capita income groups. We categorize the  
 274 sample into advanced, emerging, and low-income economies based on the International  
 275 Monetary Fund's (IMF's) income group classification. The regression results shown in Table 4  
 276 for each subgroup consistently demonstrate that JE exerts a positive effect on overall FSE and its  
 277 components, FIE and FME.

278 The positive impact of JE on FSE, FIE, and FME reinforces the significance of a well-  
 279 functioning judicial system in nurturing a thriving financial ecosystem. An efficient judiciary  
 280 enhances contract enforcement, reduces information asymmetry, and supports the growth of both  
 281 financial institutions and financial markets. Overall, our study contributes valuable insights to the  
 282 literature by highlighting the universal positive effect of JE on FSE, FIE, and FME across  
 283 diverse income groups. These findings, which are consistent across income groups, emphasize  
 284 the critical role of a robust legal system in shaping the performance and efficiency of the  
 285 financial sector, irrespective of the country's per capita income level. Policymakers should focus  
 286 on maintaining and further increasing JE to enhance FSE.

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Table 4. Effect of JE on FSE, FIE, and FME across income groups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Income Group=LIC	Income Group= EM	Income Group=HIC	Income Group=LIC	Income Group= EM	Income Group=HIC	Income Group=LIC	Income Group= EM	Income Group=HIC
	FSE	FSE	FSE	FIE	FIE	FIE	FME	FME	FME
JE_Time	.051*** (.01)	.037*** (.012)	.061*** (.021)	.071*** (.017)	.045*** (.008)	.056*** (.013)	.029*** (.007)	0.044** (2.35)	0.034** (2.29)
GDP_PC	-.006 (.004)	.011 (.007)	.075*** (.021)	-.019** (.009)	-.002 (.005)	.011 (.01)	.01*** (.002)	.022 (.015)	.166*** (.044)
DC_PS	.038*** (.003)	.062*** (.009)	.039*** (.014)	.07*** (.006)	.02*** (.004)	.008 (.008)	-.003 (.002)	.112*** (.017)	.077** (.03)
QoG	.007 (.006)	.005 (.006)	.046** (.022)	.002 (.011)	.004 (.005)	.018* (.011)	.026*** (.004)	.01 (.012)	.118*** (.045)
Trade Openness	-.025*** (.005)	-.039*** (.013)	-.138*** (.015)	-.041*** (.009)	.013* (.007)	-.045*** (.008)	-.009*** (.004)	-.104*** (.025)	-.224*** (.032)
Financial Openness	-.002 (.002)	-.008* (.005)	.004 (.003)	-.005 (.004)	-.001 (.003)	.002 (.002)	0 (.001)	-.019* (.01)	.005 (.006)
Human Capital	.029** (.012)	-.24*** (.055)	.296*** (.073)	.037* (.021)	-.162*** (.028)	.051 (.046)	.011** (.005)	-.34*** (.107)	.557*** (.142)
Inflation	-.004*** (.002)	.007** (.003)	-.003 (.006)	-.011*** (.003)	0 (.002)	0 (.004)	.003*** (.001)	.017** (.006)	-.006 (.012)
Govt._Exp	-.042** (.02)	-.216*** (.041)	.144 (.092)	-.034 (.041)	-.091*** (.026)	-.041 (.044)	-.013 (.009)	-.364*** (.086)	.464** (.192)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	.007 (.138)	2.545*** (.405)	-2.29*** (.664)	.046 (.262)	1.817*** (.229)	.057 (.358)	-.18*** (.065)	3.471*** (.818)	-5.624*** (1.407)
Observations	392	751	381	392	751	381	392	751	381
Adj. R-squared	.404	.243	.526	.382	.169	.344	.291	.21	.481

Note: This table reports the results of fixed effect regression estimates with robust standard errors that are clustered at the country level across

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*the various income groups. FSE is overall financial system efficiency, FIE is financial institutions' efficiency and FME is financial markets' efficiency. LIC, EM and HIC represent low-income countries, emerging economies and high-income countries respectively, Robust standard errors are in parentheses. \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$*

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290 **4.4 Robustness check**

291 *4.4.1 Alternative measure of JE*

292 We test the robustness of our results using an alternative measure of JE to ensure that our  
 293 results are not sensitive to the choice of the JE indicator. Following [Shah et al. \(2017\)](#), we use  
 294 JE\_Cost instead of JE\_Time to measure JE. JE\_Cost is the total cost of contract enforcement as a  
 295 percentage of the total claim amount. Table 5 reports the results of the regression using this  
 296 alternative proxy. The positive and significant coefficients of JE\_Cost in columns 1–3 support  
 297 our main findings and imply that the cost efficiency of a country's judicial process is a key driver  
 298 of its overall FSE and its components, FIE and FSE. The results of the robustness check  
 299 strengthen the reliability of our main findings.

300 *Table 4. Robustness test using alternative measure of JE*

	(1)	(2)	(3)
	FSE	FIE	FME
JE_Cost	.021** (.01)	.051*** (.015)	.036* (.019)
GDP_PC	.021** (.01)	.027** (.011)	.015 (.018)
DC_PS	.059*** (.005)	.04*** (.003)	.08*** (.01)
QoG	.017*** (.004)	.008** (.004)	.03*** (.008)
Trade Openness	-.003 (.011)	-.016 (.011)	.016 (.024)
Financial Openness	-.005** (.002)	-.002 (.001)	-.01** (.004)
Human Capital	-.065*** (.018)	0 (.016)	-.148*** (.033)
Inflation	-.001 (.002)	-.001 (.002)	.001 (.004)
Govt._Exp	-.056** (.026)	-.081*** (.019)	-.023 (.053)
Country fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Constant	.848*** (.163)	.585*** (.144)	1.101*** (.323)
Observations	1524	1524	1524
R-squared	.579	.292	.522

*Note: This table reports the result of fixed effect regression with robust standard errors estimation performed using alternative measure of JE. Robust standard errors are in parentheses. \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$ .*

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## 303 4.4.2 Robustness using additional control variables for both JE indicators.

304 In this section, we extend our analysis by incorporating additional controls for FSE to  
 305 further assess the robustness of our baseline findings. Specifically, we include variables for legal  
 306 origin, culture, and geography in our model, following [Cooray \(2011\)](#). Legal origin is the legal  
 307 tradition of the company law or commercial code that each country inherits. In the model, this  
 308 variable is equal to 1 for English Common Law, 2 for French Commercial Code, 3 for  
 309 socialist/communist law, 4 for German Commercial Code, and 5 for Scandinavian Commercial  
 310 Code. Data on legal origin is obtained from ([R. La Porta et al., 1999](#)) and the CIA Factbook. The  
 311 religious fractionalization measure of [Alesina et al. \(2003\)](#) is used to measure culture, and the  
 312 absolute latitude of a country is used to proxy its geography following [Cooray \(2011\)](#), with data  
 313 sourced from the QoG standard data set. The results presented in Table 6 are in line with our  
 314 baseline findings for both proxies of judicial efficiency, namely JE\_Time (columns 1–3) and  
 315 JE\_Cost (columns 4–6). The consistency between the baseline and extended results reinforces  
 316 the robustness of our findings, providing further support for the positive impact of JE on FSE.  
 317

318 *Table 6. Robustness using additional control variables.*

VARIABLES	(1) FSE	(2) FIE	(3) FME	(4) FSE	(5) FIE	(6) FME
JE_Time	.019** (.009)	.09*** (.025)	.035* (.02)			
JE_Cost				.065** (.028)	.056*** (.016)	.053* (.028)
GDP_PC	.009** (.004)	.011*** (.003)	.032*** (.008)	.011** (.004)	.014*** (.004)	.038*** (.009)
DC_PS	.08*** (.005)	.051*** (.003)	.113*** (.01)	.081*** (.005)	.05*** (.003)	.115*** (.01)
QOG	.011** (.005)	.002 (.004)	.016 (.01)	.011** (.005)	0 (.004)	.018* (.01)
Trade Openess	-.081*** (.006)	-.017*** (.004)	-.153*** (.012)	-.083*** (.006)	-.016*** (.004)	-.159*** (.012)
Financial Openess	-.001 (.002)	-.003* (.001)	-.001 (.005)	-.002 (.002)	-.002 (.001)	-.002 (.005)
Human Capital	-.1*** (.016)	-.02 (.016)	-.2*** (.031)	-.097*** (.016)	-.013 (.016)	-.2*** (.029)
Inflation	-.002 (.002)	.001 (.002)	-.004 (.004)	-.002 (.002)	0 (.002)	-.003 (.004)
Govt._Exp	-.163*** (.028)	-.064*** (.022)	-.272*** (.057)	-.155*** (.028)	-.065*** (.022)	-.255*** (.056)
French legal origin	.001 (.006)	-.001 (.005)	.005 (.014)	.001 (.006)	.002 (.005)	.001 (.014)
Socialist legal origin	-.001 (.011)	.008 (.006)	-.009 (.022)	-.005 (.011)	.015** (.007)	-.022 (.023)
German legal origin	.02 (.015)	-.018** (.008)	-.02 (.012)	.016 (.015)	-.015** (.008)	-.005 (.007)
Scandinavian legal origin	.023* (.013)	-.002 (.009)	.056** (.025)	.018 (.013)	.005 (.009)	.038 (.025)
Latitude	.235*** (.021)	.076*** (.016)	.399*** (.039)	.235*** (.021)	.058*** (.017)	.416*** (.04)

Culture	.088*** (.012)	.03*** (.009)	.15*** (.025)	.084*** (.012)	.031*** (.008)	.141*** (.024)
Constant	1.575*** (.188)	.817*** (.161)	2.459*** (.384)	1.49*** (.168)	.515*** (.157)	2.541*** (.334)
Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1340	1340	1340	1340	1340	1340
R-squared	.654	.317	.595	.653	.328	.596

*Note: This table reports the results of fixed effect regression estimation with robust standard errors that are clustered at country level performed using additional control variable to check the robustness of the main findings. Robust standard errors are in parentheses \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$ .*

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## 5 CONCLUSION AND POLICY RECOMMENDATIONS

322 Financial system efficiency (FSE) is crucial in optimizing resource utilization and  
 323 enhancing economic growth and development. It reflects the ability of a country's financial  
 324 sector to provide financial services to households and firms in a cost-effective manner. An  
 325 efficient and well-functioning financial system enables efficient resource allocation, stimulates  
 326 investment, and supports economic prosperity (Ro, Kim, & Kim, 2017; IMF Svirydzenka, 2016;  
 327 Yu, Li, & Huang, 2017). This study examines the impact of JE on FSE and its two key  
 328 components, FIE and financial markets' efficiency in a global context. Our sample includes 108  
 329 countries, spanning the period from 2004 to 2020, selected to maximize the use of available data.  
 330 We employed a fixed effect regression for our baseline analysis and 2SLS for our main analysis  
 331 to address potential endogeneity concerns.

332 The results of our study unequivocally reveal a positive and significant effect of JE on  
 333 FSE, FIE, and FME. These findings underscore the critical role of well-functioning and efficient  
 334 judicial systems in shaping robust and efficient financial ecosystems worldwide. A strong  
 335 judiciary enhances contract enforcement, reduces information asymmetry, and fosters investor  
 336 confidence, thereby promoting efficient financial intermediation and resource allocation. Our  
 337 findings reinforce new intuitional economics transaction cost theory and law and finance theory  
 338 in the context of JE and FSE.

339 To explore whether per capita income heterogeneity affects these relationships, we divide  
 340 the sample into income groups based on the IMF's classification. We find that the positive effects  
 341 of JE on FSE, FIE, and FME hold true across all income groups, validating the universal  
 342 significance of JE in driving FSE, regardless of a country's economic context. Additionally, we  
 343 conducted robustness checks by using alternative proxies of JE and introducing additional  
 344 control variables. The results of these tests further confirm the robustness and validity of our  
 345 main findings, reinforcing the positive relationship between JE and FSE.

346 Our study offers important insights for policymakers, regulators, and other stakeholders.  
 347 To achieve optimal economic growth and development, countries must prioritize implementing  
 348 reforms to foster JE and enhance efficient contract enforcement mechanisms. By fostering FSE  
 349 through efficient judicial processes, countries can unlock new opportunities for economic  
 350 development. International organizations and development agencies play a crucial role in this  
 351 endeavor by providing technical assistance and capacity building to countries seeking to improve  
 352 their JE and FSE. Sharing best practices and knowledge among countries will further enhance  
 353 FSE on a global scale. In conclusion, our study highlights the vital importance of JE in driving  
 354 FSE across countries at diverse stages of economic development. Policymakers and stakeholders

355 should leverage these findings to implement targeted JE reforms that foster FSE to help attain  
356 sustainable economic growth and prosperity.

357  
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### 360 REFERENCES

- 361 Acemoglu, D., & Johnson, S. (2005). Unbundling Institutions. *Journal of Political Economy*,  
362 113(5), 949-995. doi:10.1086/432166
- 363 Ahmad, N., & Ali, S. (2010). Corruption and financial sector performance: A cross-country  
364 analysis. *Economics Bulletin*, 30(1), 303-308.
- 365 Ahmad, N., Naveed, A., Ahmad, S., & Butt, I. (2020). BANKING SECTOR PERFORMANCE,  
366 PROFITABILITY, AND EFFICIENCY: A CITATION-BASED SYSTEMATIC  
367 LITERATURE REVIEW. *Journal of Economic Surveys*, 34(1), 185-218.  
368 doi:https://doi.org/10.1111/joes.12346
- 369 Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., & Wacziarg, R. (2003).  
370 Fractionalization. *Journal of Economic Growth*, 8(2), 155-194.  
371 doi:10.1023/A:1024471506938
- 372 Bae, K.-H., & Goyal, V. K. (2009). Creditor Rights, Enforcement, and Bank Loans. *The Journal*  
373 *of Finance*, 64(2), 823-860. doi:https://doi.org/10.1111/j.1540-6261.2009.01450.x
- 374 Coase, R. (1998). The New Institutional Economics. *The American Economic Review*, 88(2), 72-  
375 74.
- 376 Cooray, A. (2011). The role of the government in financial sector development. *Economic*  
377 *Modelling*, 28(3), 928-938. doi:https://doi.org/10.1016/j.econmod.2010.11.001
- 378 Diallo, B. (2018). Bank efficiency and industry growth during financial crises. *Economic*  
379 *Modelling*, 68, 11-22. doi:https://doi.org/10.1016/j.econmod.2017.03.011
- 380 Dima, B., Barna, F., & Nachescu, M.-L. (2018). Does rule of law support the capital market?  
381 *Economic Research-Ekonomska Istraživanja*, 31(1), 461-479.  
382 doi:10.1080/1331677X.2018.1432371
- 383 Ellahi, N., Kiani, A. K., Awais, M., Affandi, H., Saghir, R., & Qaim, S. (2021). Investigating the  
384 Institutional Determinants of Financial Development: Empirical Evidence From SAARC  
385 Countries. *SAGE Open*, 11(2), 21582440211006029. doi:10.1177/21582440211006029
- 386 Greenwood, J., & Jovanovic, B. (1990). Financial Development, Growth, and the Distribution of  
387 Income. *Journal of Political Economy*, 98(5, Part 1), 1076-1107. doi:10.1086/261720
- 388 Groenewegen, J., Spithoven, A., & Van Den Berg, A. (2010). *Institutional economics: An*  
389 *introduction*.
- 390 Herger, N., Hodler, R., & Lobsiger, M. (2008). What Determines Financial Development?  
391 Culture, Institutions or Trade. *Review of World Economics*, 144(3), 558-587.  
392 doi:10.1007/s10290-008-0160-1
- 393 Hoang, L. (2003). *The Effects of Judicial Efficiency on Credit Market Development*. Retrieved  
394 from
- 395 Khan, H., Khan, S., & Zuojun, F. (2020). Institutional Quality and Financial Development:  
396 Evidence from Developing and Emerging Economies. *Global Business Review*,  
397 0972150919892366.
- 398 Khan, M. A., Gu, L., Khan, M. A., & Bhatti, M. I. (2022). Institutional perspective of financial  
399 sector development: A multidimensional assessment. *Economic Systems*, 101041.  
400 doi:https://doi.org/10.1016/j.ecosys.2022.101041

- 401 Khan, M. A., Kong, D., Xiang, J., & Zhang, J. (2019). Impact of Institutional Quality on  
 402 Financial Development: Cross-Country Evidence based on Emerging and Growth-  
 403 Leading Economies. *Emerging Markets Finance and Trade*, 1-17.  
 404 doi:10.1080/1540496X.2019.1588725
- 405 La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government.  
 406 *The Journal of Law, Economics, and Organization*, 15(1), 222-279.  
 407 doi:10.1093/jleo/15.1.222
- 408 La Porta, R., Lopez-De-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal Determinants of  
 409 External Finance. *The Journal of Finance*, 52(3), 1131-1150. doi:10.1111/j.1540-  
 410 6261.1997.tb02727.x
- 411 La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, Robert W. (1998). Law and Finance.  
 412 *Journal of Political Economy*, 106(6), 1113-1155. doi:10.1086/250042
- 413 Laeven, L., & Majnoni, G. (2005). Does judicial efficiency lower the cost of credit? *Journal of*  
 414 *Banking & Finance*, 29(7), 1791-1812. doi:https://doi.org/10.1016/j.jbankfin.2004.06.036
- 415 Law, S. H., Kutan, A. M., & Naseem, N. A. M. (2018). The role of institutions in finance curse:  
 416 Evidence from international data. *Journal of Comparative Economics*, 46(1), 174-191.  
 417 doi:https://doi.org/10.1016/j.jce.2017.04.001
- 418 Lensink, R., Meesters, A., & Naaborg, I. (2008). Bank efficiency and foreign ownership: Do  
 419 good institutions matter? *Journal of Banking & Finance*, 32(5), 834-844.  
 420 doi:https://doi.org/10.1016/j.jbankfin.2007.06.001
- 421 Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal of*  
 422 *Economic Literature*, 35(2), 688-726.
- 423 Naghavi, N., & Lau, W.-Y. (2014). Exploring the nexus between financial openness and  
 424 informational efficiency – does the quality of institution matter? *Applied Economics*,  
 425 46(7), 674-685. doi:10.1080/00036846.2013.849380
- 426 North, D. (1981). *Structure and Change in Economic History* WW Norton & Co. New York.
- 427 North, D. C. (1990). *Institutions, institutional change and economic performance*: Cambridge  
 428 university press.
- 429 Pezone, V. (2023). The Real Effects of Judicial Enforcement\*. *Review of Finance*, 27(3), 889-  
 430 933. doi:10.1093/rof/rfac050
- 431 Pistor, K., Raiser, M., & Gelfer, S. (2000). Law and Finance in Transition Economies. *Economics*  
 432 *of Transition*, 8(2), 325-368. doi:https://doi.org/10.1111/1468-0351.00047
- 433 Ro, Y.-J., Kim, I.-C., & Kim, J. W. (2017). Financial Development and Investment in Korea.  
 434 *Emerging Markets Finance and Trade*, 53(3), 534-543.  
 435 doi:10.1080/1540496X.2015.1095562
- 436 Shah, A., Shah, H. A., Smith, J. M., & Labianca, G. (2017). Judicial efficiency and capital  
 437 structure: An international study. *Journal of Corporate Finance*, 44, 255-274.  
 438 doi:https://doi.org/10.1016/j.jcorpfin.2017.03.012
- 439 Staikouras, C., Mamatzakis, E., & Koutsomanoli-Filippaki, A. (2008). Cost efficiency of the  
 440 banking industry in the South Eastern European region. *Journal of International*  
 441 *Financial Markets, Institutions and Money*, 18(5), 483-497.  
 442 doi:https://doi.org/10.1016/j.intfin.2007.07.003
- 443 Svirydzenka, K. (2016). *Introducing a new broad-based index of financial development*:  
 444 International Monetary Fund.

- 445 Taddese Bekele, D., & Abebaw Degu, A. (2023). The effect of financial sector development on  
446 economic growth of selected sub-Saharan Africa countries. *International Journal of*  
447 *Finance & Economics*, 28(3), 2834-2842. doi:<https://doi.org/10.1002/ijfe.2566>
- 448 Voghouei, H., Azali, M., & Jamali, M. A. (2011). A survey of the determinants of financial  
449 development. *Asian-Pacific Economic Literature*, 25(2), 1-20.  
450 doi:<https://doi.org/10.1111/j.1467-8411.2011.01304.x>
- 451 Ximeng, L., & Zhiwen, L. (2023). Efficacy of judicial independence in explaining financial  
452 markets in emerging markets. *Borsa Istanbul Review*.  
453 doi:<https://doi.org/10.1016/j.bir.2023.07.001>
- 454 Yu, X., Li, M., & Huang, S. (2017). Financial Functions and Financial Development in China: A  
455 Spatial Effect Analysis. *Emerging Markets Finance and Trade*, 53(9), 2052-2062.  
456 doi:[10.1080/1540496X.2017.1286588](https://doi.org/10.1080/1540496X.2017.1286588)
- 457 Yuan, S., Wu, Z., & Liu, L. (2022). The effects of financial openness and financial efficiency on  
458 Chinese macroeconomic volatilities. *The North American Journal of Economics and*  
459 *Finance*, 63, 101819. doi:<https://doi.org/10.1016/j.najef.2022.101819>
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**Appendix A**

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Albania	Cambodia	Gambia, The	Korea, Rep.	Nigeria	Tajikistan
Algeria	Cameroon	Georgia	Kuwait	Norway	Tanzania
Argentina	Canada	Germany	Kyrgyz Republic	Oman	Thailand
Armenia	Chad	Ghana	Latvia	Pakistan	Togo
Australia	Chile	Greece	Lithuania	Panama	Tunisia
Austria	China	Guatemala	Luxembourg	Paraguay	Turkiye
Azerbaijan	Colombia	Guinea	Madagascar	Peru	Uganda
Bahrain	Congo, Dem. Rep.	Honduras	Malaysia	Philippines	Ukraine
Barbados	Congo, Rep.	Hungary	Mali	Poland	United Arab Emirates
Belarus	Costa Rica	India	Mauritius	Portugal	United Kingdom
Belgium	Croatia	Indonesia	Mexico	Qatar	United States
Benin	Denmark	Iran, Islamic Rep.	Mongolia	Romania	Uruguay
Bhutan	Dominican Republic	Ireland	Morocco	Russian Federation	Uzbekistan
Bolivia	Ecuador	Israel	Mozambique	Saudi Arabia	Zambia
Botswana	Egypt, Arab Rep.	Italy	Namibia	Senegal	
Brazil	El Salvador	Japan	Nepal	Spain	
Brunei Darussalam	Fiji	Jordan	Netherlands	Sri Lanka	
Bulgaria	Finland	Kazakhstan	New Zealand	Sweden	
	France	Kenya	Niger	Switzerland	

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