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Reinforcing inequalities: A critical examination of international sanctions and bureaucratic decline in the Global South

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ABSTRACT

This study critically examines the impact of international sanctions on bureaucratic quality in 74 developing countries from 1990 to 2020, highlighting how global governance mechanisms influence domestic institutional capacities. By focusing on the interaction between sanctions and economic crises, the research provides fresh empirical evidence on how external political pressures can inadvertently hinder development trajectories in the Global South. Utilizing a fixed-effect regression methodology with robust controls and addressing endogeneity concerns, the findings reveal that international sanctions—especially multilateral ones from the EU and UN—significantly deteriorate bureaucratic quality, particularly during economic crises. This deterioration undermines state capacity, exacerbates inequalities, and challenges the effectiveness and fairness of sanctions as tools of global governance. The study contributes to debates on global development by demonstrating how sanctions can reinforce global power asymmetries and produce divergent development outcomes. It urges a reevaluation of sanctions within international policy, advocating for more equitable and context-sensitive approaches that prioritize the institutional integrity and development needs of vulnerable nations. The research underscores the importance of aligning global governance mechanisms with ethical principles and development goals, promoting dialogue and collaboration over punitive measures to achieve a more inclusive and sustainable global development paradigm.

1. Introduction and Literature Review

In the increasingly interconnected world of the 21st century, the dynamics of global development are shaped not only by internal policies and capacities but also by external forces and international power relations. This study examines the impact of international sanctions on bureaucratic quality in 74 developing countries from 1990 to 2020, focusing on how these sanctions interact with economic crises. By exploring this intersection, we aim to contribute to critical debates on global development, particularly regarding how global governance mechanisms and international political pressures influence state capacities and development trajectories in the Global South.

Global development has become a central theme in contemporary discourse, emphasizing that development is holistic, universal, sustainable, and interconnected (Horner & Hulme, 2019). However, the role of international sanctions—a key tool of global governance—in shaping development outcomes has been underexplored, especially concerning their impact on state institutions crucial for socio-economic progress. While much of the existing literature explores the political effects of sanctions, such as regime change or human rights violations, fewer studies have investigated their impact on bureaucratic institutions—particularly in developing countries, where bureaucracies play a pivotal role in governance and development. By examining this understudied area, we seek to provide empirical evidence that grounds the debates on global development in concrete case studies, as called for by recent scholarly critiques that emphasize the need for substantive analyses in the global development paradigm (Special Issue Call, 2023).

Bureaucratic quality is vital for effective governance, particularly in developing countries, where public institutions are often the cornerstone of political stability and socio-economic development. In line with

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Max Weber's theoretical framework, bureaucracies are seen as rule-bound, impersonal, and hierarchical organizations grounded in rational-legal authority (Gerth & Mills, 1946; Weber, 2023). Weber argues that meritocracy, where personnel are selected and promoted based on performance, is central to the rationalization of bureaucracies. Over time, scholars have expanded this definition to include values such as equality and justice (Riccucci & Van Ryzin, 2016; Andersen, 2018). Andersen (2018), for instance, defines bureaucratic quality in the public sector as the degree to which government policies are formulated and executed accurately, efficiently, competently, and impartially. These dimensions form the foundation of a high-quality bureaucracy essential for achieving development goals.

In the context of state development, the administrative capacity to design and implement policies is critical to socio-economic progress, especially in late-industrializing countries. Historical evidence from industrialized nations supports Weber's assertion that a rational bureaucracy is indispensable for a modern state and an advanced capitalist economy (Weber, 2023). For developing countries, a capable bureaucracy is even more important for driving socio-economic development (Kohli, 2004; Haggard, 2018). Empirical research further supports this connection, showing that countries with stronger bureaucratic institutions tend to achieve better economic outcomes, such as higher openness, greater productivity, and sustained growth (Blackburn & Forgues-Puccio, 2010; Evans & Rauch, 1999). Beyond economic benefits, improved bureaucratic quality is associated with socio-political advantages, including increased government trust, democratic resilience, improved public health, and higher human well-being (Dahlberg & Holmberg, 2014; Andersen & Krishnarajan, 2019; Prasad & Zaloznaya, 2021).

However, while much research focuses on internal factors influencing bureaucratic quality, such as corruption or public sector reforms, external political forces, particularly those emanating from the international arena, also play a significant role in shaping development outcomes. For example, the threat of war or external intervention has been shown to increase state capacity by fostering unity and strengthening central government authority (Tilly, 2017; Gibler & Miller, 2014). Similarly, external actors like the International Monetary Fund (IMF) have promoted neoliberal policies through structural adjustment programs, which can adversely affect bureaucratic quality by encouraging special interests and limiting policy flexibility (Reinsberg et al., 2019). These examples illustrate how global governance mechanisms and international policies can influence domestic institutional capacities, thereby impacting development trajectories.

A notable gap in the literature concerns the impact of international sanctions on bureaucratic quality. International sanctions, typically imposed as punitive measures to pressure a country to change its political behavior, have been shown to undermine economic development, exacerbate public health crises, and increase poverty levels (Peksen, 2011; Gordon, 2016; Splinter & Klomp, 2022). However, less is known about how sanctions affect the quality of state institutions, particularly bureaucracies that are crucial for implementing development policies. The few studies that explore this relationship tend to focus on the political realm, documenting how sanctions erode civil rights, political stability, and national leadership survival (Peksen, 2009; Escribà-Folch & Wright, 2010). This study seeks to fill this gap by examining how sanctions influence bureaucratic quality in developing countries, focusing on how the effects of sanctions are compounded during periods of economic crisis.

Economic crises, such as currency or debt crises, can already strain the capacity of bureaucracies by reducing state revenues, increasing debt, and creating political instability (Reinsberg et al., 2019). When combined with sanctions, which further restrict economic resources, these crises can severely undermine the functioning of bureaucratic institutions. This study hypothesizes that sanctions exacerbate the negative impact of economic crises on bureaucratic quality, particularly in developing countries where bureaucracies are more vulnerable to external shocks. By analyzing this interaction, we contribute to the broader discussion on state capacity and governance under external pressure, providing empirical evidence that highlights the complexities of global development processes.

In framing this study, we draw on broader critical perspectives on development, sanctions, and global power dynamics. Veltmeyer (2020) argues that sanctions, as tools of international politics, function as extensions of broader global inequalities, reinforcing the dominance of powerful states over the developing world. Similarly, critiques of the neoliberal development model highlight how sanctions exacerbate the vulnerabilities of developing countries by limiting their policy space and reinforcing dependency on external actors (Korf, 2023). By exploring how sanctions impact bureaucratic quality, this study engages with these critical perspectives, highlighting the broader implications for global development and governance. Our analysis contributes to the debates on divergence in development outcomes, illustrating how external interventions can lead to varying trajectories among nations.

Finally, this study situates itself within the evolving discourse on global development, moving beyond traditional North-South binaries. Horner & Hulme (2019) argue that development challenges today are increasingly global in nature, with inequalities persisting both between and within nations. In this context, sanctions represent a key tool in global governance that has profound implications for state capacity and development, particularly in vulnerable states. Our analysis contributes to this discussion by examining the specific institutional consequences of sanctions, thereby providing a more nuanced understanding of how external political forces shape governance in developing countries. By grounding our discussion in fresh empirical data and employing specific methodological perspectives, we respond to the call for substantive analyses that can substantiate and further develop arguments for a global development paradigm.

The remainder of this paper is organized as follows: Section 2 describes the data sources and methodology employed in the study. Section 3 presents the empirical results and analyzes the impact of international sanctions on bureaucratic quality. Section 4 discusses the findings in the context of existing literature and global development debates, elaborates on the policy implications, and suggests directions for future research. Finally, Section 5 concludes the study by summarizing the key insights and contributions to the discourse on global development.

Data & methodology

To address the research questions and hypotheses outlined in the introduction, this study employs a comprehensive empirical strategy that leverages a cross-country and cross-year panel dataset spanning from 1990 to 2020. This dataset includes 74 developing countries that have been affected by international sanctions (Table 1). The chosen timeframe, beginning in 1990, is strategically selected based on the availability of key datasets, particularly the sanctions variable from Von Soest & Wahman (2015). This starting point allows for a robust analysis of the impact of sanctions over time. The focus on developing countries is intentional, aligning with the study's goal of exploring the effects of international sanctions on nations with limited economic resources and greater vulnerabilities compared to developed countries. By concentrating on these countries, the study contributes empirical evidence to the debates on global development, particularly regarding how global governance mechanisms influence development trajectories in the Global South.

Dependent Variable: Bureaucratic quality

The dependent variable in this study is the Bureaucratic Quality indicator, sourced from the International Country Risk Guide (ICRG). This indicator is measured on a scale from 0 (indicating low bureaucratic quality) to 4 (indicating high bureaucratic quality). The average score

Table 1
Descriptive Statistics of Variables.

Variable	Mean	SD	Min	Max	Source
Bureaucratic quality	1.4136	0.8166	0	4	The PRS Group (2024)
US sanctions	0.3326	0.4712	0	1	Felbermayr et al. (2020); Von Soest & Portela (2012)
EU sanctions	0.2563	0.4367	0	1	Felbermayr et al. (2020); Von Soest & Portela (2012)
UN sanctions	0.1286	0.3348	0	1	Felbermayr et al. (2020); Von Soest & Portela (2012)
Intensity	2.2698	1.6557	1	5	Felbermayr et al. (2020); Von Soest & Portela (2012)
Economic	0.3365	0.4726	0	1	Felbermayr et al. (2020); Von Soest & Portela (2012)
Unilateral	0.1857	0.3890	0	1	Felbermayr et al. (2020); Von Soest & Portela (2012)
Plurilateral	0.1146	0.3187	0	1	Felbermayr et al. (2020); Von Soest & Portela (2012)
Economic Crisis	0.5493	0.4977	0	1	Nguyen et al. (2022)
GDP per capita (logged)	7.1135	1.1410	3.1290	9.8959	World Bank (2024)
Population (logged)	2.5852	1.4568	−1.7148	7.2521	World Bank (2024)
Urbanization (logged)	3.7184	0.4879	1.6901	4.5155	World Bank (2024)
FDI to GDP % (logged)	0.5249	1.3727	−4.6052	5.0865	World Bank (2024)
Trade Openness (logged)	4.0881	0.5485	−3.9120	5.1041	World Bank (2024)
Democracy	1.2410	0.7541	0	3.57	Angiolillo et al. (2024)
Election year	0.2746	0.4464	0	1	Angiolillo et al. (2024)
Foreign aid per capita (logged)	3.2760	1.3144	−6.1260	6.6445	World Bank (2024)
Globalization (logged)	3.8364	0.2795	2.9549	4.4005	Dreher et al. (2008)
Local conflict (logged)	4.4670	3.9133	0	14.3508	Banks and Wilson (2024)
Natural resource to GDP % (logged)	1.4616	1.6967	−6.9078	4.4840	World Bank (2024)
Military spending to GDP % (logged)	0.5568	0.7786	−3.5066	3.5375	World Bank (2024)
UNGA US	−3.3428	0.63667	−5.1961	−1.3827	Bailey et al. (2016)

among the targeted developing countries is 1.4136, reflecting generally low bureaucratic quality across the sample. The ICRG dataset is widely regarded in studies examining bureaucratic quality (e.g., Andersen & Krishnarajan, 2019; Houran & Mehmood, 2023; Reinsberg et al., 2019; Selaya & Thiele, 2012). Higher scores signify countries with strong, capable bureaucracies that effectively govern, ensuring policy stability and uninterrupted government services. These countries typically exhibit lower levels of risk, with bureaucracies that operate relatively autonomously from political pressures and have well-established recruitment and training mechanisms (The PRS Group, 2024).

By analyzing bureaucratic quality as the dependent variable, the study directly engages with core aspects of state capacity crucial for development. This focus allows us to empirically examine how external pressures from global governance tools like sanctions impact the institutional foundations essential for socio-economic progress in developing countries. Such an approach grounds the abstract debates on global development in concrete data, responding to calls for more substantive analyses in the field.

Independent Variables: International sanctions

To examine the effects of international sanctions, the study constructs variables related to sanctions using datasets from the German Institute of Global and Area Studies (GIGA) Sanction dataset by Von Soest & Portela (2012) and the Global Sanctions Database (GSDB) by Felbermayr et al. (2020). These datasets are well-established in the literature and provide detailed information on sanctions, enabling a nuanced analysis of their impact. The sanctions are categorized into seven types, including the sender (e.g., the United States, European Union, and United Nations), intensity, economic focus, and the nature of the sanctions (unilateral or plurilateral). This categorization allows for a detailed examination of how different types of sanctions affect bureaucratic quality.

The dataset reveals that 33.26 % of observations were sanctioned by the U.S., 25.63 % by the EU, and 12.86 % by the UN, indicating that the U.S. imposes the most sanctions, while the UN rarely imposes sanctions on targeted developing countries. Furthermore, 33.65 % of observations involved economic sanctions, 18.57 % were unilateral, and 11.46 % were plurilateral. These statistics align with existing literature examining the effects of international sanctions using similar categorical variables (e.g., Fu et al., 2020; Wen et al., 2021). All sanction variables are dummy variables, except for intensity, which is represented on an ordinal scale. The intensity score ranges from one (no sanctions) to six (extremely intense sanctions, such as an embargo). The average intensity score is 2.2698, indicating that international sanctions are generally of low intensity. Including the intensity measure allows for consideration of varying degrees of sanctions, avoiding oversimplification.

By differentiating between various sanctioning bodies and types, the study contributes to the dialogue on how global power dynamics and international policies influence development outcomes. This detailed categorization enables us to explore the nuanced ways in which global governance mechanisms impact state institutions in the developing world, thereby enriching the debates on global development, divergence, and dialogue.

Interaction Terms: Sanctions and Economic crises

Recognizing that the impact of sanctions may vary depending on the economic context of the targeted countries, this study incorporates interaction terms between the explanatory sanction variables and the Economic Crisis variable. The Economic Crisis variable is defined by Nguyen et al. (2022) and identifies whether a country is currently experiencing an economic crisis, such as a banking, currency, or sovereign debt crisis. This variable is coded as one if a country-year is affected by any of these crises and zero otherwise, a method widely used in previous studies (Chletsos & Sintos, 2023). The study hypothesizes that during economic crises, international sanctions exacerbate the weakening of bureaucratic quality compared to periods without an economic crisis. The dataset indicates that 54.93 % of country-years experienced an economic crisis, reflecting the frequent occurrence of crises in targeted developing countries.

By analyzing the interaction between sanctions and economic crises, the study examines how compounded external and internal pressures affect state capacity. This approach contributes to the discourse on divergence in development outcomes, highlighting how global governance mechanisms can lead to varying trajectories among nations. It provides empirical evidence of the complex interplay between international policies and domestic vulnerabilities, thus advancing the dialogue on global development.

Control Variables: Socio-Economic and political factors

To ensure the robustness of the findings, the study includes several crucial covariates that address socio-economic and political factors potentially influencing bureaucratic quality. Economic development is measured by GDP per capita (logged), as wealthier countries often have better resources to maintain higher bureaucratic quality (Bäck & Hadenius, 2008; Reinsberg et al., 2019). Additionally, population size (logged) and urbanization (logged) are considered, as larger and more urbanized populations can strain government resources, potentially diminishing bureaucratic quality (Holcombe & Williams, 2008; Tran et al., 2019). Foreign direct investment (FDI) relative to GDP is also included, given that increased foreign investment can enhance state resources and support investments in the government sector (e.g., Phan & Nguyen, 2020).

Trade openness (logged) is another key control variable, as it can indicate exploitative trade relationships between developed and developing countries, potentially depleting resources and hindering state capacity development (Reinsberg et al., 2019). The study also controls for democracy, recognizing that democratic societies have mechanisms for holding governments accountable for investments in public goods, including efficient government services. In contrast, undemocratic regimes have weaker accountability, reducing incentives to improve bureaucratic quality (Fortin-Rittberger, 2014). Additionally, the variable for election year is included, considering that incumbent governments may enhance government services through increased state investments during election years to secure voter support and maintain power (Balaguer-Coll et al., 2015).

Including these control variables acknowledges the multifaceted nature of development processes, where both internal socio-economic conditions and external global forces interact. This comprehensive approach aligns with the special issue's emphasis on grounding global development debates in substantive analyses that consider multiple dimensions, thereby contributing to a more holistic understanding of how global and domestic factors converge to shape development outcomes.

Analytical Approach: Fixed-Effect Regression methodology

The study employs a fixed-effect regression methodology to explore the relationship between international sanctions and bureaucratic quality. We chose the fixed-effect model due to the Hausman Test falling below the 5 % significance level, indicating its superiority over the random-effects model for our analysis. Previous studies have individually examined different components of international sanctions in fixed-effect regression models to mitigate potential multicollinearity concerns that could compromise estimate precision (e.g., Chen et al., 2019; Early & Peksen, 2022; Fu et al., 2023; Fu & Chang, 2024; Moteng et al., 2023). This fixed-effect regression approach is particularly crucial when analyzing longitudinal datasets spanning multiple time periods across various countries, enabling the control of diverse factors while addressing country-specific and year-specific effects.

The regression equations are specified as follows:

$$BQ_{\iota\tau} = \alpha_1 + \alpha_2(Sanctions_{\iota\tau-1} x EconCrisis_{\iota\tau-1}) + \alpha_3 X_{\iota\tau-1} + \upsilon_\iota + \varsigma_\tau + \varepsilon_{\iota\tau} \quad (1)$$

BQ Denotes bureaucratic quality, while *Sanctions* denotes one of the seven explanatory variables related to international sanctions, which has been interacted with *EconCrisis*, which refers to the dummy variable of economic crisis. X refers to the covariates, while the ι, τ , and ε refers to set of country dummies, year dummies, and error terms respectively. The $\tau-1$ suggest that all of the right-hand-side variables are lagged by one year to account for the slow-moving nature of bureaucratic quality and address potential concerns related to serial correlation, as discussed in Reinsberg et al. (2019). This lag allows for the effects of international sanctions to be realized over time. Additionally, we have conducted separate analyses without the interaction of the economic crisis variables to facilitate better comparability of our results:

$$BQ_{\iota\tau} = \alpha_1 + \alpha_2 Sanctions_{\iota\tau-1} + \alpha_3 X_{\iota\tau-1} + \upsilon_\iota + \varsigma_\tau + \varepsilon_{\iota\tau} \quad (2)$$

Through this methodological framework, the study aims to provide a rigorous and nuanced understanding of how international sanctions interact with economic crises to influence bureaucratic quality in developing countries. By employing a robust analytical approach that accounts for both global governance mechanisms and domestic factors, the study contributes empirical evidence to the debates on global development. The methodology enables us to examine how external political pressures, in the form of sanctions, intersect with internal economic challenges to shape state capacities, thereby enriching the discourse on divergence and dialogue within global development studies.

Results

The empirical analysis yields several significant findings that illuminate the impact of international sanctions, particularly in the context of economic crises, on bureaucratic quality in targeted developing countries. These findings not only provide insights into the specific effects of sanctions but also contribute to broader debates on global development by demonstrating how global governance mechanisms can influence domestic institutional capacities, potentially leading to divergent development trajectories.

Overall impact of sanctions and Economic crises

Table 2 reveals the interaction between sanctions variables and economic crises. An additional unit of interaction between economic crises and U.S., EU, and UN sanctions shows a significant negative association with bureaucratic quality, with coefficients of −0.1358, −0.1881, and −0.3696, respectively. These results, statistically significant, demonstrate the compounded negative effects of both economic crises and sanctions on bureaucratic performance. UN sanctions, in particular, have the most severe impact, exceeding the effects of sanctions imposed by the U.S. and EU. This finding highlights the stronger pressures exerted by multilateral sanctions, especially those from international bodies like the UN, which lead to a more pronounced deterioration in bureaucratic quality.

From a global development perspective, these results underscore how international sanctions—tools of global governance—can adversely affect the institutional capacities of developing countries. By undermining bureaucratic quality, sanctions can hinder the ability of states to implement development policies effectively, exacerbating inequalities and impeding progress toward holistic and sustainable development goals. This finding aligns with critical perspectives that question the neutrality of global governance mechanisms and highlight their potential to reinforce global power asymmetries (Veltmeyer, 2020; Korf, 2023).

The analysis also explores the effect of sanctions intensity. A one-unit increase in sanctions intensity, when combined with economic crises, correlates with a negative coefficient of −0.0537, indicating that more intense sanctions further degrade bureaucratic quality during such crises. This highlights the need to consider the severity of sanctions when evaluating their impact on state institutions critical for development. Moreover, economic-targeted sanctions, focused on financial and economic systems, carry a significant negative coefficient of −0.16919,

Table 2
Fixed-Effects Panel Regression: Sanctions and Economic Crisis Impact on Bureaucracy Quality in Targeted Developing Countries.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	0.0912**						
	(0.0473)						
US Sanctions x Economic Crisis	−0.1358**						
	(0.0619)						
EU Sanctions		0.0100					
		(0.0526)					
EU Sanctions x Economic Crisis		−0.1881***					
		(0.0674)					
UN Sanctions			0.1076				
			(0.0741)				
UN Sanctions x Economic Crisis			−0.3696***				
			(0.0953)				
Intensity				0.0126			
				(0.0159)			
Intensity x Economic Crisis				−0.0537***			
				(0.0193)			
Economic					0.0904**		
					(0.0440)		
Economic x Economic Crisis					−0.1692***		
					(0.0602)		
Unilateral						0.1783***	
						(0.0520)	
Unilateral x Economic Crisis						−0.0222	
						(0.0715)	
Plurilateral							−0.1500*
							(0.0775)
Plurilateral x Economic Crisis							−0.0015*
							(0.0966)
Economic Crisis	−0.1338**	−0.1329***	−0.1443***	−0.0667	−0.1203***	−0.1694***	−0.1688***
	(0.0473)	(0.0358)	(0.0341)	(0.0496)	(0.0380)	(0.0352)	(0.0347)
GDP Per Capita	0.1058***	0.1060***	0.0981***	0.1025***	0.1102***	0.1171***	0.1166***
	(0.0279)	(0.0278)	(0.0279)	(0.0279)	(0.0278)	(0.0278)	(0.0280)
Population	−0.4322***	−0.3799***	−0.3839***	−0.4115***	−0.4253***	−0.4522***	−0.4166***
	(0.1066)	(0.1060)	(0.1062)	(0.1060)	(0.1073)	(0.1059)	(0.1059)
Urbanization	−0.3007*	−0.3158*	−0.2729	−0.2997*	−0.3114*	−0.2571(0.1761)	−0.3227*
	(0.1771)	(0.1759)	(0.1761)	(0.1765)	(0.1774)		(0.1761)
FDI to GDP	0.0179	0.0192	0.0154	0.0181	0.0181	0.0183	0.0164(0.0122)
	(0.0123)	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0122)	
Trade Openness	0.0617	0.0587	0.0496	0.0446	0.0597	0.0649	0.0558
	(0.0464)	(0.0462)	(0.0463)	(0.0466)	(0.0463)	(0.0460)	(0.0463)
Democracy	0.1005***	0.0795***	0.0860***	0.0827***	0.0918***	0.0945***	0.0743***
	(0.0279)	(0.0273)	(0.0271)	(0.0278)	(0.0274)	(0.0270)	(0.0277)
Election Year	0.0011	0.0019	−0.0021	0.0020	−0.0006	−0.0028	0.0024
	(0.0261)	(0.0261)	(0.0260)	(0.0261)	(0.0261)	(0.0260)	(0.0261)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1290	1290	1290	1290	1290	1290	1290
R-Squared	0.0152	0.0212	0.0246	0.0201	0.0172	0.0275	0.0173

$p < 0.01$***, $p < 0.05$**, $p < 0.01$*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

underscoring their damaging effect on bureaucratic quality, especially amid economic crises. Sanctions that directly target a nation's economic foundation exacerbate the financial strain on the state, further undermining bureaucratic performance and, by extension, its development prospects.

Finally, unilateral sanctions show no significant effect, while plurilateral sanctions interacting with economic crises weaken bureaucratic quality by 0.0015 units. These nuanced findings suggest that the multilateral nature of sanctions plays a critical role in their impact on state institutions, with multilateral sanctions posing greater challenges to bureaucratic quality and, consequently, to development efforts.

Independent effects of sanctions without Economic crises

To further understand the impact of sanctions independent of economic crises, Table 3 presents the analysis of key sanction variables without the economic crisis interaction. Here, the negative associations observed for U.S., UN, and economic sanctions are diminished, indicating that these sanctions categories alone do not significantly impact bureaucratic quality. However, the EU, Intensity, and Plurilateral sanctions continue to demonstrate statistically significant, albeit weaker, negative associations with bureaucratic quality, with coefficients of −0.08877, −0.0207, and −0.1509, respectively.

These findings suggest that while economic crises amplify the negative effects of sanctions, the sanctions themselves still exert pressure on bureaucratic quality, though to a lesser degree. From a global development standpoint, this indicates that even in the absence of economic crises, sanctions can undermine state capacities essential for development, albeit less severely. This challenges the assumption that sanctions are benign in stable economic contexts and underscores the importance of considering their broader implications for development policies and institutional resilience.

Conversely, unilateral sanctions reveal a stronger positive effect on bureaucratic quality with a coefficient of 0.1668 in Table 3. This result may indicate that unilateral sanctions, which often allow targeted states more flexibility in finding alternative economic partners, might incentivize bureaucracies to improve their functioning in response to external pressures. However, due to inconsistencies observed in robustness

Table 3
Fixed-Effects Panel Regression: Sanctions Impact on Bureaucracy Quality in Targeted Developing Countries Without Economic Crisis Interaction.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Economic Crisis	−0.1702***	−0.1674***	−0.1696***	−0.1686***	−0.1699***	−0.1728***	−0.1689***
	(0.0337)	(0.0336)	(0.0336)	(0.0336)	(0.0337)	(0.0334)	(0.0336)
US Sanctions	0.02739						
	(0.0333)						
EU Sanctions		−0.0888**					
		(0.0391)					
UN Sanctions			−0.0851				
			(0.0553)				
Intensity				−0.0207*			
				(0.0106)			
Economic					0.0084		
					(0.0330)		
Unilateral						0.1668***	
						(0.0364)	
Plurilateral							−0.1509***
							(0.0530)
GDP Per Capita	0.1085***	0.1100***	0.1061***	0.1061***	0.1092	0.1168***	0.1166***
	(0.0279)	(0.0279)	(0.0280)	(0.0279)	(0.0279)	(0.0277)	(0.0280)
Population	−0.4223***	−0.3883***	−0.3899***	−0.3953***	−0.4169***	−0.4489***	−0.4167***
	(0.1066)	(0.1062)	(0.1068)	(0.1061)	(0.1076)	(0.1053)	(0.1056)
Urbanization	−0.3297*	−0.3396*	−0.3278*	−0.3429*	−0.3342*	−0.2594	−0.3227*
	(0.1769)	(0.1762)	(0.1765)	(0.1763)	(0.1777)	(0.1759)	(0.1761)
FDI to GDP	0.0161	0.0160	0.0159	0.0160	0.0160	0.0180	0.0164
	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0123)	(0.0122)	(0.0122)
Trade Openness	0.0668	0.0590	0.0578	0.0528	0.0648	0.0657	0.0558
	(0.0464)	(0.0463)	(0.0465)	(0.0469)	(0.0463)	(0.0460)	(0.0463)
Democracy	0.0953***	0.0826***	0.0871***	0.0776***	0.0912***	0.0947***	0.0743***
	(0.0279)	(0.0273)	(0.0272)	(0.0279)	(0.0275)	(0.0270)	(0.0276)
Election Year	0.0006	0.0041	0.0019	0.0031	0.0011	−0.0029	0.0025
	(0.0261)	(0.0261)	(0.0262)	(0.0261)	(0.0262)	(0.0260)	(0.0261)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1290	1290	1290	1290	1290	1290	1290
R-Squared	0.0122	0.0158	0.0135	0.0147	0.0117	0.0282	0.0181

p<0.01***, p<0.05**, p<0.01*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

checks, this positive association warrants cautious interpretation.

Robustness checks and Contextual Variations

To ensure the robustness of the findings, several additional analyses were conducted. The robustness checks, which included all developing countries regardless of sanction status, confirm the main findings. In Table 4, most sanction variables remain significantly negatively associated with bureaucratic quality, except for unilateral sanctions, which remain statistically positive, while the negative significance effect of plurilateral sanctions is canceled out. These results are consistent with the main findings presented in Table 2, reinforcing the argument that international sanctions generally undermine bureaucratic quality, particularly in the context of economic crises.

These consistent negative associations across different models highlight the pervasive impact of sanctions on bureaucratic quality in developing countries. This reinforces critical arguments in global development debates about how external interventions can produce divergent development outcomes by weakening state institutions in some countries, thereby exacerbating global inequalities.

Further analysis distinguishes between countries affected by economic crises and those not affected. Table 5 shows that all sanction variables, except unilateral sanctions, have a statistically significant negative association with bureaucratic quality in countries experiencing an economic crisis. This finding highlights the heightened vulnerability of bureaucratic quality in states facing both economic and external political pressures. It underscores the compounded challenges that developing countries face in the global development landscape, where external sanctions can intensify internal crises, leading to further divergence in development trajectories.

In contrast, Table 6 examines countries not experiencing economic crises and presents a different picture. Here, most sanction variables, except for plurilateral sanctions, positively associate with bureaucratic quality. This suggests that in the absence of an economic crisis, sanctions might have a less detrimental or even positive impact on bureaucratic quality, potentially due to bureaucratic resilience or the adaptation of state institutions to external pressures. This variation emphasizes the importance of context in global development studies, illustrating how similar global governance mechanisms can have different outcomes depending on domestic conditions.

Impact across Economic strata

The study also examines the impact of sanctions on bureaucratic quality across different economic strata by dividing sanctioned developing countries into relatively poorer and more affluent groups. This division enables an analysis of how a country's economic status affects the influence of sanctions, contributing to the dialogue on divergence within global development.

Table 7 shows that in poorer developing countries, all sanctions, except unilateral sanctions, exhibit a negative association with bureaucratic quality when combined with economic crises. This indicates that poorer countries are more adversely affected by sanctions, which can further hinder their development efforts and widen the gap between them and more affluent nations. This finding supports arguments that global governance mechanisms, like sanctions, can reinforce existing inequalities and contribute to divergent development outcomes (Horner & Hulme, 2019).

In contrast, Table 8 indicates that in more affluent developing countries, only EU, UN, intensity, economic, and unilateral sanctions significantly reduce bureaucratic quality. These findings suggest that while more affluent countries—typically with stronger institutional

Table 4
Fixed-Effects Panel Regression: Sanctions and Economic Crisis Impact on Bureaucracy Quality Across All Developing Countries.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	0.1031** (0.0434)						
US Sanctions x Economic Crisis	−0.1596*** (0.0559)						
EU Sanctions		0.0194 (0.0500)					
EU Sanctions x Economic Crisis		−0.2260*** (0.0629)					
UN Sanctions			0.1089 (0.0711)				
UN Sanctions x Economic Crisis			−0.4020*** (0.0911)				
Intensity				0.0149 (0.0147)			
Intensity x Economic Crisis				−0.0592*** (0.0173)			
Economic					0.09102** (0.0406)		
Economic x Economic Crisis					−0.1938*** (0.0543)		
Unilateral						0.1824*** (0.0490)	
Unilateral x Economic Crisis						−0.0431 (0.0666)	
Plurilateral							−0.1205 (0.0736)
Plurilateral x Economic Crisis							−0.0570 (0.0918)
Economic Crisis	−0.0744*** (0.0256)	0.0745*** (0.0250)	−0.0839*** (0.0244)	−0.0099 (0.0355)	−0.0668*** (0.0257)	−0.04314 (0.0666)	−0.0955 (0.0246)
GDP Per Capita	0.0845*** (0.0192)	0.0839*** (0.0191)	0.0793*** (0.0190)	0.0820*** (0.0192)	0.0870*** (0.0191)	0.0901*** (0.0192)	0.0885*** (0.0192)
Population	−0.2398*** (0.0634)	−0.2157*** (0.0631)	−0.2180*** (0.0632)	−0.2329*** (0.0632)	−0.2368 (0.0635)	−0.2441*** (0.0632)	−0.2281 (0.0631)
Urbanization	−0.1866 (0.1184)	−0.1836 (0.1181)	−0.1603 (0.1183)	−0.1773 (0.1183)	−0.1911 (0.1184)	−0.1752 (0.1181)	−0.1943 (0.1183)
FDI to GDP	0.0070 (0.0086)	0.0087 (0.0086)	0.0061 (0.0086)	0.0075 (0.0086)	0.0073 (0.0086)	0.0068 (0.0086)	0.0063 (0.0086)
Trade Openness	0.1119*** (0.0356)	0.1111*** (0.0355)	0.1030*** (0.0356)	0.1004*** (0.0357)	0.1117*** (0.0356)	0.1156*** (0.0355)	0.1100*** (0.0356)
Democracy	0.0712*** (0.0230)	0.0561** (0.0226)	0.0612*** (0.0225)	0.0589** (0.0229)	0.0649*** (0.0227)	0.0670*** (0.0224)	0.0531** (0.0228)
Election Year	0.0020 (0.0187)	0.0020 (0.0187)	0.0001 (0.0186)	0.0021 (0.0186)	0.0008 (0.0187)	0.0005 (0.0186)	0.0026 (0.0187)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2494	2494	2494	2494	2494	2494	2494
R-Squared	0.0363	0.0409	0.0421	0.0395	0.0380	0.0415	0.0367

$p<0.01$***, $p<0.05$**, $p<0.01$*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

structures and greater resources—are better equipped to withstand external pressures, sanctions still have a negative impact, albeit less severe compared to their poorer counterparts. This underscores the uneven effects of global governance tools and the need for more equitable approaches in global development policies.

Temporal effects of sanctions

To assess the duration of sanctions' impact, the study incorporates lagged variables in the analysis. Table 9 shows that most sanctions maintain significant negative associations with bureaucratic quality from lag years 0 to 4. UN and EU sanctions, when combined with economic crises, continue to show a strong negative association with bureaucratic quality at a significance level below 1 %. However, the negative impact of U.S. sanctions and sanctions intensity weakens over time, though they remain statistically significant after four years. Economic sanctions lose their statistical significance by the fourth year, while unilateral and plurilateral sanctions generally lack statistical significance across the lag periods, except for unilateral sanctions, which show significance in the first year.

This temporal analysis suggests that the negative effects of sanctions on bureaucratic quality are most severe in the short to medium term, with some potential for recovery or adaptation over time. From a global development perspective, this indicates that while sanctions can cause immediate harm to state capacities, the long-term impact may be mitigated if states can adapt or if sanctions are lifted. However, the persistent negative effects of certain sanctions highlight the lasting challenges that developing countries may face, which can impede their progress toward development goals.

Additional covariates

To ensure that the results are not influenced by potential confounders, additional covariates were included in the analysis presented in Table 10. Local conflict, measured by the weighted political conflict index developed by Banks & Wilson (2024), was added to account for the extent of political violence in a country-year. Countries experiencing high levels of political violence may attract international sanctions due to anti-democratic practices or human rights violations, and such violence can also undermine the functioning of state institutions.

Table 5
Fixed-Effects Panel Regression: Sanctions Impact on Bureaucracy Quality in Targeted Developing Countries During Economic Crisis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	−0.1260**						
	(0.0529)						
EU Sanctions		−0.2864***					
		(0.0614)					
UN Sanctions			−0.3999***				
			(0.0874)				
Intensity				−0.0721***			
				(0.0153)			
Economic					−0.1997***		
					(0.0554)		
Unilateral						0.1190*	
						(0.0612)	
Plurilateral							−0.1782**
							(0.0799)
GDP Per Capita	0.1797***	0.1766***	0.1567***	0.1577***	0.1788***	0.1916***	0.1913***
	(0.0459)	(0.0453)	(0.0457)	(0.0456)	(0.0456)	(0.0462)	(0.0461)
Population	−0.7290***	−0.7260***	−0.6704***	−0.7160***	−0.6692***	−0.7889***	−0.7794***
	(0.2046)	(0.2015)	(0.2025)	(0.2015)	(0.2044)	(0.2051)	(0.2045)
Urbanization	−0.0250	0.1259	0.1703	0.0316	−0.1183	0.0607	0.0626
	(0.4041)	(0.4004)	(0.4019)	(0.3987)	(0.4016)	(0.4093)	(0.4079)
FDI to GDP	0.0318*	0.0366**	0.0272	0.0334*	0.0313*	0.0296*	0.0325*
	(0.0175)	(0.0173)	(0.0173)	(0.0173)	(0.0174)	(0.0176)	(0.0176)
Trade Openness	0.0754	0.0780	0.0544	0.0505	0.0770	0.0907	0.0797
	(0.0629)	(0.0618)	(0.0623)	(0.0623)	(0.0623)	(0.0627)	(0.0628)
Democracy	0.1087**	0.0898*	0.1279**	0.0810	0.1074*	0.1275**(0.0535)	0.0984*
	(0.0540)	(0.0533)	(0.0527)	(0.0536)	(0.0533)		(0.0550)
Election Year	−0.0217	−0.0198	−0.0240	−0.0253	−0.0255	−0.0237	−0.0251
	(0.0419)	(0.0414)	(0.0414)	(0.0414)	(0.0417)	(0.0420)	(0.0420)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	634	634	634	634	634	634	634
R-Squared	0.0720	0.0969	0.0957	0.0976	0.0835	0.0690	0.0709

p<0.01***, p<0.05**, p<0.01*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

Table 6
Fixed-Effects Panel Regression: Sanctions Impact on Bureaucracy Quality in Targeted Developing Countries Not Facing Economic Crisis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	0.1583***						
	(0.0358)						
EU Sanctions		0.1269***					
		(0.0396)					
UN Sanctions			0.2739***				
			(0.0554)				
Intensity				0.0446***			
				(0.0124)			
Economic					0.1279***		
					(0.0327)		
Unilateral						0.1299***	
						(0.0370)	
Plurilateral							−0.1162***
							(0.0575)
GDP Per Capita	0.04767	0.0547*	0.0496*	0.0614**	0.0627**	0.0674**	0.05945*
	(0.0300)	(0.0302)	(0.0299)	(0.0302)	(0.0301)	(0.0304)	(0.0305)
Population	−0.6035***	−0.5359***	−0.5251***	0.5804***	0.6156***	−0.5471***	−0.4560***
	(0.1330)	(0.1321)	(0.1294)	(0.1338)	(0.1352)	(0.1321)	(0.1312)
Urbanization	0.0132	−0.0787	−0.0483	−0.0644	−0.0159	−0.0580	−0.0945
	(0.1765)	(0.1761)	(0.1743)	(0.1759)	(0.1765)	(0.1761)	(0.1767)
FDI to GDP	−0.0159	−0.0159	−0.0188	−0.0184	−0.0162	−0.0165	−0.0227
	(0.0146)	(0.0148)	(0.0145)	(0.0146)	(0.0147)	(0.0147)	(0.0147)
Trade Openness	−0.4327***	−0.4151***	−0.4370***	−0.4128***	−0.4346***	−0.4288***	−0.4367***
	(0.0685)	(0.0690)	(0.0683)	(0.0689)	(0.0688)	(0.0689)	(0.0696)
Democracy	0.0475*	0.0205	0.0250	0.03913	0.0303	0.0118	0.0025
	(0.0268)	(0.0259)	(0.0257)	(0.0267)	(0.0261)	(0.0258)	(0.0266)
Election Year	0.0017	0.0005	0.0016(0.0238)	−0.0009	−0.0010	0.0034	0.0107
	(0.0239)	(0.0241)		(0.0241)	(0.0240)	(0.0240)	(0.0242)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	656	656	656	656	656	656	656
R-Squared	0.1347	0.1216	0.1414	0.1253	0.1287	0.1245	0.1127

p<0.01***, p<0.05**, p<0.01*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

Table 7
Fixed-Effects Panel Regression: Sanctions and Economic Crisis Impact on Bureaucracy Quality in Targeted Poorer Developing Countries.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	0.0054						
	(0.0595)						
US Sanctions x Economic Crisis	−0.0861*						
	(0.0455)						
EU Sanctions		−0.1792**					
		(0.0732)					
EU Sanctions x Economic Crisis		−0.2350***					
		(0.0530)					
UN Sanctions			−0.4165***				
			(0.1135)				
UN Sanctions x Economic Crisis			−0.3047***				
			(0.0783)				
Intensity				−0.0231			
				(0.0201)			
Intensity x Economic Crisis				−0.0546***			
				(0.0117)			
Economic					0.0287		
					(0.0558)		
Economic x Economic Crisis					−0.1285***		
					(0.0462)		
Unilateral						0.2040***	
						(0.0616)	
Unilateral x Economic Crisis						0.1236**	
						(0.0520)	
Plurilateral							−0.1392
							(0.0977)
Plurilateral x Economic Crisis							−0.2084***
							(0.0717)
Economic Crisis	−0.1606***	−0.1634***	−0.1762***	−0.1375**	−0.1421***	−0.1752***	−0.1665***
	(0.0434)	(0.0417)	(0.0394)	(0.0576)	(0.0442)	(0.04091)	(0.0406)
GDP Per Capita	0.1593***	0.1553***	0.1449***	0.1463***	0.1595***	0.1703***	0.1645***
	(0.0366)	(0.0362)	(0.0362)	(0.0367)	(0.0365)	(0.0361)	(0.0365)
Population	−0.5353***	−0.4845***	−0.4721***	−0.5051***	−0.5332***	−0.6056***	−0.5253***
	(0.1320)	(0.1294)	(0.1289)	(0.1306)	(0.1319)	(0.1298)	(0.1295)
Urbanization	−0.0945	−0.0963	0.0025	−0.0913	−0.0905	0.0423	−0.0903
	(0.2220)	(0.2191)	(0.2179)	(0.2205)	(0.2224)	(0.2195)	(0.2197)
FDI to GDP	0.0193	0.0203	0.0191	0.0193	0.0199	0.0209	0.0189
	(0.0143)	(0.0142)	(0.0141)	(0.0143)	(0.0143)	(0.0142)	(0.0143)
Trade Openness	0.07145	0.0668	0.0534	0.0551	0.0713	0.07601	0.0658
	(0.0512)	(0.0506)	(0.0506)	(0.0512)	(0.0511)	(0.0505)	(0.0510)
Democracy	0.0543	0.0457	0.0555	0.0414	0.0541(0.0358)	0.0555	0.0377
	(0.0363)	(0.0356)	(0.0353)	(0.0359)		(0.0353)	(0.0363)
Election Year	0.0100	0.0167	0.0120	0.0123	0.0096	0.0069	0.0116
	(0.0304)	(0.0302)	(0.0300)	(0.0303)	(0.0304)	(0.0301)	(0.0303)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1022	1022	1022	1022	1022	1022	1022
R-Squared	0.0495	0.0650	0.0607	0.0670	0.0535	0.0515	0.0542

$p<0.01$***, $p<0.05$**, $p<0.01$*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

Additionally, the natural resource variable, measured by the national income derived from natural resource rents relative to GDP, was included. According to the resource curse theory developed by Auty (1993), countries rich in natural resources often face governance challenges, including corruption, human rights abuses, and conflict, which can increase the likelihood of international sanctions. Governance deficiencies resulting from resource-related conflicts can compromise state institutions, hinder sustainable development, and exacerbate social inequalities.

Table 10 shows that, even after controlling for these factors, all sanction variables interacting with economic crises have a statistically significant negative impact on bureaucratic quality, except for unilateral and plurilateral sanctions. This consistency indicates that the results are robust and that international sanctions, particularly during economic crises, generally undermine the bureaucratic quality of the target state.

Addressing heteroscedasticity and serial correlation concerns

To further ensure the robustness of the findings, Feasible Generalized Least Squares (FGLS) were employed to test for heteroscedasticity and autocorrelation in the errors. Table 11 shows that when interacting with the economic crisis variable, all international sanctions variables, except for unilateral and plurilateral sanctions, exhibit a negative association with bureaucratic quality, significant at the 1 % level. The Durbin-Watson test results, with values ranging from 1.6320 to 1.8550, indicate no significant serial correlation in the residuals of the regression models. These values suggest that the independence assumption of the error terms holds, ensuring that the regression results are reliable and free from concerns of heteroscedasticity and serial correlation.

Addressing endogeneity concerns

To address potential endogeneity in the analysis, a two-stage least squares (2SLS) regression was conducted to mitigate reverse causality issues, as shown in Table 12. The choice of instrumental variable was guided by existing political economy literature, specifically the work of Moteng et al. (2023), which recommends using a country's voting alignment with the United States in the United Nations General

Table 8
Fixed-Effects Panel Regression: Sanctions and Economic Crisis Impact on Bureaucracy Quality in Targeted More Affluent Developing Countries.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	0.3691***						
	(0.0649)						
US Sanctions x Economic Crisis	−0.0183						
	(0.0948)						
EU Sanctions		0.1741***					
		(0.0518)					
EU Sanctions x Economic Crisis		−0.3331***					
		(0.1036)					
UN Sanctions			0.2283***				
			(0.0652)				
UN Sanctions x Economic Crisis			−0.6225***				
			(0.1338)				
Intensity				0.0863***			
				(0.0225)			
Intensity x Economic Crisis				−0.0499*			
				(0.0280)			
Economic					0.1334**		
					(0.0596)		
Economic x Economic Crisis					−0.3352***		
					(0.1000)		
Unilateral						0.0199	
						(0.0973)	
Unilateral x Economic Crisis						−0.0340	
						(0.2025)	
Plurilateral							−0.0022
							(0.0878)
Plurilateral x Economic Crisis							−0.0345
							(0.1420)
Economic Crisis	−0.0812	0.0361	0.0310	0.0442	0.0681	−0.0540	−0.0508
	(0.0603)	(0.0619)	(0.0531)	(0.0873)	(0.0638)	(0.0522)	(0.0550)
GDP Per Capita	−0.0301	0.1213**	0.0820	0.0637	0.1206**	0.1213**	0.1257**
	(0.0592)	(0.0533)	(0.0531)	(0.0580)	(0.0552)	(0.0587)	(0.0562)
Population	−1.6874***	−1.4462***	−1.350***	−1.5952***	−1.5051***	−1.4810***	−1.4848***
	(0.2052)	(0.2104)	(0.2097)	(0.2132)	(0.2251)	(0.2179)	(0.2167)
Urbanization	0.2358	−0.5289	−0.3248	−0.1053	−0.3934	−0.5686	−0.5644
	(0.5419)	(0.5428)	(0.5423)	(0.5618)	(0.5827)	(0.5655)	(0.5592)
FDI to GDP	−0.0663***	−0.0852***	−0.0774***	−0.0822***	−0.0915***	−0.0973***	−0.0982***
	(0.0205)	(0.0207)	(0.0205)	(0.0210)	(0.0210)	(0.0215)	(0.0211)
Trade Openness	−0.1377	−0.0807	−0.1115	−0.0948	−0.1147	−0.0603	−0.0609
	(0.1100)	(0.1131)	(0.1113)	(0.1131)	(0.1143)	(0.1166)	(0.1167)
Democracy	0.0882	0.0253	−0.0016	0.0804**	0.0231	0.0168	0.0160
	(0.0330)	(0.0329)	(0.0329)	(0.0364)	(0.0348)	(0.0331)	(0.0331)
Election Year	−0.0250	−0.0366	−0.0316	−0.0262	−0.0350	−0.0289	−0.0296
	(0.0324)	(0.0335)	(0.0329)	(0.0335)	(0.0337)	(0.0346)	(0.0347)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	268	268	268	268	268	268	268
R-Squared	0.3000	0.2550	0.2810	0.2520	0.2450	0.2020	0.2020

p<0.01***, p<0.05**, p<0.01*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

Assembly (UNGA) as an instrument for international sanctions. This selection is based on research showing that countries aligning their voting behavior with the U.S. are more likely to receive favorable financial assistance from U.S.-dominated intergovernmental bodies like the IMF (Dreher et al., 2008) and less likely to face sanctions from the U. S. and its allies, such as the EU (Moteng et al., 2023).

Conversely, countries that diverge from U.S. voting patterns in the UNGA are more likely to experience strained relations with the U.S. and its allies, increasing the likelihood of sanctions from the U.S., EU, and UN, as highlighted by Moteng et al. (2023). By addressing endogeneity concerns, the study strengthens the validity of its findings and their implications for global development debates.

The second-stage results show that all sanction variables, except unilateral and plurilateral sanctions, negatively impact bureaucratic quality. Based on these findings and the robustness checks, it can be concluded that international sanctions, particularly during economic crises, generally undermine the bureaucratic quality of the target state, with the exception of unilateral and plurilateral sanctions.

Summary of key findings in the context of global development

Overall, the results of this study provide compelling evidence that international sanctions have a detrimental effect on bureaucratic quality in developing countries, especially when these countries are also experiencing economic crises. This has significant implications for global development debates. The findings highlight how global governance mechanisms, intended to enforce international norms, can inadvertently weaken state institutions essential for development, thus contributing to divergent development outcomes and perpetuating global inequalities.

By demonstrating the compounded negative effects of sanctions and economic crises on bureaucratic quality, the study underscores the need for a critical reassessment of how sanctions are used within the global development paradigm. It suggests that more nuanced and context-sensitive approaches are necessary to ensure that global governance tools do not hinder the development prospects of vulnerable nations. These insights contribute to the dialogue on global development by providing empirical evidence of the complex interplay between international policies and domestic institutional capacities.

Table 9
Fixed-Effects Panel Regression: Lagged Impact of Sanctions and Economic Crisis on Bureaucracy Quality in Targeted Developing Countries.

	0 Year	1 Year^	2 Year	3 Year	4 Year
US Sanctions x Economic Crisis	−0.1586**	−0.1358**	−0.1072*	−0.0950*	−0.1004*
	(0.0660)	(0.0619)	(0.0594)	(0.0566)	(0.0522)
EU Sanctions x Economic Crisis	−0.2356***	−0.1881***	−0.1674***	−0.1784***	−0.1324**
	(0.0717)	(0.0674)	(0.0646)	(0.0614)	(0.0564)
UN Sanctions x Economic Crisis	−0.4181***	−0.1076***	−0.2859***	−0.3151***	−0.2709***
	(0.1016)	(0.0741)	(0.0915)	(0.0875)	(0.0802)
Intensity x Economic Crisis	−0.0661***	−0.0537***	−0.0387**	−0.0355**	−0.0307*
	(0.0206)	(0.0193)	(0.0185)	(0.0176)	(0.0161)
Economic x Economic Crisis	−0.1936***	−0.1692***	−0.1156**	−0.1045*	−0.0801
	(0.0642)	(0.0602)	(0.0576)	(0.0547)	(0.0501)
Unilateral x Economic Crisis	−0.0275	−0.0222	0.0283	0.0592	0.0284
	(0.0761)	(0.0715)	(0.0692)	(0.0662)	(0.0607)
Plurilateral x Economic Crisis	−0.0075	−0.0015*	−0.0493	−0.0755	−0.0556
	(0.1030)	(0.0966)	(0.0923)	(0.0880)	(0.0822)
N	1290	1290	1246	1201	1155

$p<0.01$***, $p<0.05$**, $p<0.01$*.
^Lagged by one year is based on the results from Table 2.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year. Each models includes the control variables, country-year effect, and year-fixed effect, but are not shown due to space limitations. The values in parentheses denote the standard errors. Each row represents a distinct panel, and the regression analysis is conducted separately for each box, rather than combining all variables related to sanctions into a single analysis per column.

Discussion and conclusion

This study examines the effects of international sanctions on the quality of state bureaucracy in targeted developing countries, particularly in the context of economic crises. The findings illustrate that international sanctions, especially multilateral ones from the EU and UN, significantly undermine bureaucratic performance. By exploring these effects, we contribute to debates on global development, highlighting how global governance mechanisms can inadvertently hinder development trajectories in the Global South. In this section, we reflect on why these effects occur, discuss their broader implications for global development, compare the results with previous studies, and offer policy recommendations and future research directions.

Explaining why sanctions deteriorate bureaucratic quality

The empirical results suggest that international sanctions, particularly when imposed during economic crises, lead to compounded negative effects on bureaucratic quality. This outcome can be understood by examining the interplay between external pressures and internal vulnerabilities. Sanctions reduce the availability of state resources, weakening the ability to maintain professional bureaucratic systems. Governments facing sanctions often experience significant reductions in revenue, which may lead to informal practices, increasing the likelihood of inefficiency and corruption within bureaucracies.

As illustrated in Table 2, the interaction between economic crises and multilateral sanctions, especially those imposed by the UN and EU, has the most severe impact on bureaucratic quality. This finding challenges the assumption that global governance tools like sanctions are neutral mechanisms for enforcing international norms. Instead, it suggests that such tools may inadvertently exacerbate existing vulnerabilities in developing countries, undermining their institutional capacities and hindering their development prospects.

From a development perspective, these findings highlight how external political pressures can have unintended and disproportionate effects on less powerful nations. The deterioration of bureaucratic quality undermines the state's ability to implement development policies effectively, exacerbating inequalities and hindering progress toward holistic and sustainable development goals. This supports theories that question the effectiveness and fairness of global governance mechanisms, suggesting that they may reinforce global power asymmetries and contribute to divergent development outcomes (Veltmeyer, 2020; Korf, 2023).

Implications for global development and governance

The compounded negative effects of sanctions and economic crises on bureaucratic quality have profound implications for global development and governance. They call into question the ethical and practical efficacy of using sanctions as a tool for achieving political objectives. While sanctions are intended to pressure governments into compliance with international norms, this study reveals that they may do so at the expense of weakening essential state functions that are crucial for the well-being of the population and for long-term development.

This raises concerns about the responsibility of the international community in designing and implementing sanctions. Do the intended political gains justify the collateral damage inflicted on the bureaucratic institutions of developing countries? Are sanctions inadvertently perpetuating the very issues they aim to resolve by destabilizing governance structures and exacerbating poverty and inequality?

Moreover, the findings suggest that sanctions may not be as effective in achieving their political objectives as previously thought, given the significant unintended consequences. The weakening of bureaucratic quality can lead to governance failures, social unrest, and a decline in public trust, potentially creating fertile ground for authoritarianism and conflict. This challenges prevailing narratives that position sanctions as a relatively benign means of enforcing international norms.

From a global development standpoint, these insights urge a reevaluation of the use of sanctions within the broader context of international relations and development policy. They highlight the need for a more equitable and just global governance framework that prioritizes the development needs and institutional integrity of all nations, particularly those most vulnerable to external shocks.

Comparison with previous findings

While previous studies have documented the adverse political implications of sanctions (Peksen, 2009; Escribà-Folch & Wright, 2010), this study extends the literature by focusing on the underexplored area of bureaucratic quality. The finding that multilateral sanctions have the strongest negative effect on bureaucratic quality aligns with existing research on the effectiveness of multilateral sanctions in applying pressure (Besedeš et al., 2017). However, our analysis reveals that such effectiveness comes at a significant cost to the institutional health of targeted countries.

Furthermore, the amplification of negative effects during economic crises has not been thoroughly examined in prior research. This study

Table 10
Fixed-Effects Panel Regression: Sanctions and Economic Crisis Impact on Bureaucracy Quality in Targeted Developing Countries with Additional Controls.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	0.0691 (0.0478)						
US Sanctions x Economic Crisis	−0.1196* (0.0617)						
EU Sanctions		−0.0275 (0.0536)					
EU Sanctions x Economic Crisis		−0.1495** (0.0676)					
UN Sanctions			0.0653 (0.0745)				
UN Sanctions x Economic Crisis			−0.3080*** (0.0969)				
Intensity				0.0020 (0.0161)			
Intensity x Economic Crisis				−0.0458** (0.0193)			
Economic					0.06583 (0.0448)		
Economic x Economic Crisis					−0.1511** (0.0601)		
Unilateral						0.1722*** (0.0531)	
Unilateral x Economic Crisis						0.0071 (0.0751)	
Plurilateral							−0.2165*** (0.0838)
Plurilateral x Economic Crisis							0.0490 (0.1043)
Economic Crisis	−0.1474*** (0.0376)	−0.1501*** (0.0359)	−0.1565*** (0.0343)	−0.0458** (0.0193)	−0.1511***(0.0601)	−0.1890*** (0.0364)	−0.1889*** (0.0358)
GDP Per Capita	0.1512*** (0.0337)	0.1453*** (0.0336)	0.1477*** (0.0335)	0.1488*** (0.0335)	0.1533*** (0.0335)	0.1468*** (0.0350)	0.1526*** (0.0354)
Population	−0.3312*** (0.1085)	−0.2903*** (0.1075)	−0.2934*** (0.1081)	−0.3114*** (0.1077)	−0.3250*** (0.1090)	−0.3992*** (0.1158)	−0.3765*** (0.1158)
Urbanization	−0.3462* (0.1907)	−0.3559* (0.1890)	0.3323* (0.1889)	−0.3577* (0.1893)	−0.3463* (0.1914)	−0.3161 (0.1984)	−0.3723* (0.1984)
FDI to GDP	0.0163 (0.0126)	0.0182 (0.0126)	0.0136 (0.0125)	0.0166 (0.0125)	0.0169 (0.0126	0.0063 (0.0134)	0.0062 (0.0134)
Trade Openness	0.2028*** (0.0682)	0.1923*** (0.0680)	0.2006*** (0.0679)	0.1953*** (0.0679)	0.1952*** (0.0682)	0.2362*** (0.0723)	0.2297*** (0.0723)
Democracy	0.0921*** (0.0278)	0.0757*** (0.0271)	0.0830*** (0.0270)	0.0757*** (0.0277)	0.0860*** (0.0273)	0.0878*** (0.0277)	0.0609** (0.0286)
Election Year	0.0015 (0.0260)	0.0027 (0.0259)	−0.0016 (0.0259)	0.0024 (0.0259)	−0.0001 (0.0259)	−0.0089 (0.0269)	−0.0033 (0.0270)
Local Conflict	0.0020 (0.0038)	0.0032 (0.0039)	0.0019 (0.0038)	0.0030 (0.0039)	0.0019 (0.0039)	0.0005 (0.004)	0.0045 (0.0041)
Natural Resource	−0.0806*** (0.0220)	−0.0851*** (0.0220)	−0.0718*** (0.0221)	−0.0834*** (0.0219)	−0.0804*** (0.0221)	−0.0790*** (0.0225)	−0.0882*** (0.0227)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1287	1287	1287	1287	1287	1287	1287
R-Squared	0.0270	0.0338	0.0343	0.0335	0.0291	0.0428	0.0336

p<0.01***, p<0.05**, p<0.01*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.
˜The additional control variables foreign aid per capita (logged), globalization (logged), local conflict (logged), natural resource rents relative to national GDP.

highlights how the intersection of external sanctions and internal economic vulnerabilities creates a particularly destructive synergy, undermining state capacity in ways that may have long-lasting repercussions.

These findings challenge the assumptions underlying the implementation of sanctions and call for a reassessment of their role in international policy. They suggest that the traditional metrics of sanctions' success—such as compliance or regime change—are insufficient if they fail to account for the broader developmental and institutional damage inflicted.

Reflecting on the role of global power dynamics

Reflecting on these findings necessitates an examination of the global power dynamics that underpin the use of sanctions. Sanctions are often imposed by more powerful nations or coalitions, such as the EU and UN, onto less powerful, developing countries. This asymmetry raises questions about the equity and justice of such measures. Are sanctions a form of neo-imperialism, exerting control over the political and economic trajectories of sovereign nations under the guise of promoting international norms?

The disproportionate impact of sanctions on developing countries' bureaucratic quality suggests that sanctions may reinforce existing global inequalities. By weakening state institutions, sanctions can entrench dependency and hinder the capacity of these nations to assert their interests on the global stage. This dynamic perpetuates a cycle where powerful nations shape global governance in ways that serve their interests, often at the expense of less powerful states.

This perspective aligns with dependency theory and post-colonial critiques, which argue that the current global order maintains and exacerbates inequalities between nations. It calls into question the

Table 11
FGLS Regression: Sanctions and Economic Crisis Impact on Bureaucracy Quality in Targeted Developing Countries.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	−0.0624						
	(0.0418)						
US Sanctions x Economic Crisis	0.1147***						
	(0.0424)						
EU Sanctions		0.0255					
		(0.0413)					
EU Sanctions x Economic Crisis		0.3422***					
		(0.0443)					
UN Sanctions			0.2108***				
			(0.0642)				
UN Sanctions x Economic Crisis			0.3231***				
			(0.0643)				
Intensity				0.0013			
				(0.0138)			
Intensity x Economic Crisis				0.0387***			
				(0.0132)			
Economic					0.1063***		
					(0.0407)		
Economic x Economic Crisis					0.1397***		
					(0.0412)		
Unilateral						0.1600***	
						(0.0409)	
Unilateral x Economic Crisis						−0.0268	
						(0.0492)	
Plurilateral							0.0541
							(0.0658)
Plurilateral x Economic Crisis							0.0490
							(0.0701)
Economic Crisis	0.0111***	0.0453*	0.0227	0.0232***	0.0236	−0.0295	−0.0355
	(0.0254)	(0.0243)	(0.022)	(0.0260)	(0.02544)	(0.0242)	(0.0240)
GDP Per Capita	0.5453***	0.5126***(0.0193)	0.4516***	0.5271***	0.5413***	0.5533***	0.5550***
	(0.0195)		(0.0201)	(0.0201)	(0.0192)	(0.0195)	(0.0194)
Population	−0.0163	0.020	0.0354*	0.0123	−0.0391*	0.0467**	0.0074
	(0.0212)	(0.0207)	(0.0199)	(0.0219)	(0.0214)	(0.0228)	(0.0209)
Urbanization	−1.0846***	−0.9781***	−0.7524***	−1.091***	−1.1101***	−1.0924***	−1.1416***
	(0.0508)	(0.0504)	(0.0559)	(0.0514)	(0.0495)	(0.0529)	(0.0501)
FDI to GDP	−0.0294***	−0.0190***	−0.0139**	−0.0324***	−0.0269***	−0.0319***	−0.0336***
	(0.0075)	(0.0072)	(0.0071)	(0.0075)	(0.0074)	(0.0074)	(0.0075)
Trade Openness	−0.3071***	−0.2730***	−0.2538***	−0.3137***	−0.3017***	−0.2837***	−0.3006***
	(0.0267)	(0.0255)	(0.0256)	(0.0268)	(0.0262)	(0.0273)	(0.0270)
Democracy	0.2810***	0.2857***	0.2445***	0.3020***	0.2627***	0.2968***	0.3350***
	(0.0295)	(0.0271)	(0.0279)	(0.0315)	(0.0294)	(0.0274)	(0.0276)
Election Year	0.0060	0.0059	0.0038	0.0041	0.0074	0.0010	0.0021
	(0.0125)	(0.0121)	(0.0117)	(0.0126)	(0.0124)	(0.0125)	(0.0127)
Durbin-Watson Test	1.8400	1.6540	1.6320	1.7300	1.7500	1.8550	1.6850
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1290	1290	1290	1290	1290	1290	1290

$p<0.01$***, $p<0.05$**, $p<0.01$*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

legitimacy of using sanctions as a tool for international governance and highlights the need for more inclusive and participatory approaches that respect the sovereignty and development needs of all countries.

Policy implications and ethical considerations

The findings of this study have significant policy implications and raise ethical considerations that must be addressed. Policymakers in sanctioning countries must reflect on the unintended consequences of sanctions on the bureaucratic capacities of targeted nations. There is an ethical responsibility to ensure that actions taken to enforce international norms do not inflict undue harm on civilian populations and essential state functions.

The study suggests that the design and implementation of sanctions require a more nuanced approach. This could involve:

- **Re-evaluating the Use of Broad Economic Sanctions**: Broad sanctions that target entire economies can have devastating effects on bureaucratic quality and public welfare. Policymakers should consider limiting the scope of sanctions to minimize collateral damage.
- **Implementing Targeted Sanctions**: "Smart sanctions" that focus on specific individuals, entities, or sectors associated with undesirable behaviors may reduce the impact on general state functions and the broader population.
- **Incorporating Humanitarian Exemptions**: Sanctions regimes should include clear exemptions for essential goods and services, particularly those related to health, education, and governance capacity-building.
- **Engaging in Dialogue and Collaboration**: Rather than relying solely on punitive measures, the international community could prioritize diplomatic efforts, capacity-building, and support for institutional development to address underlying issues.

These policy considerations emphasize the importance of aligning international actions with ethical principles and development goals. They recognize that the well-being of populations and the integrity of state institutions should not be collateral damage in geopolitical

Table 12
2SLS Regression (Second Stage): Sanctions and Economic Crisis Impact on Bureaucracy Quality in Targeted Developing Countries.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
US Sanctions	2.328**						
	(1.084)						
US Sanctions x Economic Crisis	−5.1073						
	(2.2456)						
EU Sanctions		1.6814*					
		(0.9552)					
EU Sanctions x Economic Crisis		−3.6820***					
		(1.9509)					
UN Sanctions			4.0632**				
			(1.8145)				
UN Sanctions x Economic Crisis			−7.3572**				
			(2.9252)				
Intensity				0.6779**			
				(0.2809)			
Intensity x Economic Crisis				−1.4209***			
				(0.5484)			
Economic					1.8838***		
					(0.7871)		
Economic x Economic Crisis					−4.1617***		
					(1.6428)		
Unilateral						0.5801	
						(0.5509)	
Unilateral x Economic Crisis						−1.2074	
						(1.1512)	
Plurilateral							1.8506
							(1.984)
Plurilateral x Economic Crisis							−0.9329
							(0.9759)
Economic Crisis	1.1731	0.6330	0.3635	−1.1038***	0.9686*	1.7806	−1.8623
	(0.6404)	(0.5552)	(0.2543)	(0.5356)	(0.4967)	(1.7227)	(1.7168)
GDP Per Capita	0.4322***	0.3463***	0.2620***	0.2651***	0.4039***	0.3025***	0.2900***
	(0.0997)	(0.0721)	(0.0589)	(0.0795)	(0.0593)	(0.1046)	(0.0501)
Population	−0.0012	0.0527	0.0828**	0.0643	0.0195	0.08934	0.1254***
	(0.05105)	(0.0420)	(0.0378)	(0.0432)	(0.0299)	(0.0716)	(0.0439)
Urbanization	−0.9245***	−0.2097	−0.4195***	−0.7935***	−0.7449***	−0.5535**	−0.3132**
	(0.3191)	(0.2455)	(0.1165)	(0.2286)	(0.1545)	(0.2249)	(0.1277)
FDI to GDP	0.04320	−0.1169*	0.03503	0.0732	0.0185	−0.0136	−0.0266
	(0.0672)	(0.0688)	(0.0387)	(0.0722)	(0.0368)	(0.0592)	(0.0268)
Trade Openness	−0.4139	0.42120	−0.3547	−0.2702	−0.1446	−0.0939	0.0774
	(0.2962)	(0.2825)	(0.1566)	(0.1917)	(0.1121)	(0.2070)	(0.0791)
Democracy	0.2400	−0.0063	0.0224	0.2548**	0.0855*	−0.0870	−0.0793
	(0.1382)	(0.07489)	(0.0498)	(0.1299)	(0.0518)	(0.1720)	(0.0739)
Election Year	0.0363	−0.0014	−0.0693	−0.0589	−0.0009	−0.0405	0.0110
	(0.1187)	(0.1047)	(0.0796)	(0.1095)	(0.0755)	(0.1494)	(0.0693)
Kleibergen-Paap F-statistic	15.6880	14.4060	11.0772	11.6542	12.8830	0.0109	0.8932
Sargan–Hansen Test (p-value)	0.2441	0.5524	0.8176	0.1110	0.2099	0.9393	0.0756
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1286	1286	1286	1286	1286	1286	1286
R-Squared	0.7230	0.7430	0.7510	0.7690	0.7420	0.7110	0.7490

$p<0.01$***, $p<0.05$**, $p<0.01$*.
The values in parentheses denote the standard errors. All right-hand-side-variables are lagged by one year.

strategies.

Limitations and Reflections on methodology

While this study provides valuable insights, it is important to acknowledge its limitations and reflect on the methodology. The analysis relies on available data from 1990 to 2020, which may not capture all the nuances of sanctions' impacts or account for recent developments. The use of quantitative methods, while robust, may overlook qualitative aspects of how sanctions affect bureaucratic quality, such as changes in organizational culture or employee morale.

Additionally, the study focuses on developing countries, which may limit the generalizability of the findings to other contexts. Future research could adopt mixed-methods approaches, incorporate case studies, or explore the perspectives of those within bureaucracies to gain a deeper understanding of the mechanisms at play.

Future research directions

The findings open several avenues for future research:

- **Exploring Alternative Mechanisms**: Investigate other global governance tools and their impacts on bureaucratic quality and development, such as conditional aid, trade agreements, or international financial regulations.
- **Examining Resilience Factors**: Identify factors that enable some countries to maintain bureaucratic quality despite sanctions, such as strong civil society, effective leadership, or regional support networks.
- **Assessing Long-Term Effects**: Conduct longitudinal studies to assess the lasting impacts of sanctions on state institutions and development outcomes over extended periods.
- **Engaging with Ethical Frameworks**: Incorporate ethical analyses into studies of international policy tools, examining how they align with principles of justice, equity, and human rights.

Conclusion

In conclusion, this study examines the impact of international sanctions on bureaucratic quality in developing countries, particularly during economic crises. The findings reveal that sanctions, especially multilateral ones, significantly undermine state capacity, leading to long-term declines in bureaucratic performance. This has profound implications for global development, as weakened bureaucratic institutions hinder the implementation of development policies and exacerbate inequalities.

By adopting a reflective perspective, the study challenges conventional views on the efficacy and ethics of sanctions as tools of global governance. It underscores the need for more equitable, just, and context-sensitive approaches in international relations that prioritize the development needs and institutional integrity of all nations.

Policymakers and international organizations must consider the broader consequences of sanctions and explore alternative strategies that promote dialogue, collaboration, and support for institutional development. Only through such engagement can the international community work toward a global development paradigm that is truly holistic, sustainable, and inclusive.

CRediT authorship contribution statement

Jeremy Ko: Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Chun Kai Leung:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Formal analysis, Conceptualization. **Chitao Yu:** Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

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.

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