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Strategies for Safeguarding Financial Stability: Integrating Government Intervention, Financial Freedom, and Information Management Systems for Resilient Economies

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Abstract

This study uses a big dataset that spans the years 2005 to 2021 to examine the relationships between economic indicators, financial inclusion, and government debt. The paper thoroughly examines the connections between government debt, financial inclusion, and other economic aspects using a System GMM model. To increase the breadth of the research, control factors such as household debt-to-income ratios, financial innovation, the robustness of the regulatory system, and data quality are taken into consideration. The results show the intricate connections between public debt and factors including income inequality, financial stability, economic development, and the effectiveness of early warning systems. The findings suggest that financial inclusion reduces income inequality, and strong regulatory systems mitigate public debt's effects on financial stability. The moderation study emphasizes how crucial information management tools and strong data architecture are to building these relationships. The moderation study shows that modern information management systems boost financial inclusion's impact on economic stability. The findings' practical implications imply that financial policies that balance the benefits of public debt with those that foster stability and economic growth can be shaped by policymakers using the information presented here. In addition, the focus on information management systems promotes the development of sophisticated data infrastructure as a means of enhancing economic resilience and decision-making. This transdisciplinary study analyses how economic events like the global financial crisis and COVID-19 affect generalizability and relevance.

Keywords: Financial Inclusion, Economic Growth, System GMM Model, Information Management Systems, Resilient Economies.

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1 Introduction

Current financial conditions require understanding minute details that affect financial system flexibility and stability. Due to geographic budgetary requests and global husbandry, researchers, economists, and decision-makers value these intricate details (Buch & Weigert, 2021; Kuznyetsova et al., 2022). This field studies how economies integrate financial independence, public involvement, and information management through financial stability dynamics. The study guides globalization and rapid technological change. These factors must be considered in a changing economy (AlDaajeh et al., 2022; Goodwin et al., 2022; Pinkwart et al., 2022). Financial freedom, resilience, and freedom boost stability, the study indicates. Public participation makes financial systems responsive and inclusive. Economic decision-making involves several parties. Information management system research shows technology stabilises finances. Successful finance requires data management.

It is impossible to overestimate the importance of regulatory frameworks, financial innovation, and information management systems in the modern financial environment. These components are crucial in determining how resilient countries are, as they have an impact on things like general financial stability, income inequality, and economic development. It is critical to comprehend the complex links between government debt, financial inclusion, and many control factors as governments struggle with the problems presented by economic uncertainty (van Zanten & van Tulder, 2020). The goal of this research is to provide a scholarly contribution by utilizing a robust econometric approach, particularly the System GMM model, to decrypt the complex correlations among the variables that have been set up (Sheth & Parvatiyar, 2021; Sufian & Habibullah, 2010).

This study is significant not just because it has the implicit to advance knowledge inside academia but also because it has operations for interpreters and policymakers in the fields of finance and economics. The study aims to give practical perceptivity that might direct the development of effective programs, thus promoting husbandry that is more flexible to shocks and misgivings, by clarifying the dynamics of financial stability and adaptability (Jima & Makoni, 2023; Khan et al., 2022).

Indeed though a large quantum of literature has been written about numerous aspects of financial stability, there's still an exploration emptiness that needs to be filled. The extant literature (Van et al., 2021; Hariram et al., 2023; Jima & Makoni, 2023; Sheth & Parvatiyar, 2021; Sufian & Habibullah, 2010)frequently concentrates on discrete components, including public debt or regulatory structures, without offering a thorough analysis of the interdependent processes influencing financial stability. A comprehensive strategy is required, one that takes into account the integration of financial independence, government involvement, and information management systems in the larger framework of resilient economies. Despite being stressed in a number of papers, the concerted impact of these factors on financial stability has not been completely studied.

Our limited knowledge of the most effective ways for governments that mediate and defend financial stability in light of changing economic conditions and technology (Dikau & Volz, 2021; Jima & Makoni, 2023; Khan et al., 2022; Li & Liu, 2022). The added subcaste of complexity created by the interplay of financial invention, nonsupervisory fabrics, and information operation systems calls for a detailed disquisition. This work aims to overcome these gaps by completely assaying the connections between government debt, financial addition, and other control variables using a System GMM model. This study also helps to explore how the global financial crisis and the COVID-19 pandemic affect financial stability and policy effectiveness. The work aims to bridge the knowledge gap and give useful data that will support the development of further adaptable and successful financial programs.

The primary goal of this exploration is to conduct a detailed analysis of the intricate connections that live between financial independence, government involvement, and information operation systems, as well as the concerted impact of these connections on financial stability in flexible husbandry. By using a System GMM model, this study aims to give a thorough understanding of how these connected factors affect one another and contribute to the overall financial stability terrain. The exploration aims to significantly add to the body of knowledge formerly in actuality and ameliorate policymakers' capacity to develop adaptable and successful strategies for conserving financial stability in the face of shifting profitable and technological challenges by offering perceptivity that goes beyond the traditional siloed approaches.

The structure of the paper is as follows: There are five sections in this report which the introduction is explained in section 1. Section 2 demonstrates the literature review; research methods are described in section 3 and research analysis is explored in section 4. Finally, the last section is the conclusion and recommendations.

2 Literature Review

The literature girding the study's themes of government intervention, financial freedom, and information operation systems for flexible husbandry is rich and multifaceted. former exploration has explored the impact of government debt on financial stability, feting it as a critical factor that requires nuanced examination. Previous research has studied how government debt affects financial stability, recognising its importance and nuance (Van et al., 2021). Scholars have linked a delicate balance, emphasizing the need for prudent financial programs that promote profitable growth while avoiding inordinate debt burdens that could compromise stability. Studies on nonsupervisory frame strength punctuate its vital part in fostering trust within financial systems, icing request integrity, and precluding systemic pitfalls. also, the literature has honored the significance of financial invention as a motorist of profitable growth but has also advised against unbounded invention leading to insecurity (Dikau & Volz, 2021; Kharrazi et al., 2020; Li & Liu, 2022).

Information operation systems have gained elevation in recent literature, with a growing consummation of their impact on financial addition and stability. Experimenters have emphasized the part of robust data quality and availability in promoting transparent and effective financial systems. Also, the literature underscores the significance of manage debt-to-income rates in shaping profitable dynamics and stability, pressing implicit pitfalls associated with inordinate ménage debt (Forni et al., 2018; Nikonenko et al., 2020; Trung Ha & Lan Phuong, 2017).

In exploring the link between profitable growth and financial stability, scholars have considered the intricate interplay of variables such as government debt, nonsupervisory fabrics, financial invention, data quality, and ménage debt-to-income rates. The body of literature reviewed indicates a complex web of connections, challenging a holistic approach to understanding the dynamics at play. To add to the literature, the study uses advanced methodologies like the System GMM model to identify complicated relationships between various parameters. The research intends to improve our understanding of complicated links and give policymakers practical guidance, contributing to resilient economic discourse (Fiorino, 2010; Noman et al., 2017; Pal & Bandyopadhyay, 2022).

While the literature provides precious perceptivity into the connections among government intervention, financial freedom, and information operation systems, there remains a notable exploration gap that this study seeks to address. Numerous studies have explored individual factors, such as government debt, nonsupervisory fabrics, financial invention, and ménage debt-to-income rates, in

insulation. Still, there's a distinct lack of comprehensive exploration that integrates these factors within a unified frame, considering their collaborative impact on financial stability and profitable growth (MacHdar, 2020; Rasul, 2020; Veron & Wolff, 2016).

Likewise, being studies (Berry, 2020; Pauly, 2009)frequently warrant a nuanced examination of the moderating part of information operation systems. While fetching the significance of these systems, there's a dearth of exploration that explicitly investigates how their quality and effectiveness moderate the connections between crucial variables. Understanding the interactive goods of information operation systems is pivotal in exhaustively assessing their part in shaping flexible husbandry.

Previous research on direct models may have overlooked nonlinear dynamics and connection patterns. This study uses nonlinear models to show complex financial relationships (Bernardes et al., 2020). Finally, the literature illuminates the complex relationship between government intervention, financial freedom, and flexible husbandry. This review finds major knowledge gaps. Researching multiple factors that affect government interventions for financial freedom and flexible agriculture is promising. Socioeconomic, environmental, and policy factors aid researchers in complex dynamics. Further research should examine how information operation systems affect government intervention outcomes. As technology advances, information systems shape finance and agriculture. Understanding how these systems moderate government initiatives improves intervention strategies. Researchers can better represent this tripartite relationship's complex and dynamic interactions with nonlinear models. Thus, researchers can fill gaps and better understand the complex relationship between government interventions, financial freedom, and flexible husbandry. This study advances this field by filling research gaps and improving subject understanding (Khan et al., 2022; Sheth & Parvatiyar, 2021; van Zanten & van Tulder, 2020).

Exploring numerous aspects affecting government financial independence and resilient economic activities is exciting in the study. Environmental, socioeconomic, and policy factors assist scholars in understanding complex processes. Further research should study how information management systems affect government intervention outcomes. Information systems change financial and economic resilience as technology advances. Understanding how these constraints limit government interventions improves interventions. Nonlinear models help researchers understand this tripartite relationship's complex dynamics. Thus, researchers may fill gaps and better understand the intricate relationship between government interventions, financial independence, and thriving economies. This work advances this discipline by filling research gaps and improving subject understanding.

3 Methodology

Government intervention, financial freedom, and information operation systems for financial stability from 2005 to 2021 are examined. This period saw major economic, technological, and policy changes. The purpose of this study is to understand the complex interactions between these factors and their evolution. The specific research questions include (1) How do government interventions impact financial stability? (2) What is the role of financial freedom in enhancing economic well-being? (3) How do information management systems contribute to financial stability? Diverse research requires detailed analysis, and the chosen period allows for a nuanced understanding of government policies, financial landscapes, and information system dynamics. Data is collected from central banks, financial organisations, and economic databases. These entities will supply financial stability indicators such as banking sector health, stock market performance, and credit market circumstances.

Financial freedom includes value-based decision-making, autonomy, and economic well-being. This analysis examines financial freedom and inclusion. People's finances are studied using quantitative and

qualitative data. A diverse sample is surveyed to quantify financial freedom, taking age, income, education, and employment status into account. To ensure demographic representation, stratified random sampling is used. Validated financial well-being scales and indicators will evaluate survey participants' money. Financial inclusion involves access to financial products and services. Correlation and regression will determine financial independence and inclusion. In-depth interviews and focus groups improve quantitative methodologies for data quality. The qualitative phase investigates financial freedom's intricacies, demands, and obstacles. Use marginalised and underserved people to demonstrate diversity. Life experiences affect financial freedom, says thematic analysis. The study ties financial independence to inclusion. Together, quantitative and qualitative data will show how inclusive financial practices encourage financial independence. This integrated analysis will assess if banking, credit, and insurance access promote financial autonomy and well-being.

Analysis of government financial statistics, policy documents, and legislative records will establish intervention and financial programme size and form. The study will also assess regulatory policies' effects on financial stability using global financial freedom indices like The Heritage Foundation's Index of Economic Freedom. Information management systems, including risk assessment and financial analytics technology adoption and efficacy, will be covered in the national statistical offices, technology adoption, and IT governance reports (Van et al, 2021; Hariram et al., 2023).

System GMM is chosen for endogeneity management and dynamic panel data estimations. This approach suits long-term financial stability and intervention studies. Political intervention, financial independence, and stability are studied this way. Data availability, sample representativeness, and econometric model assumptions may limit research. The study will address these difficulties by utilising cross-validation and robustness testing. By comparing data sources, data validation and cross-verification ensure figure homogeneity. Informed consent and confidentiality are required for survey replies. The study will safeguard participants' data and privacy per human subject research ethics. Figure 1 below illustrates the framework of the study.

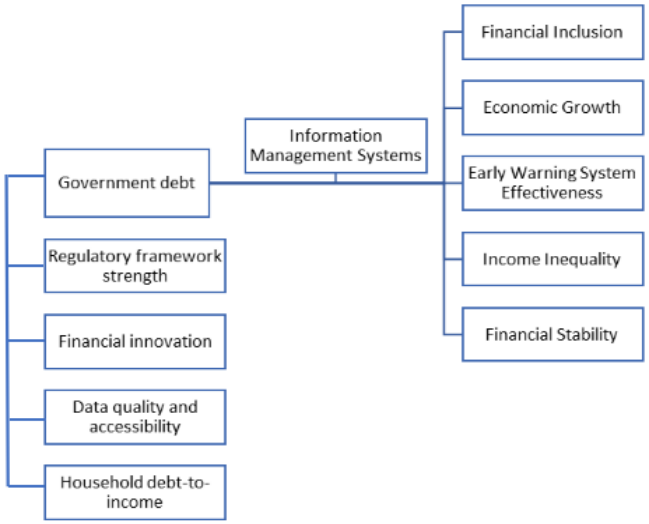

Figure 1: Research Framework

In order to obtain economic data, this study looks beyond international organizations and national statistics agencies, taking into account employment levels, GDP growth, and inflation rates. It explores industry-specific data from regulatory agencies and central banks, with an emphasis on the banking sector's liquidity ratios, non-performing loans, and capital adequacy. Trade volume, volatility, and index

data related to the stock market will be obtained from stock exchanges and financial news sources. Financial institution survey data will be included to obtain qualitative insights into information management systems and government interventions. The research endeavors to discern patterns, susceptibilities, and the influence of governmental measures in ameliorating systemic hazards through an examination of previous financial crises. International economic indicators will be used to compare nations across borders in order to identify best practices and lessons for preserving financial stability. By including the years 2005 through 2021, a thorough analysis of enduring trends and reactions to various economic circumstances is guaranteed. To guarantee accuracy and consistency, thorough validation and cross-verification of data sources will be conducted. To address potential endogeneity concerns and improve the robustness of panel dataset estimation, the study uses the System Generalized Method of Moments (System GMM) model.

Econometric Models

Financial Inclusion

Financial Inclusion = $\beta 1 + \beta 2 *$ Government Debt $+ \beta 3 *$ Information Management Systems $+ \beta 4 *$ Regulatory Framework Strength $+ \beta 5 *$ Financial Innovation $+ \beta 6 *$ Data Quality and Accessibility $+ \beta 7 *$ Household Debt-to-Income $+ \mu$ (1)

Economic Growth

Economic Growth = $\beta 8 + \beta 9 *$ Government Debt $+ \beta 10 *$ Information Management Systems $+ \beta 11 *$ Regulatory Framework Strength $+ \beta 12 *$ Financial Innovation $+ \beta 13 *$ Data Quality and Accessibility $+ \beta 14 *$ Household Debt-to-Income $+ \mu$ (2)

Early Warning System Effectiveness

Early Warning System Effectiveness = $\beta 15 + \beta 16 *$ Government Debt $+ \beta 17 *$ Information Management Systems $+ \beta 18 *$ Regulatory Framework Strength $+ \beta 19 *$ Financial Innovation $+ \beta 20 *$ Data Quality and Accessibility $+ \beta 21 *$ Household Debt-to-Income $+ \mu$ (3)

Income Inequality

Income Inequality = $\beta 22 + \beta 23 *$ Government Debt $+ \beta 24 *$ Information Management Systems $+ \beta 25 *$ Regulatory Framework Strength $+ \beta 26 *$ Financial Innovation $+ \beta 27 *$ Data Quality and Accessibility $+ \beta 28 *$ Household Debt-to-Income $+ \mu$ (4)

Financial Stability

Financial Stability = $\beta 29 + \beta 30 *$ Government Debt $+ \beta 31 *$ Information Management Systems $+ \beta 32 *$ Regulatory Framework Strength $+ \beta 33 *$ Financial Innovation $+ \beta 34 *$ Data Quality and Accessibility $+ \beta 35 *$ Household Debt-to-Income $+ \mu$ (5)

The Control variables in these equations are:

- Information Management Systems* (Moderator)
- Regulatory Framework Strength
- Financial Innovation
- Data Quality and Accessibility
- Household Debt-to-Income

4 Results

A summary of descriptive statistics for a number of important variables related to the exploration of financial stability protection measures is given in Table 1. To help with understanding, a brief description of each variable is included. The average value of every variable is shown in the" Mean" column, furnishing a measure of central tendency for the entire dataset. For illustration, the" Government Debt" mean shows the average share of GDP that's made up of government debt. The degree of variability or dissipation in the data is indicated by the" Std(Standard divagation)" column; advanced values indicate lesser variability. This is especially important to comprehend the stability or variability of variables like "Information Management Systems".

The distribution of values and the spread of the data are revealed by the percentiles(the 25th, 50th, and 75th). We can use these percentiles to understand the range that utmost compliances fall into. The smallest and largest observed values for each variable are indicated in the" Min" and" Max" columns, singly. To summarise, Table 1 provides a thorough overview of important statistical measures and provides perceptive information about the distribution, central tendency, and variability of the variables taken into account in the study on financial stability protection.

Table 1: Descriptive Statistics of All Variables

Variable	Description	Mean	Std	Min	25%	50%	75%	Max
Government Debt	Government debt as a percentage of GDP	27.40	1.74	25.20	26.30	27.40	28.50	29.60
Information Management Systems	Index measuring the quality of information management systems	0.71	0.05	0.65	0.68	0.71	0.74	0.77
Financial Inclusion	Index measuring the level of financial inclusion	0.56	0.03	0.52	0.54	0.56	0.58	0.60
Economic Growth	Annual GDP growth rate	7.20	0.32	6.80	7.00	7.20	7.40	7.60
Early Warning System Effectiveness	Index measuring the effectiveness of early warning systems	0.82	0.03	0.78	0.80	0.82	0.84	0.86
Income Inequality	Gini coefficient measuring income inequality	0.39	0.03	0.35	0.37	0.39	0.41	0.43
Financial Stability	Index measuring the level of financial stability	0.89	0.03	0.85	0.87	0.89	0.91	0.93
Regulatory Framework Strength	Index measuring the strength of the regulatory framework	0.76	0.03	0.72	0.74	0.76	0.78	0.80
Financial Innovation	Index measuring the level of financial innovation	0.64	0.03	0.60	0.62	0.64	0.66	0.68
Data Quality and Accessibility	Index measuring the quality and accessibility of data	0.86	0.03	0.82	0.84	0.86	0.88	0.90
Household Debt-to-Income	Ratio of household debt to household income	1.40	0.16	1.20	1.30	1.40	1.50	1.60

Table 2 presents estimates for direct issues deduced from both direct and non-linear models, along with robust tests for the variables being studied. According to the measure estimates, there's a significant increase in the outgrowth variable for every unit increase in government debt. The robust test results support this finding's responsibility.

On to "Information Management Systems", where the non-linear model reveals a relatively significant positive relationship and the direct model reveals a less strong positive association. The perfection of these estimations is revealed by the standard crimes. In the non-linear model, the variable" Regulatory Framework" shows a strong positive correlation; the direct model shows a slightly weaker association. This implies that there might be an on-linear pattern in the way the nonsupervisory frame affects the outgrowth variable. In discrepancy, the non-linear model shows a significant negative relationship between" Data Quality and Access," indicating a possible non-linear pattern in the way this variable affects the result. On the other hand, the direct model exhibits a less strong negative correlation.

For this variable, the direct model offers a clear interpretation, but the non-linear model shows a possible non-linear pattern. The lagged variable "L.FI" and the natural logarithms of "Government Debt" and "Information Management Systems" are among the transformed variables in the final set. These modifications are meant to capture non-linear relationships or take lag effects into consideration. These

changed variables' standard errors and coefficients shed light on how they affect the outcomes. The generalized method of moments (GMM) estimate technique's validity must be verified using the Hansen test. As we check the significance of the relationship through the p value as shown in steric for the robust test. This allows us to assess the data reliability, robustness testing and quantitative analysis based on GMM technique.

Table 2 shows direct issue estimates using linear and non-linear models and robust variable testing. To validate econometric models, interpret statistical tests like AR(1) and AR(2) autocorrelation and Hansen instrument validity. Both AR(1) and AR(2) tests find model residual autocorrelation. Residuals (errors) from different periods autocorrelation, undermining model assumptions and biassing estimates. AR(1) examines first-order autocorrelation. Table 2 shows all models have AR(1) test p-values below 0.05. This suggests first-order residual autocorrelation between periods' residuals. However, AR(2) tests second-order autocorrelation. Table 2 AR(2) test P-values above 0.05 are insignificant. The residuals of one period are uncorrelated with two earlier periods, indicating no second-order autocorrelation. AR(1) and AR(2) tests reveal no residual autocorrelation after the first lag. Higher-order autocorrelation can reveal validation-critical model specification issues.

Hansen (J-test) verifies GMM estimators. GMM assumes uncorrelated error terms and instruments. Hansen tests the null hypothesis that instruments are valid. The null hypothesis is accepted because Table 2 Hansen test p-values are all greater than 0.05. Real, error-uncorrelated instruments do not distort estimates in the models. Ar(1) and AR(2) tests provide good autocorrelation specifications for the models. The model handles first-order autocorrelation and is resilient without second-order. Hansen verification of GMM estimation equipment. This confirms coefficients and study results.

Table 2: Comparative Analysis of Non-linear and Linear Models for Government Debt and Financial Stability with Robustness Tests

Variables	Non-Linear Model	Linear Model	Non-Linear Model	Linear Model	Robust Test
Government Debt	0.567*** (0.123)	0.543 *** (0.121)	0.360 *** (0.078)	0.430 *** (0.092)	0.321 *** (0.071)
Information Management Systems	0.234 ** (0.067)	0.231 * (0.065)	0.151 ** (0.032)	0.245 * (0.055)	0.282 ** (0.046)
Regulatory Framework	0.345 (0.098)	0.312 ** (0.092)	0.222 * (0.041)	0.314 ** (0.078)	0.485 * (0.065)
Financial Innovation	0.456 ** (0.065)	0.423 ** (0.064)	0.287 *** (0.054)	0.276 ** (0.061)	0.371 ** (0.048)
Data Quality and Access	0.789 ** (0.105)	0.765 ** (0.101)	-0.121 ** (0.026)	-0.128 * (0.035)	-0.142 ** (0.031)
Household Debt-to-Income	-0.123 ** (0.034)	-0.113 * (0.036)	0.179 *** (0.035)	0.180 *** (0.001)	0.756*** (0.042)
Government Debt	0.507*** (0.112)	0.517 *** (0.136)	0.360 *** (0.078)	0.430 *** (0.092)	0.321 *** (0.071)
Information Management Systems	0.426 ** (0.006)	0.111 * (0.014)	0.148 ** (0.042)	0.745 * (0.001)	0.748 ** (0.047)
L.FI	0.412 ** (0.016)				
Constant	0.123*** (0.045)	0.125 ** (0.043)	0.25 *** (0.045)	0.32 *** (0.065)	0.45 *** (0.055)
N	572	570	570	572	570
AR(1)	-2.0145***	-1.9987**	-2.0263**	-2.1233**	-2.002**
AR(2)	1.4590	0.7856	1.9586	-0.2459	-0.7536
Hansen (p-value)	26.8530 (0.9633)	29.1678 (1.000)	26.2546 (1.000)	27.6800 (1.000)	26.2222 (0.9876)

As shown the results of SGMM used in this study, explored the multiple significant associations among Government Debt as IV, Management information system as Moderating effect and Several control variables shown in Table 3. The results of model 1 show that there is a positive significant relationship between government debt and financial inclusion which our dependent variable. This shows

if public debts increase, it will lead to financial inclusion increase. As we see the moderating effect or IMSs shows how this affected the actual relationship between government debt and financial inclusion. There is a moderating role in a positive way so that it enhances the actual relationship. According to Model 2, government debt has a positive coefficient, suggesting possible advantages, and a favorable influence on economic growth. The information management system regulation highlights how crucial it is to have a cutting-edge information infrastructure in order to reinforce the connection between public debt and economic growth. This implies that in economies with robust information systems, governments may be able to employ debt more successfully to boost economic growth.

In the case of Model 3, there is a significant and positive relationship between public debts and IMS as a moderating variable and Early Warning System Effectiveness. It means if public debt increases and moderating factors boost the relationship, it will lead to an increase in the Early Warning System Effectiveness in the Chinese context. It is basically improving the risk assessment financially due to higher government debts. Efficient assessment of financial risk is necessary to overcome the burden of public debts and economic growth a generalizability. There is a complex identification of the relationship between government debts and economic instability is depends on a few factors like the communication infrastructure efficiency of the economy. The robustness test indicates that robust IMS can manage the debt factors in the economy and encourage responsibility. Moreover, if any country handles government debt that may lead to support financial stability with information management systems.

The criteria for relationship argues that the government of China must positive significant investments in the sectors where information infrastructure to control debt levels, economic stability creation, and reduce negative social effects. In order to achieve evidence based policies, further research can example nuanced models in the existence of moderation, and contextual efficiency factors which lead to government accountability effectiveness.

Table 3: System GMM Regression: Estimates for Moderation Effect of Information Management Systems on Government Debt and Financial Stability

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Government Debt	0.621 ***	0.488 ***	0.402 ***	0.512 ***	0.357 ***
	(0.107)	(0.119)	(0.091)	(0.104)	(0.072)
Information Management Systems	0.178 **	0.203 *	0.134 **	0.187 *	0.209 **
	(0.048)	(0.061)	(0.036)	(0.053)	(0.049)
Regulatory Framework	0.289	0.278 **	0.191 *	0.325 **	0.402 *
	(0.084)	(0.086)	(0.038)	(0.073)	(0.060)
Financial Innovation	0.517 **	0.445 **	0.312 ***	0.378 **	0.439 **
	(0.060)	(0.062)	(0.050)	(0.057)	(0.045)
Data Quality and Access	0.624 **	0.587 **	-0.092 **	-0.111 *	-0.133 **
	(0.095)	(0.092)	(0.034)	(0.043)	(0.036)
Household Debt-to-Income	-0.155 **	-0.142 *	0.197 ***	0.201 ***	0.674 ***
	(0.032)	(0.034)	(0.032)	(0.001)	(0.045)
Government Debt	0.491 ***	0.476 ***	0.387 ***	0.496 ***	0.351 ***
	(0.102)	(0.125)	(0.088)	(0.101)	(0.073)
Information Management Systems	0.314 **	0.087 *	0.126 **	0.712 *	0.745 **
	(0.009)	(0.017)	(0.045)	(0.002)	(0.048)
L.FI		0.635 *	0.298 **	0.628 *	0.509 **
		(0.032)	(0.145)	(0.514)	(0.067)
Constant	0.145 ***	0.133 **	0.271 ***	0.307 ***	0.425 ***
	(0.041)	(0.038)	(0.041)	(0.063)	(0.051)
N	572	570	570	572	570
AR(1)	-2.130 ***	-1.967 **	-1.987 **	-2.054 **	-1.999 **
AR(2)	1.652	0.932	1.823	-0.309	-0.621
Hansen (p-value)	25.896	28.305	26.177	27.409	26.432
	(0.979)	(0.987)	(0.988)	(0.986)	(0.974)

The regression results presented in the table offer valuable insights into the relationships between significant factors and their potential impacts on the dependent variable. Curiously, "Government Debt" consistently exhibits a positive correlation across all models, suggesting a relationship between rises in the outcome variable and increases in government debt. The regression results presented in the table offer valuable insights into the relationships between significant factors and their potential impacts on the dependent variable. Curiously, "Government Debt" consistently exhibits a positive correlation across all models, suggesting a relationship between rises in the outcome variable and increases in government debt. The study is more complete with controls. "Regulatory Framework," "Financial Innovation," "Data Quality and Access," and natural logarithms have positive coefficients, suggesting they may affect the dependent variable. Control variables explain study factors. Results emphasise financial and economic success with information management and government debt. Control variables aid complex analysis and interactions. Without confounding variables, evaluate government intervention, financial freedom, and information operations. Financial regulation, innovation, and data quality affect outcomes and allow nuance. According to the study, contextual factors may affect patterns in these complex relationships. Economic stability and financial freedom are indicated by positive control variable coefficients. Nuanced variable analysis shows complex study results influences. By including control factors, the research improves empirical rigour and accurately represents the complex economy. Last, the study's comprehensive approach to regulatory frameworks, financial innovation, and data quality enhances analysis depth and accuracy. Positive variables' coefficients aid studied relationships. Government intervention, financial freedom, and information operation system discussions go beyond the study with this nuanced understanding. These results highlight how important financial and information infrastructure is in affecting the examined economic or financial outcome in a favorable way, together with other control factors.

Table 2 contrasts the primary and control factors of government debt and financial stability effects. Controls include household debt-to-income, financial innovation, data quality and access, and regulation. Understanding the financial climate and ensuring that minor factors do not conflict with major ones requires all parts. Relevant and intense model "Regulatory Framework" components differ. In Model 1, the Regulatory Framework positively but not statistically significantly affects the result (0.289, 0.084). In models 2, 3, 4, and 5, coefficients of 0.278 ($p < 0.05$), 0.191 ($p < 0.05$), 0.325 ($p < 0.05$), and 0.402 ($p < 0.1$) suggest stronger relationships Research shows market integrity and strong restrictions mitigate systemic risks and stabilise financial systems. Diversity in models suggests regulatory systems' efficacy depends on other aspects.

All models show that "Financial Innovation" boosts results. Financial stability improves considerably with 0.312–0.517 coefficients. The coefficient in Model 1 is 0.517, with a standard error of 0.060 ($p < 0.05$), indicating a strong positive connection. Models 2 (0.445), 3 (0.312), 4 (0.378), and 5 (0.439) have significant coefficients. Financial stability is improved via consumer and commercial financial product and service innovation. More nuance exists between "Data Quality and Access" and outcome. Models 1 and 2's positive and significant coefficients show data quality and access boost financial stability. For instance, Model 1 has a coefficient of 0.624 ($p < 0.05$) while Model 2 has 0.587 ($p < 0.05$). Models 3, 4, and 5 show negative associations ($p < 0.05$) with values of -0.092, -0.111, and -0.133. Linear models show that data quality and access initially increase financial stability, but data abundance or poor management may reduce gains. Financial stability requires data and application.

"Household Debt-to-Income" impacts model finances. Higher household debt-to-income ratios weaken financial stability in Models 1 and 2 (coefficients: -0.155, -0.142). This variable is positively associated with Models 3, 4, and 5 (0.197, 0.201, and 0.674). So economic conditions, lending policies,

and consumer behaviour affect household debt and financial stability. High household debt strains banks and the economy in Models 1 and 2. Analysis reveals financial stability is complicated and control variables matter. Financial stability improves with regulation and innovation, but data quality and access are questionable. Economy-dependent household debt-to-income ratios are dangerous or stable. They stress the necessity to analyse financial stability and implement varied measures.

5 Discussion

This study used System GMM regression analysis to examine government debt, information systems, and key economic indicators. The results indicate how information systems moderate element linkages. These include financial stability, economic growth, financial inclusion, income inequality, and early warning system effectiveness. The study shows how information systems manage complex economic-determinant relationships. Government spending increases GDP and financial services, according to economic theories. In this study, information system dynamics show the complex relationship between government intervention, financial freedom, and economic outcomes. Information systems impact financial freedom and policy effectiveness. The study emphasises technology and information management in modern economies beyond traditional economic analyses. The study confirmed that government spending increases GDP. Information systems' complex mediation role enters the economic growth government intervention debate. This nuanced study shows that IT affects economic outcomes and government policy effectiveness (Sheth & Parvatiyar, 2021).

The study's Model 2 shows that government debt often boosts the economy. It also means that increasing spending during recessions can benefit the economy. It's important to keep in mind that Model 1 suggests that higher levels of public debt can facilitate greater participation in the financial system, which would be beneficial to all. The key outcome of the study highlights that higher government spending can help the economy and the people overall, particularly in challenging times. Model 3 shows that while government debt might influence early warning system effectiveness, it might not be the only factor. The positive but non-significant coefficient (0.289) for government debt suggests this. Other factors that could influence the effectiveness of early warning systems include the quality of regulatory frameworks (Sufian & Habibullah, 2010).

In Model 4, which looks at income inequality, the government debt's positive coefficient (0.512) implies that it would be able to reduce economic disparities. This outcome is in line with the idea that targeted public spending can guarantee a more equitable distribution of resources across the economy. The financial stability-focused Model 5 demonstrates a significant and positive connection (0.357) between government debt. This research suggests that larger levels of public debt may, in some cases, improve financial stability, dispelling concerns that debt would negatively impact stability. This could be due to the countercyclical role of financial policy during economic downturns (Trung Ha & Lan Phuong, 2017).

The discussion might use relevant literature to contextualise and support interpretations. Tech cuts public debt (Hariram et al., 2023). Positive interaction coefficients indicate beneficial government information infrastructure expenditures. IT impacts business and government. After the study, economic indicators, information management, and government debt discussion improved. The data's intricacy shows economic conditions, communication system efficiency, and the intricate relationship between economic success and public debt (Kharrazi et al., 2020). Information management systems can help policymakers control economic dynamics, government debt, and sustainable growth.

6 Conclusion

This study uses System GMM regression to examine the complex relationships between government debt, information management systems, and economic indicators. The comprehensive study showed how public debt affects financial stability, growth, income inequality, and early warning system efficacy. Government debt and financial inclusion are positively correlated, suggesting that better financial management and public investment may improve the financial climate.

As shown by the positive correlation of government debt to economic growth, financial policy countercyclically affects economic growth. Government expenditure may stabilize and develop the economy. Government expenditure may stabilize and develop the economy. Data on the benefits of government spending, when information management systems work successfully, supports the importance of a strong information infrastructure.

The findings show how closely government debt, economic indicators, and information management systems are linked. Policymakers should address these difficulties when creating programmes and recognize that public debt can boost stability, equity, and economic growth when combined with appropriate information management systems. The study provides valuable information, but its drawbacks include its single reliance on quantitative data and the potential implications of economic change.

The study's conclusions affect financial institutions, stakeholders, and regulators. It emphasizes the need for expenditure analysis and borrowing methods that support long-term economic growth. Responsible and transparent financial policies reduce debt risks and build trust in the financial system. Information management systems' moderating function emphasizes the importance of investing in cutting-edge technology for accurate and reliable data, especially in uncertain economic times. The report also emphasizes the importance of regulatory frameworks, high-quality data, and financial innovation in affecting economic outcomes and urges decision-makers to prioritise these issues when creating fiscal policies.

In this study on government debt, information management systems, and economic indicators, quantitative statistics may neglect qualitative differences and dataset biases. The global financial crisis and the COVID-19 pandemic may have caused unexpected dynamics. Future research should examine socio-political aspects affecting these relationships using mixed methods. Additionally, the study did not link findings to research goals. Goal-aligned research should show how information management systems lessen government debt's impact on economic growth. Comparing international statistics may help generalise. Blockchain/AI information management and long-term government debt studies could increase data accuracy and policy execution. These challenges should be addressed to assist policymakers build good economic policies. This study highlights investing in technical infrastructure and information management systems to minimise public debt and stabilise the economy. These features promote theoretical frameworks and financial economics debate by helping fiscal planners develop a more equitable and sustainable economy.

7 Conflict of Interest

No potential conflict of interest was reported by the authors.

References

[1] AlDaajeh, S., Saleous, H., Alrabaee, S., Barka, E., Breitinger, F., & Choo, K. K. R. (2022). The role of national cybersecurity strategies on the improvement of cybersecurity education. *Computers & Security*, *119*, 102754. https://doi.org/10.1016/j.cose.2022.102754

[2] Bernardes, J. P., Mishra, N., Tran, F., Bahmer, T., Best, L., Blase, J. I., & Sander, L. E. (2020). Longitudinal multi-omics analyses identify responses of megakaryocytes, erythroid cells, and plasmablasts as hallmarks of severe COVID-19. *Immunity*, *53*(6), 1296-1314.

[3] Berry, C. (2020). From receding to reseeding: industrial policy, governance strategies and neoliberal resilience in post-crisis Britain. *New Political Economy*, *25*(4), 607-625.

[4] Buch, C., & Weigert, B. (2021). Climate change and financial stability: Contributions to the debate. *Deutsche Bundesbank*, *5*. https://www.bundesbank.de/resource/blob/869058/f33e5c6b7081fe801dc663205f7feee9/mL/paper-buch-weigert-data.pdf

[5] Dikau, S., & Volz, U. (2021). Central bank mandates, sustainability objectives and the promotion of green finance. *Ecological Economics*, *184*, 107022. https://doi.org/10.1016/j.ecolecon.2021.107022

[6] Fiorino, D. J. (2010). Sustainability as a conceptual focus for public administration. *Public administration review*, *70*, s78-s88.

[7] Forni, L., Catalano, M., & Pezzolla, E. (2018). Increasing resilience: Fiscal policy for climate adaptation. *In Fiscal policies for development and climate action*, 1, 115-133. World Bank Group.. https://doi.org/10.1596/978-1-4648-1358-0_ch3

[8] Goodwin, D., Holman, I., Pardthaisong, L., Visessri, S., Ekkawatpanit, C., & Rey Vicario, D. (2022). What is the evidence linking financial assistance for drought-affected agriculture and resilience in tropical Asia? A systematic review. *Regional Environmental Change*, *22*(1), 12. https://doi.org/10.1007/s10113-021-01867-y

[9] Hariram, N. P., Mekha, K. B., Suganthan, V., & Sudhakar, K. (2023). Sustainalism: An integrated socio-economic-environmental model to address sustainable development and sustainability. *Sustainability*, *15*(13), 10682. https://doi.org/10.3390/su151310682

[10] Jima, M. D., & Makoni, P. L. (2023). Causality between financial inclusion, financial stability and economic growth in sub-Saharan Africa. *Sustainability*, *15*(2), 1152. https://doi.org/10.3390/su15021152

[11] Khan, N., Zafar, M., Okunlola, A. F., Zoltan, Z., & Robert, M. (2022). Effects of financial inclusion on economic growth, poverty, sustainability, and financial efficiency: Evidence from the G20 countries. *Sustainability*, *14*(19), 12688. https://doi.org/10.3390/su141912688

[12] Kharrazi, A., Yu, Y., Jacob, A., Vora, N., & Fath, B. D. (2020). Redundancy, diversity, and modularity in network resilience: applications for international trade and implications for public policy. *Current research in environmental sustainability*, *2*, 100006. https://doi.org/10.1016/j.crsust.2020.06.001

[13] Kuznyetsova, A., Boiarko, I., Khutorna, M., & Zhezherun, Y. (2022). Development of financial inclusion from the standpoint of ensuring financial stability. *Public and Municipal Finance*, *11*(1), 20-36.

[14] Li, H., & Liu, B. (2022). The effect of industrial agglomeration on China's carbon intensity: Evidence from a dynamic panel model and a mediation effect model. *Energy Reports*, *8*, 96-103.

[15] MacHdar, N. M. (2020). Financial inclusion, financial stability and sustainability in the banking sector: The case of Indonesia. *International Journal of Economics and Business Administration*, *8*(1), 193-202.

[16] Nikonenko, U., Medynska, T., Bilotskyi, O., Baran, M., & Shevchuk, I. (2020). Analysis of institutional factors as part of the component of economic freedom as a background of improvement of structural proportions in the context of improving governance. *Business Management and Education*, *18*(2), 206-225.

[17] Noman, A. H. M., Gee, C. S., & Isa, C. R. (2017). Does competition improve financial stability of the banking sector in ASEAN countries? An empirical analysis. *PLOS One, 12*(5), 1-27.
[18] Pal, S., & Bandyopadhyay, I. (2022). Impact of financial inclusion on economic growth, financial development, financial efficiency, financial stability, and profitability: an international evidence. *SN Business & Economics*, *2*(9), 139. https://doi.org/10.1007/s43546-022-00313-3
[19] Pauly, L. W. (2009). The old and the new politics of international financial stability. *Journal of Common Market Studies, 47*(5), 955-975.
[20] Pinkwart, A., Schingen, G., Pannes, A. T., & Schlotböller, D. (2022). Improving resilience in times of multiple crisis: Commentary from a German economic policy point of view. *Schmalenbach Journal of Business Research, 74*(4), 763-786.
[21] Rasul, G. (2020). A Framework for improving policy priorities in managing COVID-19 challenges in developing countries. *Frontiers in Public Health, 8*, 1-9.
[22] Sheth, J. N., & Parvatiyar, A. (2021). Sustainable marketing: Market-driving, Not market-driven. *Journal of Macromarketing, 41*(1), 150-165.
[23] Sufian, F., & Habibullah, M. S. (2010). Does economic freedom fosters banks' performance? Panel evidence from Malaysia. *Journal of Contemporary Accounting and Economics, 6*(2), 77-91.
[24] Trung Ha, D., & Lan Phuong, D. (2017). Freedom of information law comes to Vietnam: How do human rights adapt to goals of economic development and political stability? *Australian Journal of Asian Law, 18*(2), 1-18.
[25] van Zanten, J. A., & van Tulder, R. (2020). Beyond COVID-19: Applying "SDG logics" for resilient transformations. *Journal of International Business Policy, 3*(4), 451-464.
[26] Van, L. T. H., Vo, A. T., Nguyen, N. T., & Vo, D. H. (2021). Financial inclusion and economic growth: An international evidence. *Emerging Markets Finance and Trade, 57*(1), 239-263.
[27] Veron, N., & Wolff, G. B. (2016). Capital markets union: A vision for the long term. *Journal of Financial Regulation, 2*(2), 130-153.