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The Impact of Adopting International Financial Reporting Standards and Public Sector Standards on Economic Freedom

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Abstract

This study examined the effect of adopting International Financial Reporting Standards (IFRS) and International Public Sector Accounting Standards (IPSAS) on economic freedom in developing countries. The analysis used panel data for 32 developing economies in Latin America, Asia, Eastern Europe, and Africa, including Albania, Argentina, Bangladesh, Brazil, Chile, Mexico, Turkey, and South Africa, over the period 2000 to 2023. Economic independence is a key factor in improving the business environment, attracting foreign investment and supporting sustained economic growth. The study employs panel data regression on data collected from commonly used economic and financial databases. The results showed that the adoption of IFRS and the simultaneous adoption of IFRS and IPSAS have statistically significant positive effects on economic freedom. According to the findings, combining IFRS and IPSAS can improve financial transparency, institutional quality, investor confidence, and eventually boost economic freedom in poor nations. Thus, the report advises that financial regulators, economic policymakers and international organizations examine the implementation of IFRS and IPSAS as policy tools to promote economic reforms and improve the performance and integrity of the financial markets.

Keywords:
Developing Countries,
Economic Freedom, IFRS,
IPSAS

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1. Introduction

Harmonized financial reporting standards have become more important as economic globalization and international financial transactions continue to grow. For financial information to be transparent, comparable, and reliable, IFRS and IPSAS are essential standards. Numerous nations have implemented these standards in developed regions of Asia and Africa, as well as in the corporate and governmental sectors, mainly in Europe. Domestic and foreign investors will be more confident in the quality of financial reporting. The adoption of these standards has become a significant approach to improve the business environment and build national economies due to the increasing demand for transparent and harmonized financial markets (Masoud, 2025).

Experts and policymakers have paid close attention to the concept of economic independence in recent decades. Business ease, economic transparency, property rights protection, and bureaucratic limitations are all measured. International investment, as well as financial and economic development at the national level, can be affected by it. Economic freedom refers to the degree to which individuals and companies are able to engage in economic activity without government intervention. A country with more economic freedom has a faster economic growth rate, attracts more foreign investment, and has a lower unemployment rate. Thus, identifying the factors associated with economic independence is essential. By improving financial openness and the quality of economic information, IFRS and IPSAS can increase economic freedom. No independent study has examined the impact of international standards on economic freedom, unlike their impact on macroeconomic variables such as foreign direct investment and financing costs. Studying how the adoption and application of IFRS and IPSAS can increase economic freedom within countries fills that gap. Several factors make this research significant. Achieving financial transparency and accountability is one of the benefits of adopting international accounting standards. It also promotes investor confidence and reduces financial corruption. Standards such as these can help explain financial operations, reduce economic malpractice, and increase government monitoring in nations with high levels of financial corruption. Second, international standards can increase economic competitiveness and reduce financing costs, thus attracting foreign investment. An organization can compete worldwide and pursue a wider range of investment options with harmonized financial reporting. Thirdly, international harmonization can strengthen economic governance and thereby enhance productivity and economic growth. Accurate and comparable financial reports can help policymakers and investors make better decisions. As a result, adopting IFRS and IPSAS could improve the quality of financial information and the conduct of macroeconomic policies, especially those related to economic freedom. Economic barriers could be reduced, public confidence could be raised in government, and sovereign credit ratings could improve in developing nations where corruption, inefficiencies, and inadequate transparency often prevail. The paper uses panel data from 32 developing nations throughout the period 2000-2023. The dependent variable is Economic Freedom (EF). Independent variables include adoption of IFRS, adoption of IPSAS and simultaneous adoption of both standards. Controls are inflation, gross domestic product (GDP) and other institutional considerations. The analysis is based on panel data econometric models and includes tests for heteroscedasticity and autocorrelation, and estimators robust to sampling error.

Despite extensive research on the financial, investment, and capital-market effects of IFRS and IPSAS, an important gap remains. Existing studies largely examine firm-level outcomes, reporting quality, or fiscal transparency, with less attention to the institutional channel through which international accounting standards may influence economic freedom as a composite governance indicator. No previous empirical study has systematically analyzed the separate and joint effects of IFRS and IPSAS on economic freedom across countries. This study addresses that gap by integrating

institutional economics with international accounting research and testing how harmonized private- and public-sector transparency reforms shape economic freedom in developing economies.

The results indicate a significant positive association between the adoption of IFRS and IPSAS and national levels of economic freedom. The simultaneous adoption of both standards is also connected with a significant improvement in economic freedom, highlighting the potential synergy between financial responsibility in the public sector and financial openness in the private sector. These results imply that the economic impact of international standards is not just channeled through the technical accounting reporting channels but also through improvements in broader institutional arrangements in both private and public sectors.

This study makes several contributions. First, it presents empirical evidence for a favorable association between the adoption of IFRS and IPSAS and economic freedom in developing nations. Secondly, it uses a panel data set of 32 developing economies in different regions, which enhances the application of the findings. Third, the methodological credibility of the findings is supported by the robust panel data regression technique. The research also shows that financial transparency and the quality of institutions mediate the relationship between standards' acceptance and economic freedom, which has consequences for policymakers. Fourth, it offers practical guidance to financial regulators and international organizations on the potential role of IFRS and IPSAS in economic reform and financial-market integrity. Although a substantial literature examines the financial and macroeconomic consequences of IFRS and IPSAS, no empirical study has previously investigated their separate and joint effects on economic freedom, an institutional indicator of governance quality, transparency, and market liberalization. This study provides the first comprehensive cross-country analysis of how IFRS and IPSAS adoption, separately and together, influences economic freedom in 32 developing countries over 24 years. Its innovation is in the combination of institutional economics with international accounting standards, the use of a long-term panel dataset, and the evaluation of the synergistic effect of the simultaneous implementation of IFRS and IPSAS. The findings are important for policymakers, regulators, investors and international organizations because they show how more financial openness and enhanced public sector accountability may bolster economic governance and foster economic freedom.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 presents the empirical results, Section 5 discusses the findings, and Section 6 concludes and sets out the policy implications.

2. Literature review and hypothesis development

2.1. Literature review

This article shifts the analytical focus from financial reporting outcomes to economic governance institutions. Whereas most previous studies examine the implications of IFRS for financial information quality or the cost of capital, this study considers the effect of international accounting standards on economic freedom, a composite macroeconomic indicator. The use of cross-country data over a long period (2000–2023) also strengthens the explanatory scope of the analysis and its relevance to policymakers and international organizations.

Economic freedom is an institutional concept grounded in economic liberalism and good governance. It fosters the efficient use of resources and minimizes the role of government while promoting competition. In this sense, transparent and reliable information is a sine qua non of efficiently functioning markets and of control of institutional corruption. According to institutional theory, transparent financial reporting standards minimize information asymmetry, enhance

government accountability, and increase market efficiency (Chiu et al., 2025; North, 1990; Acemoglu and Robinson, 2012).

This institutional view is also consistent with other studies (North, 1990; Acemoglu and Robinson, 2012). Economic freedom is determined by government size, legal system and property rights, sound money, global trade, and regulation (Gwartney et al., 2021). Strong property rights and little corruption allow people to work without fear of expropriation or illegal intervention (Alquist et al., 2022). Economic freedom is also influenced by political institutions and policy. Countries with strong institutions, consistent monetary policies, and lower taxes have more economic freedom, which leads to higher growth and wealth equality (Lawson et al., 2024). Privatization and more effective free markets that minimize the role of the government in the economy may also improve economic freedom (Ayal and Karras, 1998).

Financial reporting is key to financial and economic openness and can contribute to the quality of governance and public trust. Hence, the adoption of IFRS for the commercial sector and IPSAS for the public sector has been of interest to policymakers and international organizations. These standards are designed to increase transparency, accountability and comparability of financial information by developing a standardized accounting language (Islam, 2026; Scannell and Tawiah, 2024).

Much of the growing literature on these standards remains focused on their technical and reporting consequences. Their relationships with macroeconomic and institutional indicators, including economic freedom, are less developed (Hung et al., 2024).

IFRS was adopted to promote transparency, globalize reporting, and aid investment decision-making. Numerous studies show that IFRS minimizes information asymmetry, enhances capital market access, and lowers capital costs (Islam, 2026; Fisseha, 2023). Foreign direct investment in poor nations increased significantly after IFRS implementation, according to Islam (2026). By boosting openness and standardizing financial information, IFRS adoption can minimize corruption, promote corporate governance, and boost government efficiency, according to Akisik (2020). Gordon et al. (2012) provide developing country data linking IFRS adoption to long-term economic growth.

The benefits of IFRS adoption have not been uniform across countries. Hung et al. (2024), for example, emphasize that in countries with weak institutions and inefficient bureaucracies, IFRS adoption alone may not improve reporting quality or governance without accompanying institutional reforms and capacity building. IFRS is therefore a tool whose effectiveness depends on implementation and national institutional conditions.

IFRS relates to private firms generally, while IPSAS applies to governments and the public sector. The aim of IPSAS is to enhance accountability, to explain the financial activities of the government and to enhance the management of public resources (Laswad and Redmayne, 2015). International organizations such as the IMF and the World Bank have backed its implementation since the standards may inhibit corruption, waste and poor decision-making (Tawiah, 2023b).

However, the application of IPSAS is challenged by many factors. While IFRS has found broader acceptance, the adoption of IPSAS is frequently impeded by organizational resistance, a lack of experienced staff, and insufficient information technology infrastructure (Chatti et al., 2025). Scannell and Tawiah (2024) say that adoption in some countries is purely symbolic and would not lead to any real gains in government accountability without political backing and institutional capabilities. Some circumstances also show favorable evidence. For example, Tawiah (2023a) states that countries that adopted IPSAS, in addition to structural changes, improved government financial openness and public trust in the government financial system. In such cases, IPSAS can assist in strengthening governmental institutions and financial stability.

According to Gwartney et al. (2021), the Fraser Institute of Canada has published the Economic Freedom of the World (EFW) index every year since 1996 to measure market liberalization. Since

1970, the index has compiled data for 162 nations and awards a score between 0 and 10 based on the protection of private property rights, freedom to trade, competition, and individual freedom. The higher the score, the better the economic freedom.

Tawiah (2023a,b) investigated the impact of adopting IPSAS on the quality of financial reporting in Nigeria. Financial reporting quality was positively and significantly improved by IPSAS implementation, and greater compliance with these standards was associated with greater quality. According to Hung et al. (2024), economic freedom affects economic growth by including regulatory quality (RQ) for a sample of 54 countries between 2008 and 2022. The results show that economic freedom enhances economic growth regardless of the level of RQ. Despite differences in control variables such as corruption control and financial development, there were no significant differences among countries in Vietnam. Moreover, in Vietnam, several factors such as government spending on education and population growth rates had varied impacts. These results suggest measures to improve economic freedom.

2.2. Hypothesis development

IFRS applies to the private sector, while IPSAS applies to the public sector; implementing both standards may therefore provide broader coverage of the economy. An integrated approach can enhance financial transparency across the economic system, lower institutional barriers and promote domestic and international confidence in a country's economic structure (Saeed, 2025). This synergy, particularly in poor nations, may enhance the respective positive impacts of each norm. IFRS and IPSAS could therefore serve a complementary function in enhancing macroeconomic indices such as economic freedom.

The fundamental purpose of the research is to analyze the effects of IFRS and IPSAS implementation on national economic freedom. It compares countries that have implemented the standards entirely with those that have adopted them partially or not at all. The study also looks at their effects on elements of economic freedom such as financial openness, decrease in corruption, foreign direct investment and the business environment. The findings may help to comprehend the economic implications of international standards and advise national economic and financial policies. They can also assist policymakers in formulating measures to enhance economic indicators, increase economic freedom and support sustainable development.

Economic freedom is a composite institutional outcome measuring the performance of the legal system, regulatory arrangements, budgetary discipline, and market openness. Economic freedom is always associated with growth, innovation and investment in theory and empirical data (Gwartney et al., 2021; Lawson et al., 2024). IFRS and IPSAS can thereby reinforce the institutional basis of economic freedom by increasing financial openness and accountability, and become instruments of economic governance, not only technical reporting reforms.

- **IFRS and Economic Freedom**

Financial transparency, information asymmetry, and investor protection are all improved by IFRS adoption in the private sector. These techniques can reduce the scope of discretionary regulatory action, improve capital-market efficiency, and induce market-based resource allocation. Institutional economic theory implies that such advances lead to more economic freedom by reinforcing financial, investment and business freedoms. The following theory is consequently proposed:

H1: There is a significant relationship between adopting International Financial Reporting Standards (IFRS) and economic freedom.

- **IPSAS and Economic Freedom**

IPSAS adoption strengthens public-sector accountability, fiscal transparency, and the credibility of government financial management. Better public-sector reporting can constrain opportunistic fiscal behavior, reduce corruption, and promote rule-based governance. These outcomes are central to economic freedom through their effects on government size, regulatory efficiency, and the rule of law. The second hypothesis is therefore:

H2: There is a significant relationship between adopting International Public Sector Accounting Standards (IPSAS) and economic freedom.

- **Joint Adoption of IFRS and IPSAS**

Institutional theory indicates mutually reinforcing impacts of reforms affecting the private and the public sector. The dual adoption of IFRS and IPSAS provides an integrated transparency framework that could enhance institutional consistency, minimize systemic risk and enhance confidence in economic governance. The synergy should have a larger impact on economic freedom than either standard on its own.

The theoretical links among financial transparency, institutional quality, and market liberalization, together with institutional economics theory (North, 1990), suggest that international accounting standards may shape the institutional foundations of economic freedom. As global frameworks for uniform disclosure and accountability, IFRS and IPSAS are expected to strengthen rule-based governance and reduce information asymmetry in the private and public sectors. From an institutional economics perspective, adoption can reduce transaction costs and discretionary intervention, both of which may expand economic freedom. The following hypothesis is therefore proposed:

H3: There is a significant relationship between the concurrent adoption of both International Financial Reporting Standards (IFRS) and International Public Sector Accounting Standards (IPSAS) and economic freedom.

To the knowledge of the authors, this is the first study to investigate the impact of IFRS and IPSAS on national economic freedom. It uses sophisticated statistical techniques and global data to examine the link between financial transparency promoted by international norms and economic freedom measures.

The results show that the adoption and implementation of these standards are significantly associated with increases in numerous characteristics of economic freedom. The study fills a vacuum in the literature and provides new empirical information for policymakers, audit bodies and economic institutions. Its analytical technique may also serve as a platform for future study on the institutional effects of financial reporting standards.

3. Methodology

This study uses a panel data design covering 32 developing countries over 24 years (2000–2023). Countries were selected according to the availability of comparable data on financial reporting standards and economic governance indicators. Data were collected from primary institutional sources, such as the Heritage Foundation, the IFRS Foundation, IFAC and the World Bank, to ensure consistency and worldwide comparability.

Two independent variables measure international accounting standards adoption. The IFRS variable indicates the level of adoption and implementation in each country. Data were acquired from the IFRS Foundation, IAS PLUS and IFAC. If a country adopts IFRS, its legislation mandates corporations to draw up financial accounts according to those standards. Following Nguyen et al. (2023), full adoption was coded as 2, partial adoption as 1, and non-adoption as 0.

The IPSAS Index measures the extent of IPSAS implementation in each country based on data

from the IFAC website. It is quantified in the same way as IFRS, with full adoption coded as 2, partial adoption as 1 and non-adoption as 0 (Tawiah, 2023b).

The dependent variable is Economic Freedom (EF). It is measured using data from the Heritage Foundation's annual report. The index is from 0 to 100, with 100 being the freest in economic terms. IFRS Adoption (IFRS) is a binary variable which is coded as 0 if there is no adoption, 1 if there is partial adoption and 2 if there is full adoption and varies across nations and over time. IPSAS Adoption (IPSAS) is similarly labeled as 0, 1 or 2 according to the level of adoption and implementation. Economic Growth (GDPG) is the annual percentage growth rate of GDP reported in WDI. Inflation (INF) is the annual consumer price inflation rate (%), also obtained from WDI.

All empirical analyses were conducted in Stata 17. Panel estimators were used to exploit cross-sectional and time-series variation. The Chow and Hausman tests guided the choice between fixed and random effects. The White and Breusch–Godfrey tests were used to assess heteroskedasticity and serial correlation, respectively. Panel-corrected standard errors (PCSE) were used to obtain robust coefficient estimates.

In this study, following the research by Islam (2026) on the economic and political consequences of IFRS, a set of control variables has been employed to mitigate the effects of indirect factors on the research outcomes. Another example is the unemployment rate, which has been demonstrated to decrease with higher degrees of economic freedom, such as business freedom, labor freedom, and government integrity, and to enhance GDP (Lawson et al., 2024; Cervelló-Royo et al., 2023). The data for this variable were taken from the World Bank database. Inflation is an important gauge of the economic condition and is based on the Consumer Price Index (CPI). CPI measures the annual change in consumer costs. This variable is directly related to purchasing power (Piergallini, 2022) and data were retrieved from the World Bank. A control variable for country development status was also added. The Human Development Index (HDI), which includes characteristics such as health, education, and income (UNDP, 2024), divides countries into several groups. In this research, affluent countries are labeled with value 1 and poor or underdeveloped countries with value 0.

A further important indication of the attractiveness of a country for international investors is Foreign Direct Investment (FDI). The indicator is useful in giving information about the economic status of a country (Ababio et al., 2022). Data were collected from the World Bank and the natural logarithm was calculated. Economic growth is one of the basic criteria in the assessment of macroeconomic dynamics. This indicator captures variations in production, investment, and consumption (ADB, 2023; Lawson et al., 2024; Radmehr et al., 2022), utilizing data from the World Bank. Another control variable is GDP, which refers to the overall economic growth of a country. This statistic, which is the sum of the market value of all items and services made throughout a specified period of time, serves as a key indicator for measuring the general economic health of a society (World Bank, 2024). The appropriate data were gathered from the World Bank and its natural logarithm was employed. In assessing socio-economic processes, population, a significant demographic variable, is essential. This indicator provides important information for policy decisions and resource allocation (Caravaggio et al., 2021). Data for this indicator were obtained from the World Bank and its natural logarithm was calculated. The trade openness index is an indicator of the economic openness of a country, which is determined by the ratio of the total volume of commerce (exports and imports) to the GDP. This statistic is regarded as a significant sign for analyzing the country's integration into the global economy (Nam and Ryu, 2024). The data were obtained from the World Bank. The year variable is included to control for the effect of different time periods on the research results. This variable accounts for the impact of economic, social and political developments that can influence the results of the study (Kim et al., 2014). Finally, the country

variable accounts for structural differences between countries, such as disparities in economic policies, legal structures, and institutional infrastructures. This variable is particularly significant in international studies on accounting and financial reporting, as different nations could have varied reporting requirements that could impact the outcomes of the study (Albu et al., 2020). In this research, this set of control variables is used to improve the analytical precision and to avoid the conclusions of the model being biased by confounding factors.

To test *H1* and *H2,* the following model is used:

$$\text{Economic_freedom}_{i,t} = \beta_0 + \beta 1\ \text{IFRS}_{i,t} + \beta_2\ \text{IPSAS}\ i,t + \beta_2\ \text{Trade}_{2} + \beta_4\ \text{Gross_domestic_product}_{i,t} + \beta_5\ \text{inflation}_{i,t} + \beta_6\ \text{Unemployment_rate}_{i,t} + \beta_7\ \text{development}_{i,t} + \beta_8\ \text{Foreign-direct_investment}_{i,t} + \beta_9\ \text{Economic_growth}_{i,t} + \beta_{10}\ \text{Population}_{i,t} + \beta_{11}\ \text{year}_{i,t} + \beta n\ \text{Country}_{i,t}$$

To test Hypothesis 3, the following model is employed:

$$\text{Economic_freedom}_{i,t} = \beta_0 + \beta_1\ \text{IFRS}_{i,t} + \beta_2\ \text{IPSAS}_{i,t} + \beta_3\ \text{IFRS}_{i,t}\times\text{IPSAS}i,t + \beta_4\ \text{Trade}_{i,t} + + \beta_5\ \text{Gross_domestic_product}_{i,t} + \beta_6\ \text{inflation}_{i,t} + \beta_7\ \text{Unemployment_rate}_{i,t} + \beta_8\ \text{development}_{i,t} + \beta_9\ \text{Foreign-direct_investment}_{i,t} + \beta_{10}\ \text{Economic_growth}_{i,t} + \beta_{11}\ \text{Population}_{i,t} + \beta_{12}\ \text{year}_{i,t} + \beta_{13}\ \text{Country}\ i,t$$

4. Results

4.1. Descriptive statistics

Descriptive statistics classify, summarize, present, interpret, and communicate collected information. They provide an overview of the data and describe central tendency and dispersion using the following three methods (Field, 2018):

1. Preparation and Organization of Frequency Distribution Tables and Graph Plotting
2. Measures of Central Tendency
3. Measures of Dispersion

Frequency distributions and graphs help organize and present information (Field, 2018).

The dataset comprises 32 developing countries selected using the United Nations Human Development Index and the World Bank Income Classification. The 24-year sample period (2000–2023) provides sufficient longitudinal coverage to capture institutional and policy variation in IFRS and IPSAS implementation across emerging economies. The sample includes Albania, Argentina, Bangladesh, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, Costa Rica, Ecuador, El Salvador, Georgia, Ghana, Hungary, Jamaica, Malaysia, Mexico, Montenegro, Pakistan, Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia, South Africa, The Bahamas, Turkey, Ukraine, United Arab Emirates, Uruguay, and Venezuela.

4.2. Central tendency measures

Measures of central tendency summarize a dataset using a single representative value. They include the mode, median, and mean (Gravetter and Wallnau, 2016).

The correct application of descriptive statistics highlights the properties of a dataset, assists in the interpretation of the test findings, and makes it possible to compare with other tests and observations (Spiegel & Stephens, 2017).

Annual descriptive statistics generated in EViews for the variables measured in 32 developing countries from 2000 to 2023 are reported in Table 1.

Table 1. Descriptive statistics of research data

Variables	Mean	Median	Maximum	Minimum	Std. Dev.
ECONOMIC GROWTH	3.380	3.830	15.400	-21.420	3.840
EF	62.350	63.500	79.000	43.500	7.460
FOREIGN DIRECT INVESTMENT	26.550	26.560	26.660	26.260	0.030
GDP	11.000	11.030	12.420	9.490	0.700
IFRS	1.230	2.000	2.000	0.000	0.870
INFLATION	6.820	4.800	96.100	-2.080	8.470
IPSAS	0.270	0.000	2.000	0.000	0.540
POPULATION	7.260	7.290	8.380	5.510	0.710
TRADE	78.060	71.903	220.410	21.460	36.160
UNEMPLOYMENT	8.470	7.170	28.840	0.400	5.350

GDP, FDI, Economic Growth, and Population were homogenized through logarithmic transformation. The table reports the mean and standard deviation together with the minimum and maximum values for each variable.

The standard deviation measures dispersion around the mean.

4.3. Examination of explanatory variable correlation

Multicollinearity among explanatory variables can inflate coefficient variances and reduce the reliability of statistical inference. Before estimating the models, the study therefore examined correlations among the explanatory variables using Pearson's correlation coefficients (Dormann et al., 2013). Table 2 presents the correlation matrix.

The matrix reports pairwise correlations among the variables. Because none of the correlations is sufficiently high to indicate a serious problem, it provides no evidence of problematic multicollinearity.

4.4. Regression model estimation and hypothesis testing

Regression analysis was performed in EViews to test the hypotheses. The regression models and their coefficients were first estimated, after which the hypotheses were tested by interpreting the model outputs.

4.4.1. Analysis of pooled vs. panel models

Combined data can be analyzed using either pooled ordinary least squares or panel data methods. Under pooled estimation, the intercept is constant across cross-sections; under panel estimation, it varies across cross-sections. The F-test (Chow test) is commonly used to choose between these approaches (Baltagi, 2021).

Panel models may use fixed or random effects. A fixed-effects specification is appropriate when the cross-sectional intercepts are correlated with the explanatory variables; a random-effects specification is appropriate when they are not. Before estimation, the F-test (Chow test) is used to determine whether pooled or panel estimation is required. If panel estimation is selected, the Hausman test is then used to choose between fixed and random effects.

The null hypothesis (H0) of the F-test is that the intercepts are the same, while the alternative hypothesis (H1) is that the intercepts are different. Acceptance of H0 supports pooling of the data and testing of the hypotheses with pooled regression (Greene, 2012). The panel estimate is supported by rejection of H0. If the F-test confirms a panel model, the Hausman test checks for the correct model between random and fixed effects.

Table 2. Correlation of research data

Correlation	EF	IFRS	IPSAS	GDP	TRADE	ECONOMIC GROWTH	UNEMPLOYMENT	FOREIGN DIRECT INVESTMEN	POPULATION	INFLATION
EF	1.000									
IFRS	0.310	1.000								
IPSAS	0.200	0.270	1.000							
GDP	-0.160	0.100	0.200	1.000						
TRADE	0.340	0.140	0.200	-0.190	1.000					
ECONOMIC GROWTH	-0.120	-0.060	-0.010	0.010	0.010	1.000				
UNEMPLOYMENT	0.060	0.050	-0.070	-0.270	-0.090	-0.120	1.000			
FOREIGN DIRECT INVESTMENT	0.060	-0.090	-0.030	-0.450	0.230	0.050	0.000	1.000		
POPULATION	-0.470	-0.140	0.070	0.820	-0.380	0.130	-0.320	-0.340	1.000	
INFLATION	-0.260	-0.150	-0.040	0.020	-0.120	0.030	-0.050	0.020	0.180	1.000

Under the Hausman test, acceptance of the null hypothesis (H0) supports the random-effects model because individual effects are uncorrelated with the explanatory variables. Acceptance of the alternative hypothesis (H1) supports the fixed-effects model because such a correlation is present.

Once panel effects have been established, the Hausman test is required. The null hypothesis of the Hausman test (p-value < 0.05) rejects the random effects specification and indicates estimation by fixed effects (Wooldridge, 2002).

The White test is used to evaluate if the error term in a regression has constant variance. Heteroskedasticity means that the variance of the errors varies across the values of the independent variables. This can lead to less accurate estimations of parameters and less efficient tests of statistical hypotheses (White, 1980).

The F-statistic is significant (p-value < 0.05) and the null hypothesis of homoskedasticity is rejected. The model was hence corrected by selecting cross-sectional weights (PCSE) as the technique for the coefficient covariance. This correction adjusts the standard errors of the coefficients and their associated t-statistics for heteroskedasticity.

The White test tests the null hypothesis of a constant regression error variance. Heteroskedasticity occurs when the variance of the error is different for different values of the independent variables, and can lead to decreased accuracy of the parameter estimations and the efficiency of the statistical tests (White, 1980). A significant F-statistic (p-value < 0.05) rejects the null hypothesis of homoskedasticity. Thus, the model was corrected by selecting Cross-section weights (PCSE) as the covariance method, which adjusts coefficient standard errors and their accompanying t-statistics to account for heteroskedasticity.

Breusch-Godfrey test is used to test serial correlation in regression mistakes. Serial correlation arises when error terms are related across time and can lead to erroneous regression results and wasteful t and F-tests (Wooldridge, 2020). A significant F statistic (p-value less than 0.05) contradicts

the null hypothesis of no serial correlation. Therefore, an error term with lag was included to control for the model. For the first model, the Redundant Fixed Effects test revealed a significant F-statistic ($F = 41.084$, $p = 6.9 \times 10^{-113}$), while the Hausman test produced $\chi^2 = 42.075$, $df = 9$, $p = 3.18 \times 10^{-6}$. Because all p-values are below 0.001, the null hypotheses of homogeneous intercepts and random effects are rejected. The model is therefore specified as a Fixed-Effects Panel Model, indicating that country intercepts vary systematically rather than randomly. In institutional terms, this result implies that persistent national differences in governance quality, transparency, and policy enforcement are endogenous to the adoption of financial standards. For the second model, which includes the IFRS×IPSAS interaction, the Redundant Fixed Effects test also confirmed cross-sectional heterogeneity ($F = 40.439$, $p = 1.47 \times 10^{-111}$). The Hausman test supported the fixed-effects specification ($\chi^2 = 43.523$, $df = 10$, $p = 4.0 \times 10^{-6}$). These results support the statistical choice of fixed effects and the conceptual argument that the joint effect of IFRS and IPSAS operates through nationally embedded institutional mechanisms. Concurrent adoption may reinforce private-sector transparency and public-sector accountability within stable national institutional frameworks.

4.4.2. Diagnostic tests: heteroskedasticity and serial correlation

Before estimating the model, diagnostic tests were run to examine the validity and robustness of the econometric specifications. To test for heteroskedasticity, the White test was applied and serial correlation of the error terms was tested with the Breusch–Godfrey LM test. Both tests were applied to the first model, which tests H_1 and H_2 through the independent effects of IFRS and IPSAS, and the second model, which tests H_3 through the IFRS×IPSAS interaction.

The White test assesses whether regression error variance is constant. Heteroskedasticity is a condition in which the variance of the errors is not constant over the values of the independent variables and may result in less accurate parameter estimations and less efficient statistical tests (White, 1980).

The Breusch-Godfrey test looks for serial correlation in the errors of a regression. Serial correlation is the correlation of the error terms with time and this can lead to the regression results being wrong and the t and F-tests being wasteful (Wooldridge, 2020). A significant F-statistic (p-value < 0.05) rejects the null hypothesis of no serial association. The model was therefore corrected by including a lagged error term.

For the first model, the White test yielded $F = 4.3707$ and $p = 9.01 \times 10^{-19}$, decisively rejecting the null hypothesis of homoskedasticity. The Breusch–Godfrey LM test yielded $F = 1071.9502$ and $p = 3.78 \times 10^{-198}$, confirming strong serial correlation. Cross-section weights (PCSE) were employed to deal with heteroskedasticity and a lagged error term was incorporated to account for serial correlation. The effect of these changes is to increase the dependability of the coefficient standard errors and the robustness of the t-statistics.

The second model, which includes the IFRS×IPSAS interaction, produced similar results. The White test yielded $F = 3.9987$ and $p = 3.60 \times 10^{-18}$, again rejecting homoskedasticity. The Breusch–Godfrey LM test yielded $F = 1071.9116$ and $p = 5.54 \times 10^{-198}$, indicating strong serial correlation. PCSE weighting and a lagged residual were therefore also used in this model to address heteroskedasticity and autocorrelation, respectively.

4.4.3. Variance inflation factor (VIF)

The Variance Inflation Factor (VIF) is widely used to detect multicollinearity among explanatory variables. High VIF values indicate that linear relationships among predictors inflate the variance of estimated regression coefficients and may reduce the reliability of statistical inference (Gokmen et

al., 2022). Table 3 reports the VIF values for the independent variables.

Table 3. Variance inflation factor (VIF)

Variable	Centered VIF
IFRS	1.950
IPSAS	1.320
TRADE	1.450
GDP	2.590
INFLATION	1.270
UNEMPLOYMENT	1.510
FOREIGN DIRECT INVESTMENT	1.100
ECONOMIC GROWTH	1.190
POPULATION	2.760

Because all VIF values are below 10, the results provide no evidence of problematic multicollinearity.

4.4.4. Model estimation

Table 4 presents the estimated model and its coefficients.

Table 4. The estimated model and its coefficients

Variables	Coefficient	Std. Error	t-Statistic	Prob.
IFRS	0.310	0.150	2.050	0.040
IPSAS	0.560	0.210	2.720	0.010
TRADE	0.010	0.010	1.660	0.100
GDP	6.250	0.560	11.110	0.000
INFLATION	-0.100	0.0100	-6.730	0.000
UNEMPLOYMENT	-0.110	0.040	-2.920	0.000
FOREIGN DIRECT INVESTMENT	11.020	3.400	3.240	0.000
ECONOMIC GROWTH	-0.130	0.020	-6.610	0.000
POPULATION	-45.580	3.730	-12.230	0.000
C	32.470	95.770	0.340	0.730
R-squared	0.950	F-statistic		291.470
Adjusted R-squared	0.940	Prob(F-statistic)		0.000

The overall F-statistic is 291.47 with a p-value of 0.00, which indicates that the model is statistically significant at the 0.05 level. The most commonly used metric of goodness of fit is R-squared, which spans from zero to one, with the better fit being closer to one. The R-squared value of 0.95 indicates a good fit and the modified R-squared value of 0.94 indicates that the model explains more than 94% of the variation in the dependent variable.

The Durbin-Watson statistic is within the acceptable range of 1.5 to 2.5, indicating an acceptable level of serial correlation in the model residuals.

The regression model examines the relationship between IFRS, IPSAS, and economic freedom in underdeveloped countries. The p-values for IFRS and IPSAS are below the 0.05 significance level, indicating significant relationships between each standard and economic freedom (Table 5).

The overall F-statistic is 275.98, with a p-value of 0.00, indicating statistical significance at the 0.05 level. The R-squared of 0.95 indicates an acceptable fit, while the adjusted R-squared of 0.95 shows that the model explains more than 95% of the variation in the dependent variable.

The Durbin-Watson statistic is within the acceptable range of 1.5 to 2.5, indicating an acceptable level of autocorrelation in the model residuals.

The simultaneous application of IFRS and IPSAS is significantly related to economic freedom.

The regression model for developing countries includes IFRS, IPSAS, and economic freedom. The probability for the combined IFRS and IPSAS variable is 0.03. Because this value is below 0.05, the results indicate a significant relationship between their simultaneous application and economic freedom. The combined use of IFRS and IPSAS therefore had a significant effect on economic freedom in developing countries during 2000-2023.

Table 5. Regression Model

Variables	Coefficient	Std. Error	t-Statistic	Prob.
IFRS	0.380	0.160	2.360	0.020
IPSAS	-0.120	0.630	-0.190	0.850
IFRS*IPSAS	0.730	0.330	2.200	0.030
TRADE	0.000	0.010	0.030	0.980
GDP	6.100	0.580	10.560	0.000
INFLATION	-0.090	0.010	-6.160	0.000
UNEMPLOYMENT	-0.120	0.040	-3.160	0.000
FOREIGN DIRECT INVESTMENT	11.540	3.450	3.340	0.000
ECONOMIC GROWTH	-0.120	0.020	-6.260	0.000
POPULATION	-45.560	3.750	-12.130	0.000
R-squared	0.950	F-statistic		275.980
Adjusted R-squared	0.950	Prob(F-statistic)		0.000

5. Discussion

A well-specified regression model requires the explanatory variables not to exhibit problematic multicollinearity. Because high correlations among independent variables can destabilize coefficient estimates and distort interpretation, Pearson correlations were calculated among the explanatory variables. The correlation matrix shows no excessively high pairwise correlations. The largest coefficient is 0.82 between population and GDP. Although relatively high, this association is not treated as a fundamental problem for the model.

All other correlation coefficients are less than 0.5, suggesting that there are no strong linear correlations. For example, between IPSAS and IFRS, it is 0.27, whereas between Trade and FDI, it is 0.23. These low relationships suggest that there is no concern of multicollinearity and the independent variables can be included in the regression without disturbing the estimation. This is consistent with the accuracy of the estimations and the generalizability of the findings.

The Variance Inflation Factor (VIF) provides a further assessment of multicollinearity. All VIF values are below 10, indicating that none of the independent variables is highly correlated with the others and that multicollinearity does not materially bias the estimates.

Most of the coefficients of the independent variables are significant. The effects of IFRS and IPSAS are favorable and significant and those of inflation and unemployment are negative. GDP and FDI also have significant positive effects. The high R-squared means it explains a lot and the F-test shows the model is significant overall. Therefore, the results demonstrate clear links between the economic and financial variables studied and the dependent variable. It confirms the validity of the model for studying the data.

The regression model provides a strong and statistically significant fit for variation in economic freedom across developing countries. R^2 of 0.95 implies that the independent variables explain almost 95% of the variance in the dependent variable, indicating good precision and predictive power. The F-statistic and p-value below 0.05 indicate that the model is statistically significant and that

independent factors affect economic freedom. At p = 0.03, below the 0.05 criterion, the positive IFRS IPSAS coefficient becomes significant. This suggests that coordinated, simultaneous implementation increases economic freedom and that nations adopting both standards saw significant improvements in their economic freedom measures. GDP and FDI also have significant positive effects, but inflation and unemployment hinder them. These data support ideas associating economic growth and foreign investment with economic freedom and development.

The results suggest that simultaneous IFRS and IPSAS implementation improves financial reporting transparency and quality and is positively associated with macroeconomic indicators and economic freedom in developing countries. They also indicate the importance of financial and accounting standards policy for strengthening the economic environment and attracting investment.

6. Conclusion

Transparent and efficient economic governance is important for economic freedom and sustainable development in developing countries. IFRS and IPSAS can improve financial transparency, reduce corruption, and increase the effectiveness of economic policy. Examining their effect on economic freedom therefore has both theoretical and practical significance.

The findings indicated that the separate implementation of IFRS and IPSAS significantly affects economic freedom and that simultaneous implementation has an even stronger positive effect in developing countries. The coefficients associated with the standards were positively correlated with the economic freedom index, indicating their effectiveness in improving the national economic environment. The results also confirmed positive effects of FDI and economic growth on economic freedom, whereas inflation and unemployment have negative effects.

Overall, the results suggested that adopting IFRS and IPSAS together can increase financial transparency and investor confidence, reduce information asymmetry, and improve economic freedom in developing countries. Economic policymakers and regulators should therefore facilitate adoption and implementation to support a more efficient and transparent economic environment, sustainable growth, and stronger economic freedom.

The findings also showed that IFRS and IPSAS work together to make economic activity more transparent and efficient. Aligned implementation improves private and public economic governance. Economic freedom is favorably correlated with FDI and GDP, and adversely with inflation and unemployment. Akisik (2020), Islam (2026), and Saeed (2025) agree that international financial norms promote openness, minimize corruption, and boost economic governance. The study also revealed that IFRS and IPSAS, especially jointly, improve economic flexibility.

Some research finds standards to be less effective in poor institutional environments (e.g., Scannell & Tawiah, 2024). Conversely, the data from 32 developing countries showed strong empirical evidence that effective adoption and implementation of such reforms can lead to tangible improvements in economic freedom, provided that they are backed by institutional reform and strong political commitment.

These findings offered practical assistance to economic policymakers, regulators and financial legislators in emerging countries. The use of IFRS and IPSAS can promote increased transparency, investor confidence and a better economic environment. Implementation should be facilitated by strengthening institutional infrastructure, training of staff, and legal support. International agencies like the World Bank and the IMF should offer more consultation and technical assistance to the adopting countries.

This study is limited by its exclusive focus on developing countries and its reliance on secondary data, which may affect analytical precision. Economic freedom is also influenced by institutional and political factors that the model does not fully control.

References

1. Ababio, J. O.-M., Aboagye, A. Q. Q., Barnor, C. and Agyei, S. K. (2022). Foreign and domestic private investment in developing and emerging economies: A review of literature. *Cogent Economics & Finance*, 10(1), A. 2132646. https://doi.org/10.1080/23322039.2022.2132646
2. Acemoglu, D. and Robinson, J. A. (2012). Why nations fail: the origins of power, prosperity, and poverty. *Finance and Development-English Edition,* 49(1), P. 53.
3. Akisik, O. (2020). The impact of financial development, IFRS, and rule of law on foreign investments: A cross-country analysis. *International Review of Economics & Finance*, 69, pp. 815-838. https://doi.org/10.1016/j.iref.2020.06.015
4. Albu, N., Albu, C. N. and Gray, S. J. (2020). Institutional factors and the impact of international financial reporting standards: The Central and Eastern European experience. *Accounting Forum*, 44(3), pp. 184-214. https://doi.org/10.1080/01559982.2019.1701793
5. Alquist, R., Chabot, B. R. and Yamarthy, R. (2022). The price of property rights: Institutions, finance, and economic growth. *Journal of International Economics*, 137, A. 103594. https://doi.org/10.1016/j.jinteco.2022.103594
6. Asian Development Bank. (ADB). (2023). Asian Development Outlook April 2023. *Asian Development Bank. Manila, Philippines.* https://www.adb.org/outlook/editions/april-2023
7. Ayal, E. B. and Karras, G. (1998). Components of economic freedom and growth: An empirical study. *The Journal of Developing Areas*, 32(3), pp. 327-338. https://www.jstor.org/stable/4192775
8. Baltagi, B. H. (2021). Econometric Analysis of Panel Data. 6th ed. *Springer. Cham, Switzerland.* https://doi.org/10.1007/978-3-030-53953-5
9. Caravaggio, A., Gori, L. and Sodini, M. (2021). Population dynamics and economic development. *Discrete and Continuous Dynamical Systems - B*, 26(11), pp. 5827-5848. https://doi.org/10.3934/dcdsb.2021178
10. Cervelló-Royo, R., Devece, C. and Blanco-González Tejero, C. (2023). Economic freedom influences economic growth and unemployment: An analysis of the Eurozone. *Economic Research-Ekonomska Istraživanja*, 36(2), A. 2175007. https://doi.org/10.1080/1331677X.2023.2175007
11. Chatti, A., Damak Ayadi, S. and Jeriji, M. (2025). Drivers for IPSAS adoption: Context-related factors in public sector innovation. *International Journal of Public Administration*, 48(10), pp. 654-669. https://doi.org/10.1080/01900692.2024.2401456
12. Chiu, P. C., Hsu, P. H., Tian, F. and Yi, L. (2025). Mandatory IFRS adoption and design innovation. *Journal of International Accounting Research*, 24(3), pp. 1-33. https://doi.org/10.2308/JIAR-2022-046
13. Dormann, C. F., Elith, J., Bacher, S., Buchmann, C., Carl, G., Carré, G., García Marquéz, J. R., Gruber, B., Lafourcade, B., Leitão, P. J., Münkemüller, T., McClean, C., Osborne, P. E., Reineking, B., Schröder, B., Skidmore, A. K., Zurell, D. and Lautenbach, S. (2013). Collinearity: A review of methods to deal with it and a simulation study evaluating their performance. *Ecography*, 36(1), pp. 27-46. https://doi.org/10.1111/j.1600-0587.2012.07348.x
14. Field, A. (2018). Discovering Statistics Using IBM SPSS Statistics. 5th ed. *Sage Publications. Los Angeles, U.S.* https://edge.sagepub.com/field5e
15. Fisseha, F. L. (2023). IFRS adoption and foreign direct investment in Sub-Saharan African countries: Does the levels of adoption matter? *Cogent Business & Management*, 10(1), A. 2175441. https://doi.org/10.1080/23311975.2023.2175441

16. Gokmen, S., Dagalp, R. and Kilickaplan, S. (2022). Multicollinearity in measurement error models. *Communications in Statistics - Theory and Methods*, 51(2), pp. 474-485. https://doi.org/10.1080/03610926.2020.1750654
17. Gordon, L. A., Loeb, M. P. and Zhu, W. (2012). The impact of IFRS adoption on foreign direct investment. *Journal of Accounting and Public Policy*, 31(4), pp. 374-398. https://doi.org/10.1016/j.jaccpubpol.2012.06.001
18. Gravetter, F. J. and Wallnau, L. B. (2016). Statistics for the Behavioral Sciences. 10th ed. *Cengage Learning. Boston, U.S.*
19. Greene, W. H. (2012). Econometric Analysis. 7th ed. *Pearson Education. Upper Saddle River, NJ, U.S.* https://pages.stern.nyu.edu/~wgreene/Text/Edition7/ERRATA7.htm
20. Gwartney, J., Lawson, R. A., Hall, J. and Murphy, R. (2021). Economic Freedom of the World: 2021 Annual Report. *Fraser Institute. Vancouver, Canada.* https://www.fraserinstitute.org/studies/economic-freedom-world-2021-annual-report
21. Hung, N. T., Oanh, T. T. K. and Trang, C. T. T. (2024). The impact of economic freedom on economic growth in countries with high and low regulatory quality—lessons for Viet Nam. *Humanities and Social Sciences Communications*, 11(1), A. 1237. https://doi.org/10.1057/s41599-024-03741-8
22. Islam, R. (2026). IFRS adoption and its impact on foreign direct investment in developing countries. *Asian Journal of Economics and Banking*, pp. 1-18. https://doi.org/10.1108/AJEB-01-2026-0011
23. Kim, J. B., Shi, H. and Zhou, J. (2014). International Financial Reporting Standards, institutional infrastructures, and implied cost of equity capital around the world. *Review of Quantitative Finance and Accounting*, 42(3), pp. 469-507. https://doi.org/10.1007/s11156-013-0350-3
24. Laswad, F. and Redmayne, N. B. (2015). IPSAS or IFRS as the framework for public sector financial reporting? New Zealand preparers' perspectives. *Australian Accounting Review*, 25(2), pp. 175-184. https://doi.org/10.1111/auar.12052
25. Lawson, R., Miozzi, V. and Tuszynski, M. (2024). Economic freedom and growth, income, investment, and inequality: A quantitative summary of the literature. *Southern Economic Journal*, 90(4), pp. 1099-1135. https://doi.org/10.1002/soej.12680
26. Masoud, N. (2025). Global insights on public sector accounting reforms: A comprehensive study on the adoption, implementation, and impact of IFRS and IPSAS. *Accounting Research Journal*, 38(1), pp. 80-105. https://doi.org/10.1108/ARJ-06-2024-0228
27. Nam, H. J. and Ryu, D. (2024). Does trade openness promote economic growth in developing countries? *Journal of International Financial Markets, Institutions and Money*, 93, A. 101985. https://doi.org/10.1016/j.intfin.2024.101985
28. Nguyen, H. T. T., Nguyen, H. T. T. and Nguyen, C. V. (2023). Analysis of factors affecting the adoption of IFRS in an emerging economy. *Heliyon*, 9(6), A. e17331. https://doi.org/10.1016/j.heliyon.2023.e17331
29. North, D. C. (1990). Institutions, Institutional Change and Economic Performance. *Cambridge University Press. Cambridge, U.K.* https://doi.org/10.1017/CBO9780511808678
30. Piergallini, A. (2022). Average inflation targeting and macroeconomic stability. *Economics Letters*, 219, A. 110790. https://doi.org/10.1016/j.econlet.2022.110790
31. Radmehr, R., Ali, E. B., Shayanmehr, S., Saghaian, S., Darbandi, E., Agbozo, E. and Sarkodie, S. A. (2022). Assessing the global drivers of sustained economic development: The role of trade openness, financial development, and FDI. *Sustainability*, 14(21), A. 14023. https://doi.org/10.3390/su142114023
32. Saeed, M. M. (2025). Factors affecting the implementation of the International Public Sector

Accounting Standards (IPSAS) in Ghana. *International Journal of Public Administration*, 48(15), pp. 1011-1024. https://doi.org/10.1080/01900692.2024.2440926
33. Scannell, S. and Tawiah, V. (2024). A thematic literature review on International Public Sector Accounting Standards (IPSAS). *Public Organization Review*, 24(3), pp. 1053-1075. https://doi.org/10.1007/s11115-024-00773-1
34. Spiegel, M. R. and Stephens, L. J. (2017). Schaum's Outline of Statistics. 6th ed. *McGraw-Hill Education. New York, U.S.*
35. Tawiah, V. (2023a). The effect of IPSAS adoption on governance quality: Evidence from developing and developed countries. *Public Organization Review*, 23(1), pp. 305-324. https://doi.org/10.1007/s11115-022-00625-w
36. Tawiah, V. (2023b). The impact of IPSAS adoption on corruption in developing countries. *Financial Accountability & Management*, 39(1), pp. 103-124. https://doi.org/10.1111/faam.12288
37. United Nations Development Programme (UNDP). (2024). Human Development Report 2023-24: Breaking the Gridlock: Reimagining Cooperation in a Polarized World. *United Nations Development Programme. New York, U.S.* https://hdr.undp.org/content/human-development-report-2023-24
38. White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48(4), pp. 817-838. https://doi.org/10.2307/1912934
39. Wooldridge, J. M. (2002). Econometric Analysis of Cross Section and Panel Data. *MIT Press. Cambridge, MA, U.S.*
40. Wooldridge, J. M. (2020). Introductory Econometrics: A Modern Approach. 7th ed. *Cengage Learning. Boston, U.S.*
41. World Bank. (2024). World Development Indicators. *World Bank. Washington, DC, U.S.*