
IFRS adoption and economic growth in developing economies

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Abstract: We examine whether the adoption of International Financial Reporting Standards (IFRS) affects economic growth in developing economies and investigate the role that country-level institutional quality plays in the relationship. Using a panel data averaged over three non-overlapping years, from the period 1996 to 2013, for 78 developing countries and employing the efficient two-step system generalised methods of moment (GMM) estimation technique; we find that countries that adopt IFRS experience better economic growth than non-adopting countries. Our results also demonstrate that good institutions moderate the IFRS-economic growth nexus. Taken together, these findings suggest that IFRS adoption has important implications for economic growth.

Keywords: International Financial Reporting Standards; IFRS; economic growth; developing economies; generalised methods of moment; GMM; institutional quality; foreign direct investment; FDI; principal component analysis; accounting standards; system GMM; accounting systems.

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1 Introduction

The widespread adoption of the International Financial Reporting Standards (IFRS) has generated intense research interest within the last two decades. While several studies have examined firm-level implications of IFRS adoption (Abad et al., 2018; Daske et al., 2013; Daske et al., 2008; Barth et al., 2008; Chen et al., 2010), the macroeconomic consequences of IFRS adoption remained largely unexplored though the relevance of such empirical evidence has been emphasised in the literature. As Leuz and Wysocki (2008) point out, both firm-level and macroeconomic evidence are important in evaluating the economic consequences of accounting standards or reporting regulations. We provide some evidence on the macro front by investigating the link between IFRS adoption and economic growth of countries.

Identifying the factors that drive economic growth of countries undoubtedly has featured on the research agenda of many economists for decades. Notwithstanding the existence of several empirical studies on the determinants of economic growth (Chakrabarti, 2001; Fratzscher, 2012), the generic role of a country's accounting system (most especially the applicable accounting standards) on economic growth has not been considered in these studies. Interestingly, accounting studies concerned with accounting standards have also evolved independently from macroeconomic issues and have over the years, focused largely on firm-level implication of accounting standards. Nonetheless, the link between the accounting system of a country and its economic growth has long been anticipated.

Gray and Roberts (1991) for instance, argue that inappropriate or inadequate accounting system could be a major impediment to a country's growth prospects given that the accounting system of a country forms an integral part of the overall input into that country's economic development process. Also, an important predictor of a country's growth is the efficiency with which resources are allocated in that country (Bushman et al., 2011; Lurson and Kenny, 1995). Zhang (2013) therefore posits that since the provision of credible accounting information promotes efficient allocation of resources in an economy, the adoption of credible accounting standards could have some growth enhancing implications for countries. Empirically, studies on IFRS adoption associate it with improvement accounting information quality (Barth et al., 2008) and efficiency in the allocation of capital (Shima and Gordon, 2011). This presupposes that adopting IFRS could promote economic growth of a country. Again, existing studies document those countries that adopt IFRS experience better foreign direct investment (FDI) inflows than non-adopting countries (Gordon et al., 2012). FDI inflows have been found to impact positively on economic growth and hence it is expected that countries that adopt IFRS should experience better economic growth than non-adopting countries. This study therefore argues that to the extent that IFRS improves accounting information quality, enhances allocation of capital and promote FDI inflows to a country, its adoption should promote economic growth.

While we expect IFRS adoption to improve the economic growth of countries, we argue that country-level institutional quality is a key to the growth enhancing effect of adopting IFRS. We refer to the six indicators of institutional quality by the World Governance Indicators (WGI) (political stability and absence of violence, voice and accountability, government effectiveness, regulatory quality, rule of law and control of corruption) to be particularly relevant in the IFRS-economic growth nexus. To achieve the objectives of this study, we relied on a panel data averaged over three non-overlapping years for 78 developing countries from the period 1996 to 2013 and employed the efficient two-step system generalised methods of moment (GMM) estimation technique to examine our empirical relations.

Consistent with our predictions, we find that countries that adopt IFRS experience better economic growth than non-adopting countries. Also, our interaction of IFRS adoption and country-level institutional quality indicate that good institutions moderate favourably the impact of IFRS adoption on economic growth of countries. Our evidence contributes to both the Accounting and Economics literature in several important ways. Specifically, we extend literature on determinants of economic growth by documenting that the type of accounting standards used by a country matter for its economic growth. This evidence provides new insights into the macroeconomic implications of using a single financial reporting standard across countries. Further, we provide a mechanism for understanding better the medium through which a country can harness the economic benefits of adopting IFRS. Our results suggest that understanding the link between the adoption of IFRS and country-level institutional quality is key to identifying the medium through which a country can harness the economic benefits of IFRS adoption. Additionally, the use of the dynamic panel GMM estimation technique in this study substantially accounts for the misspecified dynamics and addresses all possible endogeneity concerns which prior IFRS related studies (Amiram, 2012; Gordon et al., 2012; Chen et al., 2014) have mostly ignored.

The remainder of this paper is organised as follows. The next section discusses related literature on IFRS adoption, institutions and economic growth and develops the study hypotheses. The following section describes the sample selection, data and empirical specifications. Results from the empirical estimations are then discussed followed by concluding remarks along with policy implications from the study findings.

2 Related literature and hypotheses development

The link between the accounting system of a country and its economic growth has long been anticipated in literature. Gray and Roberts (1991) posit that accounting forms an important component of the overall input into a country's economic development process. In their view, inappropriate accounting system may impede economic growth. Given that quality of the accounting system of a country is usually a function of its underlying reporting standards, the type of accounting applicable in a country could have economic growth implications. Despite this theoretical appeal, most studies on the determinants of economic growth (Agbloyor et al., 2016; Awad and Ragab, 2018; Cooray, 2010; Sunde, 2017) tend to ignore the role of the prevailing accounting system of a country on its growth prospect. Interestingly, while the widespread adoption of IFRS has been associated with some economic benefits, little is known about its impact on economic growth to date. With the exception of the work of Oppong and Aga (2019) that examined the impact of IFRS adoption on economic growth of some selected European countries, the IFRS and economic growth nexus has remained a grey area in both accounting and economic research. This is however, not surprising given that most accounting researchers have predominantly focused on the firm-level implication of IFRS (Daske et al., 2013; Daske et al., 2008; Barth et al., 2008; Chen et al., 2010).

2.1 IFRS adoption and economic growth

Existing studies largely conclude that the use of IFRS improves the quality and credibility of reporting in a country (Barth et al., 2008). The provision of credible and reliable accounting information facilitates good decision making especially in the allocation of scarce resources in a country (Zhang, 2013). The efficient allocation of resources in an economy is critical in ensuring that, resources get to the most productive sectors in the economy to propel growth (Bushman et al., 2011; Lurson and Kenny, 1995).

Thus, in an environment where accounting information is perceived to be unreliable, allocation of resources is likely to be ineffective. This presupposes that resources may not be channelled to the most productive sectors in such an economy, which may negatively affect economic growth. Empirically, IFRS adoption has been found to be particularly useful in enhancing capital allocation efficiencies (Shima and Gordon, 2011) and by extension can be helpful in promoting economic growth.

Moreover, the provision of quality accounting information by business units in a country is essential for the growth of a country's capital market. This is because; high quality accounting information reduces information asymmetries for foreign investors and consequently, encourages foreign investors' participation in domestic capital market activities (Frost et al., 2006). Employing a sample of 50 emerging economies over a period spanning from 2001 to 2007, Othman and Kossentini (2015) found a positive

association between the extent of IFRS adoption and stock market development. Given that stock market development has been found to promote economic growth in developing economies (Adjasi and Biekpe, 2006; Cooray, 2010), the adoption of IFRS could enhance the economic growth of a country.

Lastly, the link between a country's adoption of IFRS and its economic growth is also premised on the fact that IFRS adoption has been found to be associated with growth in FDI inflows to countries. Existing studies (Chen et al., 2014; Gordon et al., 2012; Owusu et al., 2017b) document that countries that adopt IFRS experience better FDI inflows than non-adopting countries. The argument is that, the fear of making adverse selection by foreign investors due to the existence of information asymmetry usually discourages investors from exploring foreign markets. Since IFRS adoption can help reduce information asymmetries associated with accounting information, it reduces the perceived risks of investing abroad which should ultimately promote foreign investment inflows to countries. Moreover, the adoption of IFRS has become an important reference point for the allocation of international development aid loans provided by some Bretton Woods institutions particularly the World Bank. As documented by Lamoreaux et al. (2015), development aid loans have been higher for countries with stronger accounting quality, especially where IFRS use is mandated. Given that FDI inflows and development loans play a critical role in economic growth (Li and Lu, 2005), the adoption of IFRS should enhance economic growth of developing economies. Empirically, Oppong and Aga (2019) provide evidence consistent with the argument that IFRS adoption improves economic growth of countries.

Based on the above arguments this study hypothesises that:

H1 The adoption of IFRS improves economic growth of countries.

2.2 IFRS adoption, institutional quality and economic growth

While the benefits of adopting IFRS have received empirical support, it has been argued that adopting IFRS alone may be insufficient for a country to achieve any economic outcome, unless supported by a strong institutional framework (Akisik, 2013). The accounting system of a country does not exist independently of the influences of other institutional variables in a country (Cieslewicz, 2014; Wehrfritz and Haller, 2014; Walker, 2010; Wysocki, 2011). Institutions form the basis of every economic activity in a country. Well-developed institutions create the enabling environment that promotes economic activity, growth, and development.

3 The concept of institutions and institutional quality measures

Institutions according North (1991) shape human interaction help to maintain order and reduce uncertainty in exchanges. Fundamentally they represent the mechanisms through which social and economic exchanges and interactions are guided. Whilst different notions of institutions exist in the literature, this study focuses on the definition by Kaufmann et al. (2011) commonly referred to as WGI. Apart from the fact that the WGI is the operationalised definition of institutions by reputable international organisations such as the World Bank, the WGI are generally perceived to be objective, cover virtually all countries in the world, and are derived from a broad survey sample that incorporates

data drawn from a variety of sources (Brunnschweiler, 2008; Globberman and Shapiro, 2002). In essence, the WGI encompasses a large body of indicators from multiple sources thereby providing a broader measure of institutions than most of the individual indicators in the literature.

The WGI conceptualises institutions to mean the traditions by which authority is exercised in a country. The quality of a country's institution according to the WGI measures is a reflection of:

- a the process by which governments are selected, monitored and replaced
- b the capacity of the government to effectively formulate and implement sound policies
- c the respect of citizens and the state for the institutions that govern economic and social interactions among them.

From these three thematic areas above, two corresponding measures of institutional quality for each area have been developed giving rise to six aggregated measures of quality institutions:

- 1 political stability and the absence of violence/terrorism
- 2 voice and accountability
- 3 government effectiveness
- 4 regulatory quality
- 5 the rule of law
- 6 control of corruption.

In all, higher values of these six indicators demonstrate the existence of good institutions in a country. A country with a good institutional framework, based on the WGI indicators should therefore be characterised by a stable political environment devoid of violence, the liberty of the masses to freely express themselves, effective governance and quality regulation, enforcement of rule of law and low level of corruption.

Regarding the role of institutional quality in the IFRS and economic growth nexus, we argue that the existence of quality institutional framework is relevant in enhancing the economic impact of IFRS adoption by a country. While the adoption of IFRS is expected to promote economic growth, a poor institutional environment may diminish the economic impact of IFRS (Beneish and Yohn, 2008). This is because a poor institutional environment heightens the uncertainties associated with investment and could lead investors to discount the economic benefits of IFRS adoption. Prior accounting studies argue that the effectiveness of accounting and reporting systems is usually a reflection of the institutional environment within which they operate (Leuz et al., 2003; Mir and Rahaman, 2005). In line with this general belief, Ball (2006) strongly opines that changing accounting standards alone may not be enough in achieving positive economic outcomes. By extension, the adoption of quality accounting standards, such as IFRS by a country, may be inconsequential in terms of the expected economic benefits unless it is supported by strong institutions. As Wysocki (2011) suggests, the effective implementation of IFRS in a country may depend on the strength of its other institutional indicators. Thus, institutional factors may influence directly the effective application of

IFRS and its economic outcomes. On the basis of the above discussion, we argue that while the adoption of IFRS is expected to improve the transparency in reporting, promoting FDI and economic growth, poor institutional developments in a country may diminish the economic impact of IFRS. Therefore, we also hypothesise that:

H2 Institutional quality moderates favourably the relationship between IFRS adoption and economic growth.

4 Research design

4.1 Sample selection and data

We began our sample selection with all countries classified as developing countries by the United Nations Statistics Division. The list of countries used in the analysis is presented in Table A1. A panel data of the sampled countries, covering the period 1996 to 2013, was employed in the analysis of the study objectives. To reduce the impact of volatility in the data set and the effect of strong cyclical factors that may be present in the yearly data (Ali et al., 2010; Law and Habibullah, 2009), we transformed the data from the 18-year annual observations to three non-overlapping years. This together, gives a six-time period data for our empirical analysis (1996–1998, 1999–2001, 2002–2004, 2005–2007, 2008–2010, 2011–2013). Averaging the data over a three-year interval improves the number of observations in the final analysis by reducing the amount of observations with zeros or missing values, which would have otherwise been omitted from the regression models. We employed non-overlapping averages and not moving averages as the latter though often used can introduce autocorrelation into the regression model because the data points become dependent on each other. Again, a number of studies have also employed non-overlapping years in their estimation (Ali et al., 2010; Agbloyor et al., 2016).

4.2 Empirical specification

To empirically assess the effect of IFRS adoption on economic growth, the following basic formulation, similar to previous economic growth studies (Agbloyor et al., 2016; Aisen and Veiga, 2013) is estimated:

$$y_{it} = \alpha_1 y_{it-1} + \alpha_2 IFRSdummy_{it} + \alpha_3 InstQua_{it} + \alpha_4 (IFRSdummy * InstQua_{it}) + \alpha_5 Controls_{it} + \varepsilon_{it}$$

where y_{it} represents the dependent variable, Loggdppc (measured as the log of the three year averaged GDP per capita data in constant dollars for country ‘ i ’ at time ‘ t ’, y_{it-1} represents the first lag of the dependent variable y and α_1 represents the coefficient of the lag of GDP per capita. α_2 represents the coefficient of the variable named *IFRSdummy* which captures the adoption of IFRS by a country. This was measured as a dummy ‘1’ if a country has adopted IFRS and ‘0’ if otherwise. α_3 represents the coefficient of institutional quality. A composite measure for institutional quality was obtained by computing the weighted average of the six Kaufmann governance indicators using the respective weights generated through the principal component analysis technique. The six

indices used to measure the overall institutional quality include corruption, rule of law, political stability and absence of violence, voice and accountability, government effectiveness and regulatory quality (Agbloyor et al., 2016; Kose et al., 2011). The coefficient of the interaction of IFRS adoption and institutional quality is represented in the model by α_4 . α_5 represent the coefficient of the set of control variables included in the model while ϵ represents the error term in the regression model.

4.3 Control variables and expected signs

Following prior studies, (Agbloyor et al., 2016; Borrmann et al., 2006; Oppong and Aga, 2019) we control for several known predictors of economic growth. The variables that have been shown in previous studies to be the most important determinants of growth include trade openness, savings, financial market development and population growth. Trade openness is measured as the sum of imports and exports scaled by GDP, financial development is measured as financial depth (money and quasi money ‘M2’ as a percentage of GDP), savings is measured as gross domestic savings to GD and population growth is the annual population growth rate scaled by 100. A detailed description of each variable, measurement and data source is provided in the Table A2. In line with the hypotheses of this study (H1 and H2) it is expected that the coefficient of IFRSdummy will be positive whilst institutional quality and the interaction term are also expected to have a positive coefficient. We also expect openness to trade, savings, financial market development and population growth to be positively related to economic growth and an inverse relationship between inflation and growth.

4.5 Empirical method of estimation

In this study the GMM estimation technique developed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998) is used. Compared with other estimation techniques, GMM estimator handles better the problem of unobserved heterogeneity, allows for a dynamic relation of the dependent variable and also addresses the problem of endogeneity biases in a more efficient way (Wintoki et al., 2012). Again, the GMM estimator controls for heteroskedasticity and autocorrelation effectively and can accommodate unbalanced panels (Roodman, 2006). These desirable characteristics make the GMM a more efficient panel regression estimation technique than the ordinary least square and other static estimation techniques. Specific to this study however, the GMM is employed for three important reasons.

First, the GMM technique is adopted to address potential endogeneity concerns in our estimated model. Apart from the fact that some of the variables of interest in the estimated model such as openness to trade are theoretically endogenous in nature (Busse and Hefeker, 2007), previous related IFRS studies suggest endogeneity may also result from changes due to other regulatory reforms that could have occurred around the time of IFRS adoption (Gordon et al., 2012). While the instrumental variable (IV) technique is sometimes used to deal with the effect of endogeneity on estimated results, the difficulty of getting appropriate instrument that correlates with only the exogenous variables and not the error term has been acknowledged in practice (Butkiewicz and Yanikkaya, 2006). Thus, using the GMM estimator helps in overcoming the difficulty of getting appropriate instrument with the IV approach. This is because the GMM approach assumes the only available and valid instruments are ‘internal’ and thus, strictly relies on the set of

'internal' instruments contained within the panel itself and not outside the immediate data set (Roodman, 2006; Wintoki et al., 2012).

Second, the use of the dynamic panel GMM estimator is also appropriate for this study because, it allows for the treatment of the economic growth as a dynamic process by considering the impact of past growth performance on current level of growth. According to Roodman (2006), the GMM estimators are designed for panel analysis in which current realisation of the dependent variable is influenced by past ones. Existing econometric growth studies suggest past growth has important implications on future growth performance (Aisen and Veiga, 2013; Agbloyor et al., 2016).

Third, the GMM estimators are also ideal for panels with few time periods and many cross section (panels with small 'T' and large 'N') (Roodman, 2006). The number of countries used in the study analysis far exceeds the time period of data coverage, thereby justifying the appropriateness of using the GMM technique to estimate the empirical relations.

This study employs the two-step version of the System GMM since it results in more asymptotic efficient estimates than the one-step estimator and are also robust to all kinds of heteroskedasticity (Asiedu and Lien, 2011). The Windmeijer (2005) corrected standard errors procedure is also employed to correct the biases associated with the two-step estimator. Orthogonal deviations transformations are used in the estimation and the instruments are collapsed where necessary to ensure that the number of instruments do not exceed the number of groups (Roodman, 2009).

5 Empirical results

5.1 Descriptive statistics correlations

Table 1 provides descriptive statistics for variables used in the empirical analysis. GDP per capita shows the maximum variation with a minimum value of US\$113.58 and a maximum of US\$93,200 with an average GDP per capita of US\$4,555.24. This result indicates the existence of huge disparities in GDP per capita levels across the sampled countries. The mean level of savings is approximately 17% of GDP over the period while the level of population growth averages about 1.9%. Among the six institutional quality indicators, 'control of corruption' had the best maximum score (1.67) while 'political stability' was the worst ranked indicator with a minimum value of (-2.49).

Table 2 presents the results of the pairwise correlation matrix for the variables employed in the analysis. This analysis was done with the aim of ascertaining whether the independent variables were highly correlated with each other in order to establish whether multicollinearity was an issue in the dataset. The results of the pairwise correlation matrix, as shown in Table 2, indicate that multicollinearity is not a major issue as the extent of correlation among the independent variables is very low. Notable exceptions to the correlation matrix are the six indicators of institutional quality and the aggregate measure of institutions. The six indicators exhibit a high pairwise correlation among each other and with the aggregate institutional quality measure. This result is however expected and justifies the appropriateness in using the aggregate measure in our empirical analyses.

Table 1 Descriptive statistics

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>
GDPPC	464	4,555.24	8,343.14	113.586	93,200.1
INSTQUA	466	-0.3439	0.6849	-2.1157	1.3104
VOICE	468	-0.2967	0.8079	-2.1598	1.4436
PSTAB	466	-0.3456	0.9477	-2.4914	1.3614
GOVT	468	-0.3556	0.715	-1.9606	1.5048
REGQUA	468	-0.3167	0.6963	-2.2294	1.5246
RULELAW	468	-0.3885	0.7454	-2.0686	1.4292
CORRUPT	468	-0.3578	0.7334	-1.9785	1.6791
SAVINGS	449	0.1701	0.1908	-0.7494	0.8411
FINDEVT	387	0.4887	0.2902	0.0224	1.4929
POPGROWTH	468	1.8725	1.386	-1.6069	15.8824
INFLATION	464	11.8498	51.2339	-14.631	1,048.36
TRADEOPEN	415	0.6393	0.1371	0.15	0.8793
IFRSDUMMY	468	0.2756	0.4473	0	1

Notes: GDPPC represents GDP per capita. INSTAQUA represents institutional quality. VOICE represents voice and accountability. PSTAB represents political stability. GOVT represents government effectiveness. REGQUA represents regulatory quality. RULELAW represents rule of law. CORRUPT represents control of corruption. SAVINGS represents gross domestic savings to GDP. FINDEVT represents financial development. POPGROWTH represents growth in population. TRADEOPEN represents openness to trade. IFRSDUMMY is a dummy variable that represents the adoption of IFRS by a country where IFRS represents International Financial Reporting Standards.

5.2 Regression results

Results from the dynamic panel estimation are shown in Table 3. In all, there are eight different regression outputs in Table 3. The initial result, as shown in column 1 of Table 3 (model A), tests the effect of IFRS adoption on economic growth. This regression excludes the interaction of the IFRS variable with institutional quality. Model B of Table 3 contains results based on the interaction of IFRS adoption and institutional quality and their joint impact on economic growth. In models C-H, the six indicators of institutional quality are used individually to estimate the model.

The initial results, as shown in model A, demonstrate a positive but weakly significant relationship (at 10% significance level) between the IFRS adoption and economic growth. This suggests that countries that adopt IFRS for reporting purposes experience better economic growth than non-adopting countries. Specifically, at a 10% level of significance, countries that have adopted the IFRS received about 9.28% more inflows than countries that rely on their own domestic accounting standard for financial reporting purposes. Thus, in line with our predictions, the type of accounting standards applicable in a country has important implications on economic growth. Specifically, countries that adopt quality accounting standards such as the IFRS experience better economic growth than countries with weak accounting standards. This finding in part may be attributable to the fact that, the adoption of IFRS enhances the efficiency in

allocation of scarce resources within an economy (Zhang, 2013) which has implications on growth. As documented in existing studies (Bushman et al., 2011; Lurson and Kenny, 1995) the efficiency with which resources are allocated in an economy is important in ensuring that resources get to the most productive sectors of the economy to propel growth. Again, countries that adopt IFRS are able to attract more FDI inflows than non-adopting countries (Chen et al., 2014; Gordon et al., 2012; Owusu et al., 2017a; 2017b) which is helpful in promoting economic growth. This result is consistent with the findings of Oppong and Aga (2019) who concluded that the full adoption of IFRS increases growth rate of GDP contemporaneously.

The results in model A also show a highly significant lagged dependant GDPPC variable (at 1% level) an indication that GDP per capita is highly persistent. By implication, past economic growth matters for current economic growth justifying the appropriateness of using the dynamic panel estimation technique. The institutional quality variable was found to be positive but insignificant with growth. Largely, all the control variables have the expected sign and are statistically significant at either 1% or 5% level, with the exception of population growth, which had a statistically insignificant relationship with growth. Savings recorded a very strong positive association with economic growth (p-value < 0.01); an indication that the level of domestic savings in a country impacts positively on the rate of growth in that country. By implication, countries with a high savings rate grow faster than those with a lower saving rate. This is because an increase in the savings ratio usually increases the availability of funds for investment projects in a country, which in turn stimulates economic growth. From a theoretical perspective, traditional growth theories predict a positive correlation between the savings ratio and the level of economic growth in a country (Solow, 1956; Lucas, 1988).

Additionally, the results demonstrate that the level of a country's financial development is important for its growth outcomes as financial development was found to be positive and statistically significant (at 5% level) with economic growth. While the exact role of financial development on economic growth appears to be a controversial issue in the existing empirical growth literature, this finding supports the argument that financial development can spur economic growth. Countries with a well-functioning financial system, mostly characterised by well-developed capital market and efficient banking system tend to grow faster. Empirically, several studies have found a positive association between financial development and economic growth (Hassan et al., 2011; Levine, 1997; Apergis et al., 2007; Tang, 2006).

In terms of the relationship between the degree of trade openness and economic growth, the conventional view is that openness to trade has growth-enhancing effects. The estimated results for trade openness in this study indicate a positive and significant association between the degree of trade openness and economic growth (at 1% significant level). By implication, countries with outward-oriented economies tend to grow faster than inward-oriented economies. The explanation is that, openness to trade usually expands trade opportunities to a country, increases the rate of technology transfer and diffusion and improves efficiency in resource allocation in an economy which in turn improves productivity and growth (Wang et al., 2004; Borrmann et al., 2006). The findings from this study are therefore in line with both theoretical and empirical growth studies that support the view that, trade openness facilitates a country's economic growth (Borrmann et al., 2006; Chang et al., 2009; Wang et al., 2004; Yanikkaya, 2003).

Table 2 Correlation matrix for the study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.00													
2	0.6702*	1.00												
3	0.4793*	0.8446*	1.00											
4	0.5437*	0.7860*	0.6078*	1.00										
5	0.6600*	0.9283*	0.7383*	0.6065*	1.00									
6	0.6126*	0.8678*	0.7477*	0.5321*	0.8866*	1.00								
7	0.6376*	0.9570*	0.7336*	0.7524*	0.8949*	0.8004*	1.00							
8	0.6243*	0.9214*	0.6933*	0.6789*	0.8697*	0.7514*	0.9073*	1.00						
9	0.5240*	0.1429*	-0.0325	0.1446*	0.1969*	0.2084*	0.1468*	0.0976*	1.00					
10	0.3685*	0.5549*	0.4110*	0.3467*	0.5825*	0.4071*	0.5942*	0.5690*	0.0187	1.00				
11	-0.054	-0.2080*	-0.3558*	-0.1079*	-0.1916*	-0.1909*	-0.1446*	-0.1193*	0.2575*	-0.2023*	1.00			
12	-0.1362*	-0.1603*	-0.1567*	-0.1908*	-0.1779*	-0.1978*	-0.1779*	-0.1465*	-0.0207	-0.1212*	0.0419	1.00		
13	0.2449*	0.2847*	0.2557*	0.1479*	0.2955*	0.3855*	0.2354*	0.2252*	0.0128	0.1314*	-0.0618	-0.0657	1.00	
14	0.2341*	0.2042*	0.1387*	0.1524*	0.1779*	0.2382*	0.1938*	0.1576*	0.2355*	-0.0158	0.1075*	-0.0511	0.2873*	1.00

Notes: *represents significance at 5%.

1 represents the variable GDPPC (GDP per capita), 2 represents the variable INSTAQUA (institutional quality) 3 represents the variable VOICE (voice and accountability), 4 represents the variable PSTAB (political stability), 5 represents GOVT (government effectiveness), 6 represents REGQUA (regulatory quality), 7 represents RULELAW (rule of law), 8 represents CORRUP (control of corruption), 9 represents savings, 10 represents FINDEVT (financial development), 11 represents POPGROWTH (population growth), 12 represents INFLATON, 13 represents TRADEOPEN (openness to trade) represents, 14 represents IFRSDUMMY.

Table 3 Regression results

Variables	Model A	Model B	Model C	Model D	Model E	Model F	Model G	Model H
Lag of log GDPPC	0.504*** (0.0967)	0.574*** (0.103)	0.585*** (0.0907)	0.554*** (0.129)	0.615*** (0.130)	0.550*** (0.129)	0.598*** (0.0999)	0.578*** (0.104)
IFRSDUMMY	0.0928* (0.0507)	0.108** (0.0528)	0.107** (0.0520)	0.107* (0.0558)	0.0991* (0.0570)	0.0912* (0.0514)	0.0955** (0.0389)	0.0896** (0.0395)
INSTQUA	0.154 (0.118)	0.0802 (0.112)						
INTERACTION		0.175*** (0.0606)	0.171* (0.0877)	0.118** (0.0532)	0.133** (0.0557)	0.165** (0.0715)	0.123*** (0.0451)	0.0711 (0.0496)
SAVINGS	1.678*** (0.251)	1.446*** (0.314)	1.372*** (0.334)	1.564*** (0.354)	1.390*** (0.437)	1.449*** (0.383)	1.456*** (0.286)	1.459*** (0.252)
FINDEVT	0.482** (0.232)	0.432** (0.185)	0.369* (0.216)	0.373 (0.242)	0.318* (0.182)	0.518* (0.286)	0.523*** (0.183)	0.551*** (0.181)
POPGROWTH	-0.0348 (0.0451)	-0.00266 (0.0576)	-0.0156 (0.134)	-0.0598 (0.0776)	-0.0245 (0.0593)	-0.00762 (0.0401)	-0.00454 (0.0333)	-0.00649 (0.0305)
INFLATION	-0.0323** (0.0137)	-0.0376*** (0.0117)	-0.0360** (0.0150)	-0.0375*** (0.00742)	-0.0383*** (0.00582)	-0.0333*** (0.0123)	-0.0491*** (0.00813)	-0.0428*** (0.0110)
TRADEOPEN	0.176*** (0.0637)	0.159** (0.0665)	0.229** (0.101)	0.159** (0.0679)	0.160*** (0.0501)	0.170** (0.0707)	0.107* (0.0578)	0.0967 (0.0849)
GOVT			0.0882 (0.175)					
RULELAW				0.114 (0.0822)				

Notes: Standard errors are in parentheses, ***, **, * represents significance at $p < 0.01$, $p < 0.05$, $p < 0.1$ respectively. GDPPC represents log of GDP per capita. IFRSDUMMY is a dummy variable that represents the adoption of IFRS by a country. INSTQUA represents institutional quality, SAVINGS represents gross domestic savings to GDP. FINDEVT represents financial development. POPGROWTH represents growth in population. TRADEOPEN represents openness to trade. GOVT represents government effectiveness. RULELAW represents rule of law. CORRUPPT represents control of corruption. REGQUA represents regulatory quality. VOICE represents voice and accountability. PSTAB represents political stability.

Table 3 Regression results (continued)

Variables	Model A	Model B	Model C	Model D	Model E	Model F	Model G	Model H
CORRUPT					0.0988 (0.0799)			
REGQUA						0.0912 (0.0932)		
VOICE							-0.0426 (0.0564)	
PSTAB								0.0382 (0.0740)
Constant	3.448*** (0.657)	2.881*** (0.758)	2.889*** (0.573)	3.154*** (0.843)	2.691*** (0.854)	3.030*** (0.823)	2.600*** (0.652)	2.785*** (0.698)
<i>Diagnostics</i>								
Observations	332	332	332	332	332	332	332	332
Number of groups	78	78	78	78	78	78	78	78
F	242.10	325.60	491.90	511.13	995.53	229.40	647.42	363.52
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No. of instruments	24	26	21	27	26	26	27	26
AR (1): z	1.04	0.72	0.17	0.59	0.09	0.84	0.92	1.35
(p value)	(0.297)	(0.469)	(0.861)	(0.552)	(0.925)	(0.401)	(0.360)	(0.176)
AR (2): z	-1.34	-1.70	-1.00	-1.08	-1.58	-1.93	-1.83	-1.40
(p value)	(0.180)	(0.088)	(0.316)	(0.280)	(0.114)	(0.054)	(0.067)	(0.162)
Hansen: χ^2	8.26	11.07	12.35	18.16	19.06	8.02	11.13	12.39
(p value)	(0.913)	(0.805)	(0.338)	(0.379)	(0.266)	(0.948)	(0.850)	(0.716)

Notes: Standard errors are in parentheses, ***, **, * represents significance at $p < 0.01$, $p < 0.05$, $p < 0.1$ respectively. GDPPC represents log of GDP per capita. IFRSDUMMY is a dummy variable that represents the adoption of IFRS by a country. INSTAQUA represents institutional quality. SAVINGS represents gross domestic savings to GDP. FINDEVT represents financial development. POPGROWTH represents growth in population. TRADEOPEN represents openness to trade. GOVT represents government effectiveness. RULELAW represents rule of law. CORRUPT represents control of corruption. REGQUA represents regulatory quality. VOICE represents voice and accountability. PSTAB represents political stability.

Lastly, the regression result also shows a negative and statistically significant relationship between inflation and economic growth. This clearly suggests that high inflation rates may be harmful to a country's economic growth. Thus, although some empirical studies document a positive relationship between inflation and economic growth, this result reinforces the negative effect of inflation and provides some support for the hypothesis that high inflation rates are detrimental to economic growth prospects of a country. This finding is also consistent with several empirical studies that report an inverse relationship between inflation and economic growth (Burdekin et al., 2004; Fernandez, 2003; Gylfason and Herbertsson, 2001). Taken together, the results are generally consistent with theory and empirical studies.

The existing literature argues that, complementarities exist between accounting and other institutional elements within an economy (Soderstrom and Sun, 2007; Wysocki, 2011; Wehrfritz and Haller, 2014; Cieslewicz, 2014). Therefore, further analyses were carried out to investigate whether the quality of institutions matters for the IFRS-economic growth nexus. This was done by interacting the IFRS dummy with the aggregate institutional quality measure. The next section discusses the results of the interaction of IFRS adoption with institutional quality and their joint impact on economic growth.

5.3 Results from the interaction of IFRS adoption and institutional quality

Model B of Table 3 presents results from the interaction of IFRS adoption and institutional quality. As can be seen from model B in Table 3, the interaction term is positive and highly significant (p -value < 0.01), suggesting that in the presence of good institutions, countries that adopt IFRS experience better economic growth than non-adopters. This result clearly demonstrates that institutional quality matters when considering the impact of accounting standards on economic growth and confirms the existence of complementarities between accounting standards and other institutional elements in a country.

From the results, countries that have adopted the IFRS received about 10.8% more inflows than countries that rely on their own domestic accounting standard for financial reporting purposes. Remarkably, after introducing the interacting term into the regression, the adoption dummy is also found to be positive and highly significant (at 5% significance level), better than the initial model without the interacting variable.

As can be seen from model B, the lagged of the dependent variable again is positive and significant (at 1% level) as expected. The results for the other control variables as shown in model B are consistent with findings in most empirical literature. All the control variables are appropriately signed and statistically significant, with the notable exception of population growth, which had no significant relationship with economic growth in the regression results.

Further tests were conducted to examine the relative effect of each of the institutional indicators on the estimated results. This was done by unbundling the aggregate institutional quality measure into their respective components and interacting each of them with the IFRS dummy. In the succeeding columns in Table 3 (models C to H), results for each of the individual components of institutional quality and their interaction with IFRS adoption are presented.

As shown in Table 3, the coefficient for each of the interaction was positive in all the six. This is an indication that each of the institutional quality measures matters for the growth-enhancing effect of IFRS adoption. Apart from the political stability indicator whose coefficient for the interactive term was found to be insignificant though positively related with economic growth (see model H), significant results were obtained from the interaction of all the other institutional quality indicators, as shown in models C to model G from Table 3. In all the six regressions, the lagged of the dependent variable was positive and significant at 1% level. The IFRS dummy and savings enter all the six regressions as significant and positively related to economic growth, whilst financial development and trade openness enter five out of the six regressions as positively and significantly associated with economic growth. On the other hand, inflation enters the six regressions as significant with a negative coefficient in all instances while population growth remained insignificant in all the regressions.

5.4 Diagnostic checks

In all the regressions, as reported in Table 3, the various specification tests confirm that each of the estimated models is properly specified. Checks for consistency of the estimates for all the regressions, using the Hansen test of over-identifying restrictions and the Arellano and Bond test for second-order serial correlation in the error term, produced very satisfactory outcome. As illustrated in Table 3 the results of the Hansen test for over-identifying restrictions supported the null hypothesis in all the regressions. This means that the instruments used in all the estimations were valid and there is no correlation between the instruments and the error term. The results for the Arellano-Bond test for autocorrelation, as shown in Table 3 also confirm the absence of second order serial correlation in all the regression models. In all instances, the number of instruments did not exceed the number groups and the 'F' test results for the estimated models to indicate that all the models tested are significant.

5.5 Robustness checks

To check for the robustness of the baseline results of this study, an alternative measure of the aggregate institutional quality indicator (weighted average) was used to re-estimate the models. Specifically, a weighted average index of institutional quality was constructed. This was done by subjecting the six measures of institutional quality to principal component analysis (PCA) to determine the weight of each component. A summary of the results derived from the PCA is shown in Table A3. The first principal component derived from the six indicators has eigen values greater than one and accounts for 71.6% of the total variation. This makes it the most appropriate among the other linear combination of the six indicators. Hence, the first principal component of the PCA was used in obtaining the weights for the institutional quality index. The weighted average institutional quality index was subsequently constructed based on the weight from the PCA results. Using the weighted average institutional quality index, the regression models were re-estimated and the results are as presented in Table 4.

Table 4 Results using weighted average aggregate institutional quality measure

<i>Variables</i>	<i>Model X</i>	<i>Model Y</i>	<i>Model Z</i>
Lag of log GDPPC	0.478*** (0.0803)	0.572*** (0.103)	0.611*** (0.102)
IFRSDUMMY	0.0974** (0.0405)	0.109** (0.0524)	
INSTAQUA	0.0891 (0.121)	0.0772 (0.111)	0.0503 (0.123)
INTERACTION		0.174*** (0.0602)	0.172** (0.0678)
SAVINGS	1.754*** (0.219)	1.455*** (0.310)	1.409*** (0.322)
FINDEVT	0.592** (0.226)	0.437** (0.183)	0.517** (0.230)
POPGROWTH	-0.0437 (0.0476)	-0.00378 (0.0587)	0.0410 (0.0492)
INFLATION	-0.0414*** (0.0147)	-0.0381*** (0.0116)	-0.0397*** (0.0121)
TRADEOPEN	0.148* (0.0795)	0.156** (0.0676)	0.175** (0.0765)
Constant	3.557*** (0.532)	2.895*** (0.758)	2.537*** (0.672)
<i>Diagnostics</i>			
Observations	332	332	332
Number of groups	78	78	78
F	236.09	329.09	447.34
Prob. > F	0.000	0.000	0.000
No. of instruments	25	26	21
AR (1): z (p value)	1.09 (0.275)	0.75 (0.456)	1.12 (0.264)
AR (2): z (p value)	-1.36 (0.175)	-1.68 (0.092)	-1.17 (0.243)
Hansen: χ^2 (p value)	8.45 (0.934)	11.14 (0.801)	18.05 (0.114)

Notes: Standard errors are in parentheses, ***, **, *represents significance at $p < 0.01$, $p < 0.05$, $p < 0.1$ respectively. GDPPC represents log of GDP per capita. IFRSDUMMY is a dummy variable that represents the adoption of IFRS by a country. INSTAQUA represents institutional quality. SAVINGS represents gross domestic savings to GDP. FINDEVT represents financial development. POPGROWTH represents growth in population. TRADEOPEN represents openness to trade. GOVT represents government effectiveness. RULELAW represents rule of law. CORRUPT represents control of corruption. REGQUA represents regulatory quality. VOICE represents voice and accountability. PSTAB represents political stability.

The first column of Table 4 (model X) shows results without the interaction term. Model Y of Table 4 contains results with the introduction of the interaction term while model Z presents results with the interaction term after dropping the IFRS adoption variable. As can be seen from these results, the IFRS dummy remained significant and has a positive relationship with GDP on its own in the baseline model (model X). The interaction term was equally significant and positively related to economic growth with or without the adoption dummy in the regression. Savings, financial development and openness to trade were all positive and significantly related to GDP in all the regressions while inflation remained significant and inversely related to GDP throughout the three regressions. Overall, the robustness test using the weighted average measure of institutional quality produces results similar to the main analysis.

6 Conclusions

This study examines the effect of IFRS adoption on economic growth in developing countries. We expect the adoption of IFRS by countries to result in improved economic growth and predict that the positive effect of IFRS adoption on economic growth is conditioned by country-level institutional quality. In line with our predictions, we find that countries that adopt IFRS experience better economic growth than non-adopting countries. Further analyses also show that country-level institutional quality favourably alters the effect of IFRS adoption on economic growth. We make a significant contribution to the Accounting and Economics literature by providing evidence on the impact of accounting standards on economic growth of countries. This study highlights the generic role that accounting regulations in a form of financial reporting standards can play in promoting economic growth of a country. Overall, our results indicate that the benefit of adopting IFRS transcends the traditional firm-level improvement in corporate reporting quality. At the national level, there could be significant economic benefits associated with IFRS adoption. We argue that academic researchers should not overlook the importance of a country's accounting system, particularly accounting regulations when examining the determinants of economic growth.

Given that the adoption of IFRS could be associated with better economic growth, policy makers in developing economies that are yet to adopt IFRS may be encouraged by this result to speed up the process towards adopting the IFRS, due to its inherent economic benefits. Moreover, development partners such as the World Bank, IMF.

The findings of this study are however not without limitations and hence care should be taken in interpreting the results. First, given that the detected association between IFRS adoption alone and economic performance is weak, the results may also mean the impact of the adoption alone may be of little consequences in terms of driving growth in developing economies. Future studies should therefore consider other jurisdictions not captured in the sample for instance, the developed countries where there are relatively deep capital markets and strong international portfolio flows. Second, although most countries that adopted the IFRS had at least a two-year transition period while many others did not require fair value reporting immediately, the study did not account for the impact of these differences on the estimated results. Future studies could explore this further by explicitly accounting for the impact of these differences on the estimated results. Lastly, findings of this study are based on data from only 78 developing economies and hence, the extent of generalisation of findings may be limited.

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Appendix**Table A1** List of countries included in the analysis

	<i>Country</i>		<i>Country</i>
1	Algeria	40	Kenya
2	Armenia	41	Kuwait
3	Azerbaijan	42	Lesotho
4	Bangladesh	43	Malaysia
5	Barbados	44	Mauritius
6	Belize	45	Mexico
7	Bhutan	46	Mongolia
8	Bolivia	47	Morocco
9	Botswana	48	Mozambique
10	Brazil	49	Namibia
11	Burundi	50	Nepal
12	Cabo Verde	51	Nicaragua
13	Cambodia	52	Nigeria
14	Cameroon	53	Oman
15	Central African Republic	54	Pakistan
16	Chad	55	Panama
17	Chile	56	Papua New Guinea
18	Colombia	57	Paraguay
19	Comoros	58	Philippines
20	Congo, Dem. Rep.	59	Qatar
21	Congo, Rep.	60	Seychelles
22	Costa Rica	61	Sierra Leone
23	Dominica	62	South Africa
24	Dominican Republic	63	St. Lucia
25	Egypt, Arab Rep.	64	St. Vincent and the Grenadines
26	Equatorial Guinea	65	Sudan
27	Eritrea	66	Suriname
28	Fiji	67	Swaziland
29	Gabon	68	Syrian Arab Republic
30	Gambia, The	69	Tajikistan
31	Ghana	70	Tanzania
32	Guatemala	71	Thailand
33	Guyana	72	Tonga
34	Haiti	73	Trinidad and Tobago
35	Indonesia	74	Uganda
36	Iraq	75	Uruguay
37	Israel	76	Vanuatu
38	Jamaica	77	Venezuela, RB
39	Kazakhstan	78	Zambia

Table A2 Variable description, measurement and source of data

<i>Variable</i>	<i>Measurement</i>	<i>Source</i>
LOGGDPPC	Natural logarithm of GDP per capita in constant US dollars	World Development Indicator (WDI) database published by World Bank
IFRSDUMMY	Dummy variable equal to 1, if a country has adopted IFRS; 0, otherwise. 'Adopt' means mandatory adoption of IFRS by a country.	IAS Plus, https://www.iasplus.com/country/useias.htm , IASB, https://go.ifrs.org/global-standards .
<i>Governance indicators</i>		
INSTQUA	Represent institutional quality. The simple average of the Kaufmann et al. (2010) six dimensions of worldwide governance indicators	The Worldwide Governance Indicator database 2010 prepared by Kaufmann et al. (2010) World Bank Economics Research Group.
CORRUPT	represents control of corruption	The Worldwide Governance Indicator database 2010 prepared by Kaufmann et al. (2010) World Bank Economics Research Group.
GOVT	Represents government effectiveness	The Worldwide Governance Indicator database 2010 prepared by Kaufmann et al. (2010) World Bank Economics Research Group.
PSTAB	Represents political stability and absence of violence	The Worldwide Governance Indicator database 2010 prepared by Kaufmann et al. (2010) World Bank Economics Research Group.
REGQUA	Represents regulatory quality	The Worldwide Governance Indicator database 2010 prepared by Kaufmann et al. (2010) World Bank Economics Research Group.
RULELAW	Represents the rule of law	The Worldwide Governance Indicator database 2010 prepared by Kaufmann et al. (2010) World Bank Economics Research Group.
VOICE	Represents voice and accountability	The Worldwide Governance Indicator database 2010 prepared by Kaufmann et al. (2010) World Bank Economics Research Group.
TRADEOPEN	Absolute value of exports plus imports as percentage of GDP	World Development Indicator (WDI) database published by World Bank
SAVINGS	Represent gross domestic savings to GDP	World Development Indicator (WDI) database published by World Bank
FINDEVT	Represents financial development measured as financial depth (M2) to GDP	World Development Indicator (WDI) database published by World Bank
POPGROWTH	Represents growth in population scaled by 100	World Development Indicator (WDI) database published by World Bank
INFLATION	Represent the rate of price change in the economy as whole measured by the annual growth rate of the GDP implicit deflator	World Development Indicator (WDI) database published by World Bank

Table A3 Principal component analysis

<i>Principal component</i>	<i>Eigenvalue</i>	<i>% of variance</i>	<i>Cumulative %</i>
1	2.23	71.63	71.63
2	0.36	11.43	83.07
3	0.25	8.00	91.06
4	0.14	4.49	95.56
5	0.09	3.03	98.59
6	0.04	1.41	100.00

<i>Variable</i>	<i>Factor loading</i>
VOICE	0.38
PSTAB	0.41
GOVT	0.44
REGQUA	0.39
RULELAW	0.42
CORRUPT	0.40

Table A4 IFRS adoption status of sampled countries

#	<i>Country</i>	<i>Adoption status as at 2013</i>		<i>Year</i>
		<i>YES</i>	<i>NO</i>	
1	Algeria	√		2010
2	Armenia	√		2011
3	Azerbaijan	√		2010
4	Bangladesh		√	
5	Barbados	√		2011
6	Belize		√	
7	Bhutan		√	
8	Bolivia		√	
9	Botswana	√		2003
10	Brazil	√		2010
11	Burundi		√	
12	Cabo Verde		√	
13	Cambodia	√		2012
14	Cameroon		√	
15	Central African Republic		√	
16	Chad		√	
17	Chile	√		2009
18	Colombia		√	
19	Comoros		√	
20	Congo, Dem. Rep.		√	
21	Congo, Rep.		√	
22	Costa Rica	√		2001
23	Dominica		√	

Table A4 IFRS adoption status of sampled countries (continued)

#	Country	Adoption status as at 2013		Year
		YES	NO	
24	Dominican Republic	√		2013
25	Egypt, Arab Rep.		√	
26	Equatorial Guinea		√	
27	Eritrea		√	
28	Fiji	√		2007
29	Gabon		√	
30	Gambia, The		√	
31	Ghana	√		2007
32	Guatemala	√		
33	Guyana		√	
34	Haiti		√	
35	Indonesia		√	
36	Iraq		√	
37	Israel	√		2011
38	Jamaica	√		2011
39	Kazakhstan	√		2013
40	Kenya	√		1999
41	Kuwait	√		1991
42	Lesotho		√	
43	Malaysia	√		
44	Mauritius	√		2001
45	Mexico	√		2012
46	Mongolia	√		2002
47	Morocco		√	
48	Mozambique	√		2010
49	Namibia	√		2005
50	Nepal		√	
51	Nicaragua	√		2007
52	Nigeria	√		2012
53	Oman	√		1986
54	Pakistan	√		2012
55	Panama		√	
56	Papua New Guinea	√		2001
57	Paraguay		√	
58	Philippines	√		2005
59	Qatar	√		2010
60	Seychelles		√	
61	Sierra Leone		√	
62	South Africa	√		2005

Table A4 IFRS adoption status of sampled countries (continued)

#	Country	<i>Adoption status as at 2013</i>		Year
		<i>YES</i>	<i>NO</i>	
63	St. Lucia	√		2001
64	St. Vincent and the Grenadines		√	
65	Sudan		√	
66	Suriname		√	
67	Swaziland	√		2012
68	Syrian Arab Republic		√	
69	Tajikistan		√	
70	Tanzania	√		2004
71	Thailand		√	
72	Tonga		√	
73	Trinidad and Tobago	√		1999
74	Uganda	√		1998
75	Uruguay	√		2011
76	Uzbekistan		√	
77	Venezuela, RB	√		2008
78	Zambia	√		2008