

Exploring the Nexus Between Pension Funds and Stock Market Development - Does Country-level Governance Matter? Evidence from Global Economies

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Abstract: *We examine whether country-level governance quality moderate the effect of pension funds on stock market development. Our sample consists of 16 countries, including developed and emerging countries, analysed during the period 1996-2016 using Common Correlated Mean Group and Augmented Mean Group techniques. The main findings show that, while the moderating effect of country-level governance is insignificant for the overall sample of countries, the effect is significant for some individual countries in the panel. This suggests in some economies, governance quality moderates the financial system mechanisms which influence the institutional investors' decision to allocate the funds needed to develop the stock markets.*

Keywords: pension funds; governance quality; stock market development; common correlated mean group; augmented mean group

1. Introduction

It is widely accepted that the financial sectors (financial institutions, capital markets and institutional investors) play an essential role in providing and channelling finance for investment (Draženović and Kusanović, 2016). Even though the primary purpose of pension funds is to provide income security to the retired workers or their beneficiaries, these institutions play an important role in the financial market since they channel the pooling from employees into investments in financial assets. The financial development scholars have been emphasizing the exploration of measures that simplify the pension fund and other institutional investors' participation in the domestic capital market (Genberg, 2015). Hence, it is important to understand the relationship between pension funds and stock market development while considering the quality of country governance. Governance quality claimed to have important implications on the interactions of the firms and institutions (Asongu, 2012). According to Farooque and Yarram (2013), governance at country level is among the issues that have drawn great interest from global international organizations. According to Manasseh *et al.* (2017), institutions (legal, political and supervisory bodies that make cohesion and order to be available in business activities) have been a central issue in developing policies for the development of financial system, stock market and economic performance globally. In this study, we investigate how governance quality affects the pension funds-stock market development nexus in a sample of sixteen global economies. Specifically, we examine if the responsiveness of stock market development to the pension funds depends upon the indicators of country-level governance quality.

Financial sectors not only provide short-term finance for businesses' recurrent operations, they also play a fundamental role across all sectors in the economy as they satisfy long-term physical investment needs. The institutional investors (particularly pension funds, insurance companies and mutual funds) are becoming central players in providing long-term capital because their liabilities have long-term to maturity (Genberg, 2015). The differences in the characteristics of liabilities make pension funds behave differently from insurance companies and mutual funds. Pension fund's liabilities are illiquid and usually linked to earned income stocks. As such, pension funds are believed to be the most important institutional investor because they can finance the economy on a long-run as they hold liabilities payable on a long-run (Catalan *et al.*, 2000). Many countries in the globe have been reforming their pension system not only for coping with demographic pressures and unsustainable fiscal positions, but also they believe that the fund might contribute to the country's growth by enhancing national savings and financial market development (Meng and Pfau, 2010).

Literature has established that an important association exists between institutional investors and domestic capital markets. Studies that examine the relation between pension funds and capital market development reached varied conclusions. For example, Alda (2017) found that higher pension funds invested in equities positively influence stock market development. Similarly, Enache *et al.* (2015) provide evidence that pension growth exerts strong short-term positive effect on market capitalization while the long-term effect is at lower magnitude. On the contrary, Schumkler and Raddatz (2008) provides no consistent impact of pension assets on the financial market whereas Impavido *et al.* (2003) reports a non-linear positive influence of pension assets on stock market depth and liquidity as well. Likewise, Meng and Pfau (2010) conclude that the impact of pension assets on stock market development is statistically significant for more developed countries only. From the above past literature, we observe the mixed results as regard to the relation between pension funds and stock market development. One possible reason for these results might be that all these studies focus on the direct link between those variables without considering other contingent factors that might influence the said relation. According to Mackinnon (2011), when the researchers want to reach more realistic and accurate findings, they need to insert appropriate moderating variables relating to the study in hand.

Aside from pension funds being related to the size and evolution of capital markets, there are a number of factors that might drive the just mentioned relation. For example, Laeven (2014) has identified three main influential factors of capital market development. First, macroeconomic stability policy – unsound macroeconomic policies (such as inflation volatility) hold back equity market development, countries with lower inflation rates have more developed local capital markets. Second, institutional and legal frameworks – strong institutions and well-functioning legal systems (such as enforcement of securities laws) are beneficial for capital market development as they enhance the investors' willingness to invest. Third, financial infrastructure (including organisation of trading activities and regulations that governs trading) contributes to the building of issuers' and investors' confidence for their participation in the capital market. Usually, governments maintain those three factors through several strategies including introduction and maintenance of strong legal frameworks that support the enforcement of financial contracts (Laeven 2014).

While the importance of pension funds on capital market development has been well established in the literature, it must be emphasised that the effective functioning of the institutional investors and financial markets pivots on the governance framework at country level. Literature emphasizes on exploring measures that simplify the participation of

institutional investors in the domestic capital market (Genberg, 2015). In fact, as identified by Butkiewicz and Yanikkaya (2006), governance framework is a very crucial factor for a conducive environment for growth and development. Also, Aleksynska and Havrylchyk (2013) note that governance mechanisms boost the incentive to invest thus improving resource allocation. Likewise, Gankou *et al.* (2016) pinpoint the importance of governance quality by mentioning that it is an important element in the relationship among economic agents. We are motivated to incorporate governance quality in the previously examined link between pension funds and stock market development because, as explained by Nawaz (2015), it has been the focus of many researchers, policy makers and development practitioners over the last decade. Not only that, in recent times, policy makers and academics have been considering the role of governance quality in the development and growth process of a country (Agyemang *et al.*, 2015). Furthermore, the literature argues that in an economy, governance institutions establish the incentive structure that shapes all forms of interaction such as political, economic and social (Effiong and Asuquo 2017). A better understanding of the relationship between pension funds and stock market development under different governance quality would help policy makers design appropriate strategies pertaining to the traditions and institutions by which authority in a country is exercised. Our contribution in the literature consists of establishing whether the governance quality at country level is among measures that affect the institutional investors' (pension funds for our case) participation in the domestic capital market.

To sum up, it is generally recognized that assets of institutional investors are important for financial sector development and that governance mechanisms affect institutional investment. Good governance quality is associated with a favourable investment environment. Cross-country differences in governance framework have now been highlighted to have important implications on corporate activities and behaviour of investment institutions, firms and other constituents in the financial markets (Low *et al.*, 2011). Less attention has been paid to whether aspects of governance have different effects on the relationship between institutional investors and the development of the capital market. Given the importance of country governance in the financial landscape, this paper therefore investigates how the relationship between pension funds and stock market development may be affected by country-level governance (governance effectiveness and regulatory quality). Savings collected by pension funds can have an impact on the development of the stock market, but its impact might be different depending on how the saving institutions respond to country characteristics, governance quality in our case.

An empirical econometric model with linear interaction between pension funds and governance quality is estimated. As an econometric approach, we use most recent mean group estimators developed for panel data for a sample of 16 global countries over the period from 1996 to 2016. Our main findings show that the effect of governance quality on the pension fund-stock market relation is country specific and not uniform across measures of stock market development.

The rest of the paper is organized as follows: Section two presents the literature review exploring the connection between pension funds, governance and stock market development. Section three outlines the data and empirical approach employed in this study. Empirical results are reported in section four and the paper is concluded in section five.

2. Related literature

In this section, we consider the association among our study's variables. We divide the section into three subsections respectively: pension funds and stock market development; governance

quality and stock market development; and the possible link among pension funds, governance quality and stock market development.

Pension funds and stock market development

Since the early 2000s, a growing body of literature has shown the interest of testing the connection between the growth of the pension industry and the domestic capital market as many countries have been implementing pension funds reforms. The nexus between pension funds and capital market is appealing given the mixed findings on the relationship between pension funds' assets and stock market development. Most of the previous studies reach the conclusion that pension assets positively influence stock market development using quite different methodological frameworks. However, there are still some differences of the results concerning the just mentioned relationship.

The findings of (Catalan *et al.*, 2000) indicates that countries with growth in contractual savings sectors (including pension funds) are associated with the highest growth in market capitalization and value traded. Similar thought has been put forward by Aras and Müslümov (2005) who conclude the bi-directional causality, that is, the countries that promote the development of institutional investors have well-developed securities markets and vice versa is true. Hryckiewicz (2009) shows that pension funds, as institutional investors, contribute greatly in the activities of emerging capital markets because these institutions induce the higher demand for the local securities. Enache *et al.* (2015) find the evidence of strong positive short-term effect of pension funds' assets on stock market capitalization whereas, the long-term effect was in lower magnitude. Most recently, Alda (2017) finds that higher pension funds investment in equities enhances the stock market capitalization. However, the author mentions that the results are heterogeneous among countries, independently of the pension models.

On the contrary, Impavido *et al.* (2003) find the evidence on non-linear impact of an increase in assets of contractual savings institutions relative to domestic financial assets on stock market depth and liquidity. The impact is stronger in countries with more transparent corporate information. The authors also report the variation of the results such that the stronger effect of pension funds exists in countries with market-based financial systems, mandatory pension model, and lower international securities transactions. Similarly, Meng and Pfau (2010) find the variation of the impact of pension funds on capital market development based on the country's level of financial development. Clearly, in the countries with the low level of financial development, pension funds do not impact capital market development. Furthermore, the study done by Schmukler and Raddatz (2008) does not evidence the expectations about the role of pension funds as drivers of domestic capital market development.

From the above discussion, the current study proposes that pension funds enhance stock market development in our sample countries.

Governance and stock market development

With regards to the link between governance quality and stock market development, previous scholars have assessed the role played by institutions (in our case governance institutions) on functioning of financial markets. The earlier literature underscore that countries with quality institutions (such as legal and regulatory systems involving protection of property rights, contract enforcement, and sound accounting practices) are known to have advantage in financial development (La Porta *et al.*, 1999). According to the authors, the differences in laws and their enforcement are the influential elements of variations of countries in several matters and in the overall development of financial markets.

Extending this earlier argument, other researchers with similar spirits have been confirming the importance of institutions on financial development using various elements of institutions. Law and Azman-Saini (2008) examined the link between institutional quality and financial development and found a significant and positive correlation of all governance quality indicators on the private sector credit and stock market capitalization. They also pointed out that governance effectiveness appears to be a key determinant of financial development. In another significant study in the political economy area, Roe and Siegel (2011) demonstrate that a political instability environment results in financial backwardness because institutions of investor protection (legal rules, courts, and regulators) cannot function well in that environment. Simply put, political instability found to have significant, consistent and substantial impact on bond and stock market development. Yartey (2010) documents the very large economic impact of institutions on stock market development in emerging markets. Political risk, law and order, democratic accountability and bureaucratic quality are found to have positive relationships with stock market capitalization. Asongu (2012) argues that stock markets would grow broader and deeper in countries with better developed government institutions. The findings conclude that stock market performance measures (market capitalization, stock market value traded, stock market turnover, and number of listed companies) positively correlated with the quality of government institutions.

Another significant work in governance literature is Ajide (2014). The author pointed out that political stability within a country should be maintained because it tends to lower the development of stock markets when it is deteriorated. The findings indicate that control of corruption and government effectiveness positively enhance all share price index, market capitalization and the value of total stock traded. In a similar vein, Cherif & Dreger (2016) reveal that better law and enforcement practices and anti-corruption policies contribute largely to stock market development in the Middle East and North African (MENA) region. Most recently, Manasseh *et al.* (2017) show that a minimum level of corruption and political risk as well as an efficient administrative and regulatory system accelerates stock market development via enhanced investment decisions. From the above discussion, the current study proposes a direct relationship between governance quality and stock market development in our sample countries.

Possible link between pension funds, governance quality and stock market development

While the roles of institutional investors and governance as source of financial market development are well documented in the existing literature, studies on the conditional pension funds-stock market development nexus are relatively scarce. It must be emphasized that the effective functioning of pension funds on the capital market hinges on the quality of governance framework of a country. This is because country governance is believed to be a crucial factor that influences the relationship among economic agents. According to Dixit (2009) good governance is a key driver in securing security of property rights, enforcement of contracts and collective action, all are essential prerequisites of market economies. Asongu (2012) also argues that governance quality framework has important implications on the interactions of the firms and institutions. The pivotal role of the country-level governance framework is illustrated in several cross-country studies. For instance, Effiong (2015) and Gazdar and Cherif (2015) studied the interaction role of governing institutions on the relationship between financial development and growth for Middle East and North Africa and Sub-Saharan Africa respectively. The former document significant positive results whereas the later end up with positive but insignificant results.

Likewise, Compton and Giedeman (2011) find no evidence of the interaction role of institutions on the finance-growth nexus. Gankou *et al.* (2016) study the influence of institutional environments (such as corruption, rule of law and government effectiveness) and document significant moderating effects of institutions. The authors find that, in the short-term, the positive association between foreign direct investment flows and capital flight are worsened by corruption. In a similar vein, Krammer (2013) examined the moderating role of good institutions using an average of six Worldwide Governance Indicators and found that, in transition economies governance quality negatively moderate the relationship between spillovers and productivity. Most recently, Matemilola *et al.* (2018) finds the significant moderating role of country-level governance on the relationship between debt and stock returns in developing nations.

In summary, all these arguments suggest that institutions matter for a wide range of socio-economic activities within and across-borders. That is why this study argues that country-level governance quality could moderate the relationship between pension funds and stock market development in our sample countries.

3. Data and Methodology

To examine the role of country governance quality, pension funds and their interaction using a data set of 16 selected global economies over a period of 21 years from 1996 to 2016. The selection of study time period and countries in the sample is solely due to the data availability for the most of our variables. The selected countries are Australia, Austria, Brazil, Canada, Chile, Colombia, Germany, Hong Kong, Israel, Italy, Portugal, Spain, South Africa, Switzerland, United Kingdom (UK) and the United States of America (USA).

Our main variable of interest is country-level governance quality obtained from World Governance Indicators (WGI) developed by Kaufmann *et al.* (2010). The authors used a wide variety of cross-country surveys and polls of experts to construct the indicators and use a model of unobserved components model, which enables them to measure governance quality using six indicators (Voice and Accountability (VA), Political Stability and Absence of Violence (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and Control of Corruption (CC)) and cover approximately 160 countries. These indicators are widely accepted as the measure of a country's level and have been used by many researchers such Naghavi and Lau (2014) and Matemilola *et al.* (2018). To represent governance quality, this study develops an aggregate measure of governance by averaging out the six indicators to obtain a single broader index as in Al-Marhubi 2004; Bjørnskov 2006; and Law and Azman-Saini 2012. The annual data for the governance indicators has been accessed from the World Bank database. Another independent variable is pension fund which we define as the ratio of pension funds' assets invested in shares to total pension funds' assets. This ratio is widely accepted to represent relative importance of pension funds (Thomas, Spataro, & Mathew, 2014). The ratio captures the effect of pension fund's investment in shares on stock market development. The annual data has been collected from a pension statistics database published by Organisation for Economic Co-operation and Development (OECD). The dependent variable in our study is the stock market development defined by Pradhan *et al.*, (2014) to mean a process of improvements in quantity, quality and efficiency of stock market services. We employ three measures of stock market development on which two are quantitative and one is qualitative in nature. Following Ulusoy and Demiralay (2016) and Alda (2017), we employ most commonly used quantitative measures, these are measure of size of the market (i.e. stock market capitalization) and measure of liquidity of market (i.e., share values traded). Stock

market capitalization (SMCR) is a ratio of stock market capitalization to Gross Domestic Product which measures the extent to which new companies might access the capital market. SMCR is the most representative indicator of stock market development (Cherif and Kaouther, 2010; Filatotchev *et al.*, 2013; Tunyi and Ntim, 2016). On the other hand, share values traded (SVTR) is a ratio of stock value traded to Gross Domestic Product that reflects the element of market liquidity as well as size. SVTR is included to complement SMCR because the size of the stock market does not provide any indication of its liquidity (Ben Naceur *et al.*, 2014). This ratio is an acceptable measure of development of stock markets (Alda, 2017; Impavido *et al.*, 2003; Tunyi and Ntim, 2016). Regarding qualitative measure, we employ stock market concentration (MC) following Capasso (2006) who categorises the degree of concentration as the qualitative feature of the stock market that considers the level of risk concentration. MC is measured by the ratio of the market capitalization of the largest ten firms relative to the total stock market capitalization of domestic stock exchanges. The ratio indicates how market capitalization is distributed over many firms with high turnover. Specifically, MC shows how easy the firms with good investment projects can access required capital. Data on stock market development measures is obtained from The World Bank Financial Development and Structure Database developed by Beck *et al.* (2009).

The study also considers other three variables that are known to impact stock market development. First, GDP per Capita (GDPPC), defined as GDP per capita growth. This variable is included to control for the overall level of the country's development. Garcia & Liu (1999) consider both real income and its growth rate to investigate the determinants of stock market development. The authors find that income growth rate is an important predictor of market capitalization. Similarly, Siong Hook Law and Habibullah (2009) and Yartey (2010) report positive relation between real income per capita and stock market development. The data for GDPPC are obtained on an annual basis from The World Bank database. Second, market volatility (VOL) is defined as the 12-month-annualized volatility of stocks for each country. The variable is included to capture the impact of the market fluctuation on stock market development. Equity market volatility is believed to destroy the smooth functioning of the financial system (Oseni and Nwosa, 2011). Third, inflation (INFL) measured by the annual growth rate of GDP implicit deflator is included. According to Huang *et al.* (2010), high inflation undermines the financial sector development since it has adverse effects on the ability of the financial sector to allocate resources. The data for inflation data are obtained on an annual basis from The World Bank database.

Lastly, for robustness check we employ components of governance quality sourced from The International Country Risk Guide (ICRG) that provides annual data for 12 components for a fee. Following Narayan (2015), we employ five components that are fit for this study. These components are; corruption, government stability, bureaucratic policy, law and order, and democratic accountability. The brief definitions of the WGI indicators and ICRG indicators is given in Table 1.

Table 1: Descriptions of governance quality indicators

Indicators	Descriptions
WGI Indicators	
Voice and Accountability (VA)	Participation of a country's citizens in selecting their government as well as freedom of expression, association and a free media
Political Stability and Absence of Violence (PS)	Risk of the government to be destabilized or overthrown through unconstitutional or violent means
Government Effectiveness (GE)	Quality of the public and civil service as well as of the government's policy formulation and implementation.
Regulatory Quality (RQ)	Ability of the government to permit and promote private sector development through sound policies and regulations.
Rule of Law (ROL)	Credibility with the rules of society, and the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Control of Corruption (CC)	Vulnerability of public power exercised for private gain, as well as "capture" of the state by elites and private interests
ICRG Indicators	
Government Stability (GS)	Gauges the level of ability for the government to carry out its declared program (s) as well as and its ability to stay in office.
Democracy and Accountability (DA)	Reflects the extent of responsiveness of government to its constituents, as the less responsive government is prone to fall and deter the peace within the country.
Bureaucratic Quality (BQ)	Captures both, the strength of the country's bureaucracy system and the level of expertise in relation to governance, without drastic changes to policies or interruptions in the government services even in the presence of a change in government
Law and Order (LO)	Reflects the effectiveness of enforcement and observance of law and order within the country as well as the strength and neutrality of the legal system.
Corruption (CORR)	Reflects actual or potential corruption (financial or use of position or power for one's own advantage) in the political system which directly or indirectly affects the corporate sectors.

Source: World Bank and Political Risk Services Group

Empirical Model and Econometric Methods

The primary focus of this study is to provide evidence for the moderating role of governance quality in the relationship between the assets of pension funds and the development of the stock market. For which, this study purposed a linear interaction regression model that takes the following form:

$$SMD_{it} = \beta_0 + \beta_{1i}PFA_{it} + \beta_{2i}GQ^{index}_{it} + \beta_{3i}(PFA_{it} * GQ^{index}_{it}) + \beta_{4i}VOL_{it} + \beta_{5i}INF_{it} + \beta_{6i}GDPPC_{it} + \varepsilon_{it} \quad (1)$$

where *SMD* is the stock market development; *PFA* is the ratio of pension assets invested in equities to total pension assets; *GQ^{index}* is the governance quality index (average of six individual indicators); *VOL* is the market volatility as an indicator for stock market fluctuation; *INFL* is an inflation as an indicator of macroeconomic stability; *GDPPC* is a per capita gross domestic product as an indicator of general macroeconomic development ε_{it} is an error term. β_0 is a constant term to captures time-invariant fixed effects whereas $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5,$ and

β_6 are country-specific slopes on the observable regressors. The term $PFA * GQ$ represents an interaction term which assumes that governance quality index has a moderating effect on the explanatory and explained variables in the model. β_3 signifies the coefficient that estimates the interaction effect. If β_3 is different from zero and statistically significant, it can be concluded that GQ moderates the relationship between pension funds and stock market development.

Before proceeding to cointegration estimation of our model, we need to conduct three diagnostic tests for our variables. These tests are: cross-sectional dependency test; panel unit root test; and panel cointegration test.

Cross sectional Dependency (CD) Test

According to Hoyos and Sarafidi (2006), there is possibility for the panel data to have substantial CD in errors which might lead to bias estimates and spurious estimates if not considered. The reason for the CD might be financial contagion, socioeconomic interactions and common factors (Pesaran, 2004). Several CD tests are available varied based on the size of the study period and cross-sectional of the panel data. Since the current data set has a large time and small cross-section, we resort to the Lagrange Multiplier (LM) test introduced by Breusch and Pagan (1980). LM test the null hypothesis that no nonzero correlation coefficient ρ_{ij} (i.e., Cross-sectional dependency). LM statistics takes the following form; where ρ_{ij}^{\wedge} is the sample estimate of the pairwise correlation of the residuals.

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \rho_{ij}^{\wedge 2}$$

Panel Unit Root Test

After establishing the dependency of our cross-sectional units, we now test the degree of integration of the variables in the model. Literature underscores the use of panel-based unit root tests because the standard unit root (first-generation) tests have low statistical power (John and Perron, 1991). This study therefore uses Pesaran (2007) Cross-sectionally Augmented Dickey Fuller (CADF) tests that address the assumption of cross-sectional independency under the first-generation tests. Pesaran (2007) uses modified CIPS statistics which take the following form; $CIPS = \frac{1}{N} \sum_{i=1}^n CADF = \frac{1}{N} \sum_{i=1}^n t_i (n, T)$

Panel Cointegration Test

After identifying the order of integration of the variables, we proceed to the test of cointegration. We use Westerlund (2007) error-correction model tests that avoid the common factor restriction problem and allow the time series to be of unequal length. The null hypothesis is that the variables are not cointegrated. Westerlund (2007) uses two groups of statistics- panel statistics (with the alternative hypothesis that the whole panel is cointegrated) and group mean statistics (with the alternative hypothesis that there is cointegration for at least one cross-section unit).

Panel Cointegration Estimation

In order to estimate the interaction effects of governance quality on the relationship between pension funds and stock market development, this study applies the two most recent mean group models; The Common Correlated Effects Mean Group (CCEMG) model proposed by Pesaran (2006) and Augmented Mean Group (AMG) model designed by Eberhardt and Teal

(2010). On one hand, the advantage of CCEM estimator is in preserving the consistency of slope heterogeneity and possible cross-correlation between the unobserved factors and the regressors. In the CCEM model, the cross-sectional averages of the explanatory variables and that of explained variables are incorporated as additional regressor to solve the problem of cross-sectional dependency. On the other hand, the AMG model is designed as an alternative to the CCEMG to address the issue of unobserved common factors. In AMG, a “common dynamic process” is included in the cross-sectional regression model in order to control the cross-sectional dependency.

4. Empirical Results

Cross-sectional Dependency Results

The results of cross-sectional dependency tests are reported in Table 2. The correlation matrix of the residuals shows that there is a considerable correlation observed across the countries with the correlation coefficient of more than 0.5. The highest coefficient of cross-sectional dependence was 0.9 that is observed among countries, such as, between Hong Kong with Colombia and South Africa. Overall, the LM test results suggest the presence of contemporaneous correlation across countries in our sample. Hence, cross-sectional dependency should be considered in both, panel unit test and estimation strategy.

Table 2: Cross-sectional dependence test results

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.000															
2	0.224	1.000														
3	0.373	-0.005	1.000													
4	0.305	-0.093	0.372	1.000												
5	0.400	0.638	0.190	0.370	1.000											
6	0.504	0.509	0.101	0.155	0.749	1.000										
7	0.235	0.140	0.792	0.231	0.262	-0.046	1.000									
8	0.544	0.618	0.254	0.028	0.717	0.855	0.248	1.000								
9	0.477	0.717	0.432	0.146	0.811	0.655	0.475	0.751	1.000							
10	0.152	0.165	0.578	0.104	0.109	-0.255	0.806	-0.013	0.431	1.000						
11	0.198	0.186	0.572	0.172	0.452	0.159	0.782	0.327	0.636	0.761	1.000					
12	0.568	0.603	0.330	0.190	0.644	0.829	0.204	0.927	0.665	-0.054	0.195	1.000				
13	0.416	0.564	0.410	-0.032	0.674	0.633	0.481	0.791	0.898	0.434	0.725	0.653	1.000			
14	0.342	0.293	0.765	0.272	0.338	0.155	0.781	0.328	0.654	0.742	0.758	0.360	0.650	1.000		
15	0.385	0.363	0.336	0.414	0.722	0.444	0.442	0.479	0.615	0.345	0.539	0.335	0.592	0.435	1.00	
16	0.312	0.450	-0.211	-0.473	0.344	0.510	-0.045	0.629	0.552	0.049	0.279	0.419	0.663	0.124	0.193	1.0000

Breusch-Pagan LM test of independence: chi-square(120) = 602.654, p-value = 0.0000

Notes: Number 1 to 16 represent the sample countries respectively as follows: Australia, Austria, Belgium, Canada, Chile, Colombia, Germany, Hong Kong, Israel, Italy, Portugal, South Africa, Spain, Switzerland, United Kingdom and United States.

Panel Unit Root Test Results

Table 3 shows the results of Pesaran (2007) unit root test which test the order of integration of our variables. As can be observed from Table 3, the test statistics suggest that all variables (except SMCR and INFL) are non-stationary at level. However, the test statistics reject the null hypothesis of non-stationarity for all variables at first-difference. Thus, we can conclude that our variables are integrated at order one thus warranted to proceed to the panel cointegration test.

Table 3: Panel unit root test results

Variables	Level	First difference
SMCR	-2.408***	-4.171***
SVTR	-1.756	-3.037***
MC	-2.064	-4.154 ***
PFA	-1.471	-2.830***
VOLT	-1.756	-3.450***
INFL	-2.148**	-3.834***
GQ	-1.294	-2.509***
GDPPC	-1.923	-3.615***

Notes: Asterisks ***, ** and * denote rejection of the null hypothesis of non-stationary at 1 per cent, 5 per cent and 10 per cent levels of significance.

Panel Cointegration Test Results

The Westerlund's cointegration tests results are summarized in Table 4. The idea is to test the existence of a long-run relationship between our main explanatory variables (i.e., PFA and GQ) and three measures of the explained variable (i.e., SMCR, SVTR and MC). G_τ and G_α are group mean statistics to test the null hypothesis of no cointegration against the alternative hypothesis of cointegration among some of the selected countries. The panel statistics P_τ and P_α test the null of no cointegration against the alternative hypothesis of cointegration among all the selected countries. The results indicate that both, group and panel test statistics reject the null hypothesis of no cointegration at one percent significance level for both focal variables with explained variables (i.e., SMCR and SVTR). This suggests that cointegration exists and the series are expected to move together in the long-run. However, two of the panel test statistics fail to reject the null hypothesis for both focal variables as related to MC.

Table 4: Panel cointegration test results:

	PFA with SMCR		PFA with SVTR		PFA with MC	
	value	p-value	value	p-value	value	p-value
G_τ	-3.904	0.000	-3.587	0.000	-3.485	0.000
G_α	-14.650	0.000	-14.173	0.000	-10.049	0.048
P_τ	-11.628	0.000	-10.730	0.000	-5.976	0.097
P_α	-11.572	0.000	-12.361	0.000	-8.133	0.005
	GQ with SMCR		GQ with SVTR		GQ with MC	
	value	p-value	value	p-value	value	p-value
G_τ	-3.829	0.000	-4.626	0.000	-2.955	0.000
G_α	-13.246	0.000	-13.463	0.000	-14.085	0.000
P_τ	-11.053	0.000	-12.824	0.000	-5.506	0.203
P_α	-12.216	0.000	-13.432	0.000	-7.917	0.007

Panel Cointegration Estimation Results

As a recap, we use CCEMG and AMG estimators for a sample of 16 developed and emerging countries over the period from 1996 to 2016. In the analysis we regress pension funds and its interaction with governance quality on three measures of stock market development namely stock market capitalization ratio, share values traded ratio and market concentration. However,

using MC as a measure of stock market development, the sample size was reduced to 10 countries as the data for that measure are not available in six countries, that is, Austria, Belgium, Colombia, Italy, Portugal and UK.

Table 5 shows the coefficients of CCEMG results of the interaction effect of governance quality on the link between pension funds assets and stock market development for the individual countries in our sample. Focusing on the stock market capitalization ratio as a measure of development of the stock market, three (i.e., Australia, Canada and Colombia) countries are found to have significant coefficient of interaction term. The significance of the interaction terms implies that, in those countries, governance quality mechanisms have a role to play in moderating the operations and performance between institutional investors and capital market. Specifically, governance quality and pension funds being dependent on one another to affect stock market development. The results suggest that, the stronger the governance quality the greater the association between pension funds assets and stock market size. The interaction between pension fund and governance quality are positive with coefficients of 0.855, 0.932 and 0.194 in Australia, Canada and Colombia respectively, signifying a complementary influence of pension funds and governance quality on stock market size. The moderating effect is higher in Australia and Canada compared to that in Australia. All the coefficients are significant at 5 per cent level.

On the other hand, when stock market development is proxied by stock values traded ratio, we find only one country to have significant results of the moderation effect of governance quality when stock market development is proxied by stock value traded. Precisely, the interaction term reports statistically significant in South Africa with the coefficient of 0.375 at 5 per cent level signifying that a strong governance environment enhances the investment of pension funds to stock market in this country. This means, in South Africa pension funds and governance quality complement each other in boosting the value of shares traded in the stock market.

Likewise, when the stock market development is represented by market concentration, Israel is found to have significant negative coefficient (i.e., -0.648) of interaction term at 1per cent level. The interpretation of the significance results is, in Israel, governance quality framework has a role to play in moderating the operations and performance between institutional investors and capital market. Specifically, the results evidenced that the governance quality and pension funds were substituted one another in the concentration of the stock market.

Table 5: Moderating effect of governance quality index on the relationship between pension funds and stock market development - CCEMG

		Dependent variable SMCR		Dependent variable SVTR		Dependent variable MC	
Australia	PFA	0.021 (0.021)	-1.285 (0.542) **	-0.040 (0.052)	-1.903 (2.243)	-0.007 (0.0080)	-0.030 (0.248)
	GQ	-2.484 (2.016)	-38.394 (14.911) **	-5.800 (4.323)	-55.597 (65.038)	-1.431 (0.877)	-2.249 (6.383)
	PFA*GQ		0.855 (0.353) **		1.221 (1.519)		0.021 (0.172)
	Constant	4.739 (2.791)	76.268 (29.587) **	11.107 (6.668)	103.87 (145.064)	8.250*** (3.141)	12.276 (16.256)
Austria	PFA	0.008 (0.010)	0.0358 (0.086)	-0.018 (0.018)	0.018 (0.120)	NA	NA
	GQ	0.642 (1.084)	0.905 (2.104)	4.571 (2.004) **	5.857 (3.437)	„	„
	PFA*GQ		-0.012 (0.060)		-0.029 (0.079)		

Belgium	Constant	11.266 (3.474) ***	6.423 (4.674)	20.799 (6.894) ***	24.200** (10.855)	..	..
	PFA	0.024 (0.023)	0.476 (0.688)	-0.000 (.0417)	0.921 (1.139)	NA	NA
	GQ	-1.090 (0.695)	2.215 (4.987)	-2.229 (1.591)	4.037 (8.062)	..	..
	PFA*GQ		0.331 (0.499)		-0.636 (0.829)		
Canada	Constant	2.503 (2.146)	-2.865 (8.969)	4.374 (3.833)	7.601 (17.104)	..	..
	PFA	0.012 (0.101)	1.732 (0.676) ***	-0.009 (.040)	0.524 (0.662)	-0.002 (0.021)	0.422 (0.444)
	GQ	1.812 (2.618)	23.030 (10.984) **	-1.133 (1.282)	8.052 (11.589)	0.017 (1.011)	7.677 (7.935)
	PFA*GQ		0.932 (0.392) **		-0.321 (0.398)		-0.258 (0.269)
Chile	Constant	4.726 (8.156)	-67.760 (22.812) ***	5.279 (4.211)	-10.976 (20.866)	-0.175 (3.771)	-13.167 (14.757)
	PFA	0.008 (0.064)	-0.172 (0.270)	0.057 (0.121)	-0.192 (0.539)	-0.026 (0.014)	-0.064 (0.119)
	GQ	1.004 (0.666)	-0.615 (2.638)	1.977 (1.420)	-0.328 (5.387)	-0.324 (0.219)	-0.567 (1.184)
	PFA*GQ		0.160 (0.194)		0.228 (0.406)		0.033 (0.091)
Colombia	Constant	5.402 (5.2183)	1.887 (10.043)	9.3077 (10.202)	1.178 (19.483)	7.795*** (2.647)	5.089 (2.802)
	PFA	0.040 (0.008) ***	-0.233 (0.124)	0.027 (0.020)	-0.565 (0.393)	NA	NA
	GQ	0.684 (0.396)	-2.482 (1.322)	1.783 (1.118)	-4.525 (4.195)	..	..
	PFA*GQ		0.194 (0.086) **		0.414 (0.272)		..
Germany	Constant	6.315 (4.453)	19.010 (5.829) ***	13.249 (10.208)	34.204 (18.823)	..	..
	PFA	-0.010 (0.161)	-2.383 (12.253)	0.088 (0.319)	-11.662 (24.232)	(0.087)	-7.771 (5.376)
	GQ	0.572 (1.648)	1.030 (3.143)	2.682 (4.448)	7.436 (6.314)	0.547 (0.435)	-1.081 (1.347)
	PFA*GQ		1.562 (7.904)		7.718 (15.606)		5.040 (3.436)
Hong Kong	Constant	-4.791 (2.472)	0.314 (9.673)	-0.883 (6.935)	29.261 (18.884)	-0.353 (2.648)	-0.288 (4.280)
	PFA	-0.015 (.020)	-0.1799 (0.327)	-0.046 (0.026)	-0.179 (0.427)	-0.000 (0.007)	-0.022 (0.107)
	GQ	0.479 (0.579)	-6.385 (12.978)	1.179 (0.774)	-3.469 (16.697)	0.200 (0.213)	-0.495 (4.136)
	PFA*GQ		0.105 (0.208)		0.084 (0.270)		0.015 (0.068)
Israel	Constant	1.140 (3.870)	13.06 (16.215)	6.667 (5.190)	3.995 (21.450)	1.156 (3.655)	-0.055 (5.312)
	PFA	0.122 (0.100)	-0.597 (0.616)	0.067 (0.072)	-0.320 (0.614)	0.086 (0.033)	0.751*** (0.241)
	GQ	-0.653 (0.896)	-3.577 (2.685)	-1.787 (0.863)	-3.734 (3.227)	-0.093 (0.514)	3.460*** (1.362)
	PFA*GQ		0.630 (0.536)		0.424 (0.599)		-0.648*** (0.232)
Italy	Constant	2.659 (2.222)	5.470 (5.913)	9.322*** (3.029)	17.560** (7.111)	-0.498 (4.423)	-6.120 (3.913)
	PFA	0.1050 (0.116)	-.754 (.079) ***	-0.287 (0.132)	-1.353 (0.633)	NA	NA
	GQ	10.002 (3.545) ***	0.072 (1.151)	6.894 (4.075)	-3.856 (7.026)	..	..
	PFA*GQ		1.026 (0.092)		1.295 (0.777)		..
	Constant	-9.223 (4.575) **	-2.883 (1.316) **	-17.447*** (5.890)	-13.322 (12.800)	..	..

Portugal	PFA	0.0257 (0.018)	0.035 (0.109)	0.0344 (0.023)	-0.163 (0.121)	NA	NA
	GQ	-0.625 (1.144)	-0.497 (2.194)	1.444 (1.483)	-2.530 (2.759)	„	„
	PFA*GQ		-0.009 (0.096)		0.181 (0.111)		„
	Constant	-3.780 (4.003)	-5.296 (7.096)	-10.068 (5.592)	-12.820 (7.893)	„	„
South Africa	PFA	-0.001 (0.008)	-0.154 (0.140)	-0.0102 (0.011)	-0.409** (0.162)	-0.008 (0.009)	-0.292 (0.229)
	GQ	0.804 (1.587)	-2.760 (3.814)	1.705 (1.854)	-7.408 (4.023)	0.972 (1.678)	-4.953 (4.473)
	PFA*GQ		0.144 (0.134)		0.375** (0.152)		0.276 (0.222)
	Constant	7.399 (3.201) **	3.959 (8.508)	1.675 (3.414)	5.938 (8.023)	-9.602 (7.559)	-14.483 (14.118)
Spain	PFA	-0.002 (0.043)	-0.0176 (0.163)	0.142 (0.119)	0.017 (0.446)	0.005 (0.031)	-0.006 (0.141)
	GQ	0.397 (0.811)	0.205 (2.168)	2.138 (2.178)	0.235 (6.304)	0.157 (0.696)	0.122 (1.859)
	PFA*GQ		0.013 (0.127)		0.120 (0.350)		0.005 (0.114)
	Constant	-1.812 (3.678)	-1.451 (6.974)	-21.317** (10.578)	0-6.985 (17.908)	-4.986 (7.896)	-9.308 (9.269)
Switzerland	PFA	0.112 (0.038) ***	0.176 (0.649)	0.114** (0.048)	0.136 (0.573)	0.015 (0.068)	0.185 (1.135)
	GQ	-2.579 (2.474)	-2.167 (5.146)	-4.756 (3.070)	-5.503 (4.261)	-0.275 (4.724)	3.267 (10.506)
	PFA*GQ		-0.033 (0.359)		-0.020 (0.311)		-0.110 (0.599)
	Constant	6.732 (3.611)	6.323 (18.821)	8.155 (4.766)	-2.738 (15.939)	-0.583 (7.375)	-12.074 (29.794)
UK	PFA	-0.008 (0.016)	-0.142 (0.104)	0.0376 (0.025)	0.062 (0.188)	NA	NA
	GQ	-1.540 (0.987)	-4.009 (2.143)	-1.431 (1.542)	-0.976 (3.739)	„	„
	PFA*GQ		.088 (0.067)		-0.019 (0.118)		„
	Constant	1.770 (2.584)	12.357 (8.476)	-2.127 (4.298)	-8.012 (15.602)	„	„
USA	PFA	0.004 (0.055)	-0.0713 (0.746)	0.018 (0.014)	0.050 (0.208)	0.006 (0.015)	-0.125 (0.274)
	GQ	3.509 (2.703)	1.142 (19.993)	0.935 (0.547)	1.7807 (5.480)	0.405 (0.723)	-3.128 (7.326)
	PFA*GQ		0.044 (0.495)		-0.020 (0.139)		0.084 (0.175)
	Constant	-3.836 (4.227)	6.072 (34.275)	-1.163 (1.092)	-4.619 (9.288)	2.967 (2.707)	8.051 (10.625)

Notes: *** and ** denote significance at the 1 per cent and 5 per cent levels. Standard error is within parentheses. CCEMG is cross-correlated effect mean group and AMG is augmented mean group

With regards to AMG results (refer to Table 6), the coefficients of interaction term between pension funds and governance quality are observed to be significant in three countries. When stock market development is proxied by stock market capitalization ratio, Belgium and UK record significant interaction terms whereas Italy has significant results when share values traded ratio represents the stock market development. The coefficients for Belgium and UK are -1.27 and 0.062 significant at 1 per cent level respectively signifying that the pension funds and governance quality being dependent on one another in their effect to the stock market development. The coefficient in Belgium is negative and more than one implying that the relationship between pension funds and governance quality is highly substitutable in influencing the size of the stock market. The effect is lower in the UK as compared to Belgium. The coefficient of interaction term in Italy is -1.395 significant at 5 per cent level suggesting a

substitution relationship between pension funds and governance quality in boosting the value of shares traded in stock market. As in Belgium, the coefficient is more than one signifying high moderating effect of governance quality in this country.

No significant coefficients of interaction term found in any of the countries in our sample when stock market development is proxied by market concentration, hence, we do not report the results.

Table 6: Moderating effect of governance quality index on the relationship between pension funds and stock market development - AMG

		Dependent variable		Dependent variable	
		SMCR		SVTR	
Australia	PFA	0.024** (0.009)	-0.118 (0.197)	-0.001 (0.023)	-0.695 (0.436)
	GQ	-2.682*** (0.849)	-6.169 (4.962)	-2.414 (2.113)	-19.850 (11.140)
	PFA*GQ		0.088 (0.123)		0.433 (0.272)
	Constant	7.013*** (1.361)	12.489 (7.770)	7.717** (3.416)	34.462** (17.117)
Austria	PFA	0.007 (0.008)	-0.032 (0.152)	0.004 (0.010)	0.014 (0.192)
	GQ	1.298 (1.159)	0.842 (2.176)	2.975 (1.850)	3.091 (3.080)
	PFA*GQ		0.025 (0.098)		-0.005 (0.120)
	Constant	0.423 (2.269)	1.170 (3.784)	-5.557 (3.573)	-5.797 (6.191)
Belgium	PFA	0.073** (0.033)	1.825*** (0.404)	0.029 (0.025)	0.216 (0.519)
	GQ	-1.813 (1.250)	10.385*** (2.928)	-3.522*** (1.083)	-2.198 (3.8362)
	PFA*GQ		-1.270*** (0.293)		-0.135 (0.375)
	Constant	5.806*** (1.800)	-10.578*** (3.957)	7.120*** (1.594)	5.324 (5.244)
Canada	PFA	0.054 (0.047)	-0.381 (0.934)	-0.000 (0.017)	0.645 (0.383)
	GQ	1.197 (2.006)	-6.433 (16.442)	-0.563 (0.914)	11.014 (6.922)
	PFA*GQ		0.267 (0.572)		-0.0399 (0.237)
	Constant	1.425 (3.874)	13.941 (27.028)	4.678** (1.838)	-14.045 (11.240)
Chile	PFA	0.052** (0.023)	0.118 (0.194)	0.147*** (0.040)	0.462 (0.351)
	GQ	0.092** (0.459)	1.608 (2.043)	1.650** (0.791)	4.913 (3.699)
	PFA*GQ		-0.049 (0.143)		-0.237 (0.263)
	Constant	1.874*** (0.631)	0.995 (2.644)	-2.415** (1.039)	-6.602 (4.751)
Colombia	PFA	0.032*** (0.006)	0.019 (0.129)	0.027** (0.013)	0.216 (0.277)
	GQ	0.571 (0.401)	0.425 (1.534)	1.796** (0.898)	3.984 (3.325)
	PFA*GQ		0.009 (0.092)		-0.135 (0.197)
	Constant	-0.960 (1.097)	-0.859 (1.459)	-10.259*** (2.887)	-11.752 (3.672)
Germany	PFA	0.129 (0.109)	5.703 (11.136)	-0.215 (0.196)	13.772 (23.596)
	GQ	2.305**	3.405	3.520	6.373

		(1.003)	(2.476)	(1.969)	(5.221)
	PFA*GQ		-3.573 (7.137)		-8.974 (15.137)
	Constant	-1.284 (1.720)	-3.224 (4.343)	-4.429 (3.397)	-9.380 (9.053)
Hong Kong	PFA	-0.024** (0.010)	0.049 (0.173)	-0.048*** (0.018)	0.171 (0.274)
	GQ	-0.472 (0.445)	2.495 (6.908)	-0.271 (0.733)	8.428 (10.875)
	PFA*GQ		-0.045 (0.106)		-0.134 (0.167)
	Constant	9.349*** (2.046)	4.459 (11.610)	9.569*** (3.299)	-4.906 (18.363)
Israel	PFA	0.160*** (.037)	0.331 (0.261)	0.029 (0.060)	0.269 (0.540)
	GQ	-0.571 (0.460)	0.375 (1.513)	-2.107** (0.845)	-0.801 (3.042)
	PFA*GQ		-0.168 (0.252)		-0.233 (0.519)
	Constant	4.016*** (0.683)	3.117*** (1.524)	3.355** (1.354)	2.137 (3.054)
Italy	PFA	0.003 (0.035)	-0.191 (0.127)	0.013 (0.154)	1.012** (0.456)
	GQ	7.793*** (1.009)	4.958** (2.072)	11.805*** (4.500)	24.918*** (6.872)
	PFA*GQ		0.295 (0.188)		-1.395** (0.611)
	Constant	-5.294*** (0.921)	-3.483 (1.456)	-9.338** (4.420)	-18.275*** (5.391)
Portugal	PFA	0.019 (0.014)	-0.002 (0.081)	0.025 (0.017)	-.0483 (0.084)
	GQ	0.424 (1.089)	0.092 (1.640)	0.330 (1.321)	-0.888 (1.912)
	PFA*GQ		0.018 (0.066)		(0.061) (0.069)
	Constant	1.783 (1.598)	2.187 (2.146)	-1.320 (1.889)	(0.120) (2.501)
South Africa	PFA	-0.004 (0.006)	-0.103 (0.126)	0.009 (0.012)	(0.201) (0.196)
	GQ	0.514 (1.279)	-2.022 (3.540)	-0.714 (2.091)	4.115 (5.359)
	PFA*GQ		0.096 (0.124)		-0.188 (0.192)
	Constant	5.822*** (1.256)	8.379** (3.562)	3.014 (2.080)	-1.717 (5.263)
Spain	PFA	-0.007 (0.021)	-0.006 (0.098)	0.018 (0.061)	-0.268 (0.292)
	GQ	0.386 (0.459)	0.395 (1.239)	3.010 (1.722)	-0.617 (3.995)
	PFA*GQ		-0.000 (0.077)		0.240 (0.238)
	Constant	3.391*** (0.855)	3.376** (1.608)	-3.194 (2.722)	0.680 (4.717)
Switzerland	PFA	0.023 (0.018)	0.490 (0.317)	-0.045 (0.025)	-0.311 (0.543)
	GQ	0.593 (0.947)	4.225 (2.624)	2.645 (1.390)	0.623 (4.364)
	PFA*GQ		-0.253 (0.171)		0.144 (0.293)
	Constant	2.806 (1.567)	-4.067 (4.892)	0.247 (2.402)	4.001 (8.042)
UK	PFA	0.005 (0.012)	-0.094*** (0.030)	0.024 (0.017)	-0.015 (0.060)
	GQ	-0.448	-2.805*** (0.875)	-0.125 (1.075)	-1.121 (1.803)
	PFA*GQ		0.062***		0.025

	Constant	4.777*** (1.142)	(0.018) 8.304*** (1.330)	1.914 (1.677)	(0.036) 3.384 (2.718)
USA	PFA	-0.096*** (0.027)	0.371 (0.582)	.012 .008	0.069 (0.179)
	GQ	1.034 (1.003)	13.324 (15.337)	2.125*** .302	3.609 (4.667)
	PFA*GQ		-0.308 (0.383)		-0.037 (0.117)
	Constant	5.424 (1.918)	-13.116 (23.160)	0.014 (0.098)	-2.235 (7.088)

Notes: *** and ** denote significance at the 1 per cent and 5 per cent levels. Standard error is within parentheses. CCEMG is cross-correlated effect mean group and AMG is augmented mean group

Generally, findings from the analysis establish that pension funds interaction with governance quality is significant in some countries in our sample for some measures of stock market development. Specifically, the results provide strong empirical evidence that governance quality moderates the effect of pension assets on stock market development in Australia, Belgium, Canada, Colombia, Israel, Italy, South Africa and the UK. However, the extent of the effects varies from country to country and from one measure of stock market development to another. For those countries the findings support the literature that stressed the importance of institutional quality in the operations of economic agents. According to these literatures, governance mechanisms is a key driver to pre-requisites of market economies (Dixit 2009) and an important factor in establishing conducive environment for economic activity, inventiveness, growth and development (Butkiewicz & Yanikkaya 2006) hence, seen to be major driver of sound business environment (Boğa-Avram 2013) and increase incentives to invest and improve resources allocation (Aleksynska & Havrylchyk 2013). Also, governance quality is a critical factor in relationships among economic agents i.e. firms and institutions (Gankou et al. (2016); Manasseh et al. (2017)). Furthermore, all forms of interactions including political, economic and social are shaped by governance institutions (Effiong and Asuquo 2017) and this situation results in improved economic performance, investment and growth (Effiong 2015). Likewise, Nawaz (2015) noted that better quality institutions can facilitate access to external finance by overcoming information costs and transaction costs as well.

Robustness checks results

As previously mentioned, besides using the WGI measures of governance, this study also employs five indicators from the International Country Risk Guide (ICRG) dataset to examine the moderating role of governance quality on the relationship between pension funds and stock market development. All these aspects of the institutional quality are relevant for the financial sector operations. Using CCEM estimation technique, the summary of the results is as follows. *First*, when stock market development is measured by SMCR, Hong Kong and USA report significant interaction terms (0.014 and 0.037) significant at 1 per cent and 5 per cent level respectively signifying that pension funds and governance quality complement in boosting the size of the market. *Second*, when stock market development is proxied by SVTR, we find that the interaction coefficients of Belgium and Germany are significant with the coefficients of 0.045 and -0.361 respectively significant at 5 per cent level suggesting that pension funds and governance quality are dependent each other in increasing the value of shares traded. Using AMG estimation techniques, the coefficients of the interaction terms are significant in Hong Kong, Italy and Switzerland when stock market development is represented by SMCR. Specifically, the coefficients are 0.01 and 0.03 significant at 5 per cent level for Hong Kong and Italy respectively implying the complementarity of pension funds and governance quality in enhancing the stock market size. The coefficient of Switzerland is -0.013 signifying the substitutional role played by pension funds and governance quality in increasing the size of the

market. Considering SVTR as a measure of stock market development, only Canada reports a significant coefficient of the interaction term.

Overall, we can conclude from the results that the estimated coefficients of the moderation variable are significant but varied among the countries and proxies of stock market development. Using stock market capitalization ratio to proxy stock market development, Hong Kong, Italy, Switzerland and USA show that governance quality index has a role to play in moderating the relationship between pension fund assets and stock market development whereas, Belgium, Canada and Germany are found to have significant results when share value trade ratio used to proxy stock market development. The results found that no country in the sample had significant results for both measures of stock market development. The results are similar with those reported in the main analysis and support our proposition that, holding other factors constant, governance quality framework appears to enhance the financial sector's landscape thus influencing the incentive of investors to allocate their funds to firms consequently develop the stock market. However, the magnitude of the coefficient of interaction term varied in different countries and based on the measures used to represent the stock market development.

5. Conclusion

The literature so far has broadly focused on the direct link between pension funds and stock markets development and they reach mixed results. One possible reason for the mixed findings is the failure to consider contingent factors that might influence pension funds-stock market nexus. Unlike prior studies, the current study adds to the growing literature on the pension funds-stock market development relationship by examining the moderating effects of governance quality at country-level on this relationship using single index measure of governance quality applying most recent techniques that accounts for heterogeneous slope coefficients, non-stationarity, cross-sectional dependency and endogeneity. Moreover, this study conducts additional analysis using alternate measures of governance quality sourced from ICRG dataset.

Our main findings are summarized as follows. The study finds that a single index measure of governance quality significantly moderates the pension funds and stock market development relationship for some countries in our sample. The significant results of the moderating effect of governance quality varies in several aspects such as the measure used to proxy the stock market development and the analytical technique applied. Likewise, the extent of the moderating effect of governance quality differs among the significant countries in our sample. Similar results are found when we substitute the proxy of governance quality, except that the magnitudes of the interaction coefficients of some countries change slightly. These results support our argument that, when holding other factors constant, better governance quality appears to establish a conducive environment for financial sectors, thus encouraging institutional investors' incentive to invest their funds that develop the capital market in terms of size, value of shares traded, and the concentration of the market.

These findings of this study have policy implications. The indirect effects (significant coefficients of the interaction of pension funds and governance quality) findings suggest that governance quality enhances the financing environment which increases the willingness of investors to inject their funds needed to develop the stock market. Specifically, the results imply that institutional investors' decisions to invest are not made in vacuum but rather hinge on the country's governance quality mechanisms. Hence, for the countries with significant

results, policymakers should keep on improving the governance quality to encourage institutional investors to channel the financial resources needed by deficit units and in turn develop the stock market.

Like other previous studies in a similar context, the current study has some limitations though they may not hinder its validity. *First*, the study does not investigate how different levels of governance quality (such as low, medium and high) influence the link between pension funds and stock market development. Future studies could investigate the way in which different levels of country-level governance quality might affect pension funds and stock market relationships. This would be valuable as it will give more insight on the similarities or variations of the moderating effect of governance quality. *Second*, this study analyzed the moderating effect of governance quality for the whole period covered 1996 to 2016 without considering how the global financial crisis period impacted other organs of the economy. Future study may explore the moderating effect of country-level governance on the pension funds – stock market development nexus controlling for the 2008/2009 financial crisis.

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