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The Nexus Between Financial Development, Economic Growth and Poverty Alleviation: PMG-ARDL Estimation

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Abstract

This study aims to find out the connections between financial development, economic growth, and poverty using panel data from 1985 to 2017 in fourteen African countries that many previous researchers ignore. The study deploys a dynamic Granger causality test to trace the nexus between financial development, economic growth, and poverty reduction in Africa in the long run. First, the upshots suggest a gross domestic product, gross capital formation, price of household consumption, and government expenditure substantially impacting poverty. Besides that, the result also shows a bi-directional in the long run using a PMG estimator. The findings broadly support the view that there is a stable, short-run relationship between financial development, economic growth, and poverty in the error correction terms. However, other variables show no causal relationship in the short run. In practicality, this study suggested some policy implications and supported governmental policies to reduce economic hardship on financial institutions.

Keywords:

financial development, economic growth, poverty reduction, developing countries

How to Cite:

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Introduction

Many theories and empirical literature have extensively studied when it comes to the connection between financial development and economic growth. Many writers express the linkage between these variables discoursing about it on behalf of developing countries, including sub-Saharan Africa (Dhrifi, 2013; Sehrawat & Giri, 2018; Kodongo & Ojah, 2016; Uddin et al., 2014; Yang, 2019). Other studies suggested earlier literature cannot noticeably consider the connections of financial development, economic growth, and poverty reduction (Uddin et al., 2014). In their studies, they concluded financial development reduces poverty but not linear. The influence of finance on poverty has been mostly indecisive and vague from the empirical front due to the change in the level of income which results from financial sector reforms, which leads to poverty reduction in developing countries. In the developing countries, since economic progress leads to an increase in growth, the poverty reduction strategy will take more importance than the growth model, which does not necessarily improve the lives of the poor.

Bangladesh has been experiencing a modest reduction in the poverty rate of around 1.5% point a year for the last couple of decades (Vamvakidis & Arora, 2010). The measure of poverty is also evident in improvement when it comes to distribution. Tensions mostly vanish. Researchers focus on financial sector reforms, reducing financial market imperfections to grow a discrete benefit to the individuals creates positivism, not negative and motivation effects (Ayyagari et al., 2007). Financial developments cannot stand on their own if favorable governmental policies do not immerse their development space to help economic growth. Growth is tantamount to poverty alleviation when it comes to developing policies.

Governmental policies are keynote when it comes to poverty alleviation. China, in recent years, is gradually taken millions of its people from absolute poverty. In analyzing issues in developing countries from 1966 to 2000, Visano (2008) and Jeanneney & Kpodar (2008) concluded that the poor outweigh the cost when it comes to financial development and poverty alleviation comes to the benefit of financial development. Single country data analysis shows evidence of financial growth that is strongly connected with economic growth when dated from 286 Chinese cities surveyed from 2001-2006 after China enters into the world trade organization in 2001 (Zhang et al., 2012). Financial development per se, in its broader sense, affects poverty. The findings of the ARDL bounds testing approach from 1970-2015 reveal a stout long-run relationship between financial development, economic growth, inequality, and poverty in the contest of India (Sehrawat & Giri, 2018). The study further shows unidirectional causality from financial development and economic growth to poverty, whiles inequality and poverty are bi-directional. Uddin et al. (2014) show a long-run relationship between economic growth and poverty reduction in Bangladesh. Financial developments reduce poverty but are not linear when quarter frequency data from 1975-2011.

Financial development proxy by broad money has exhibited several patterns in the selected countries coupled with their GDP growth rate (Olayungbo & Quadri,

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2019). In their further studies, Olayungbo & Quadri (2019), with the studies from 20 sub-Saharan African countries for 2000-2015, show that financial development and releases positively affect the economy in the short and long-run growth. The broad money (% GDP) in Senegal, Mali, and the Gambia amounted to 45.2, 32.9, and 57.9 respectively, but with 3.9%, 7.2%, and – 0.2% GDP annual growth rate in 2014 (WDI, 2018). Financial development contributes significantly to economic growth through straits of physical capital stock and total factor productivity when combining models and methods for cross-countries studies, for low-level, middle-income, and high in some countries (Ibrahim & Alagidede, 2018). Similar studies conducted by Rousseau (2002) on the post-1850 period and modern economists after 1960; he found out the financial revolution using traditional and modern approaches suggests promoting trade, commerce, and industrialization, institutions, markets, and financial instruments plays a vital role. Conversely, studies from 15 African countries from 1995 to 2010, using static and dynamic panel data methods, suggested under endogenous stock market capitalization and foreign direct investment consistently have positive effects on economic growth (Assefa & Mollick, 2017). Growth can also use to lower poverty and leave the poor worse off relative to the average population. However, with counter studies from a different contest, the study concluded that growth reduces poverty no matter the level of inequality but further suggested that growth is not enough to alleviate poverty (Škare & Družeta, 2016). Also, recent studies have examined the relationship among remittances, financial development, and economic growth from a different perspective without including poverty (Agbélénko & Kibet, 2015; Audu et al., 2013; Beck et al., 2001; Sibindi, 2015).

The empirical literature reviewed above shows that previous studies have extensively focused on the relationship between financial development and economic growth and how these two variables impact poverty and other macroeconomic variables in developing countries. However, empirical investigation on the effects of financial development and economic growth using financial development as a transmission channel has not received adequate priority in the SSA countries. Furthermore, previous research works have not explicitly examined the short-run and long-run effects of financial development and economic growth on poverty in less-developed economies in general and SSA countries in particular. This study, therefore, intends to contribute to the literature by filling this gap.

In this paper, we expand upon this by asking whether financial development and economic growth separately alleviate poverty. We focus on extreme, absolute poverty is measured by household consumption in-line with other studies. In this context, this study will find out if there is a connection between financial development, economic growth, and poverty. A PMG approached was used to find out this connection for fourteen African countries. The studies speak in favor of the fact that as growth transpires, poverty reduces, no matter the level of inequality. Identically, a similar growth pattern has different effects on poverty reduction. The study concludes that growth is good for poverty alleviation, but it is not enough. The extent to which growth reduces poverty depends on how the study measures poverty, and upon the poor's absorptive capacity, the pace and pattern of growth.

Methods

According to this study, 14 sub-Saharan African countries for the 1985 to 2017 data. Countries specification base on the population not less 20 million from the west, east, south, north, and central Africa. Some countries took out due to unavailable data, and others classify with other countries with a good standard of living. Data were taken from world development indicators (WDI) and Feenstra et al. (2015), that is, Penn world data files to help the researchers to come out with results. Financial development and economic growth are expected to positively impact poverty, with many studies conducted (Cepparulo et al., 2017). With this assertion, the study deploys a dynamic Granger causality test to trace the nexus between finance development, economic growth, and poverty reduction in Africa in the long run. All variables except variables in ratio forms have been transformed into natural logarithms (ln) to help stationarity in the matrix variance.

$$Y_{it} = A + \alpha_1\, gdppln_{it} + \alpha_2\, gcfln_{it} + \alpha_3\, plcln_{it} + \alpha_4\, gexpln_{it} + \eta_i + \mathcal{E}_{it} \qquad (1)$$

Where A is the constant term, η_i is an unobserved country-specific effect, and ε_i is the error $_i$ term and $_t$ is the country and time respectively. This paper adopts the PMG ARDL method of estimations. Pesaran et al. (1999) proposed the PMG estimator associated with pooling and averaging of the coefficients over the cross-sectional units. The MG, on the other hand, involves estimating each unit separately and averaging the estimated coefficient over the cross-sectional units (Pesaran & Shin, 1995) whiles the dynamic fixed effects (DFE) differ across groups. The PMG, which was strongly proposed by Pesaran et al. (1999), which is an intermediate estimator between MG and DFE involves both pooling and averaging with the long-run been homogeneous. The ARDL model is employed because of its adequacy to our data set. First, it can accommodate a mixture of stationarity of variables such as I (0) and I (1) and not I (2) like this study. This study contains 14 cross sections and 33 years, which is not bad for panel studies but can be taken care of in ARDL models. Finally, it captures the dynamics of the variable of interest in both the short run and the long run. Therefore, both the PMG and the MG estimations are carried out in this study. Equation (2) can be written in panel ARDL form of Pesaran et al. (1999) as the model is specified as the model is used for the same is as follows:

$$\Delta Y_{it} = \theta_i[Y_{i,t-1}, -\lambda'_{i,}\chi_{i,t}] + \sum_{j=1}^{p-1} \xi_{ij}\Delta Y_{i,t-j} + \sum_{j=o}^{q-1} \beta'_{ij}\Delta X_{i,t-j} + \varphi_i + e_{it^t} \qquad (2)$$

Where, θ_i=-(1 – δ_i), is the group-specific speed of adjustment coefficient (expected that $\theta_i < 0$) and λ'_i =vector of long-run relationships. However, ECT = [$Y_{i,\ t-1} - \lambda'_{i,}\chi_{i,t}$], the error correction term that needs to be corrected within the equation. $\xi_i j$, $\beta'_i j$ are the short-run dynamic coefficients of the equations.

$$\Delta gdpp_{it} = \theta_i[Y_{i,t-1} - \lambda'_{i,}\chi_{i,t}] + \sum_{j=1}^{\bar{p}-1} \varepsilon_{ij}\Delta gdpp_{i,t-j} + \sum_{j=1}^{\bar{p}-1} \pi_i\, \Delta gcfln_{i,t-j} +$$
$$\sum_{j=1}^{\bar{p}-1} \psi_i\, \Delta plcln_{i,t-j} + \sum_{j=1}^{\bar{p}-1} \omega_i \Delta gexpln_{i,t-j} + \sum_{j=1}^{\bar{p}-1} \rho_i\, \Delta gdppln + \sum_{j=1}^{q-1} \beta^2{}_i \Delta gcfln_{i,t-j} +$$
$$\sum_{j=1}^{q-1} \beta^3{}_i \Delta plcln_{i,t-j} + \beta^4{}_i \Delta gexpln_{i,t-j} + \varphi_i + e_{itt} \qquad (3)$$

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Where θ is the adjustment coefficient of the $^{p-1}$ indicating the number of lags to be used for dependent variables ξ_i, π_i, ψ_i, ω_i, and ρ_i are the short-run coefficients while β^1 to β^4 indicates the long-run coefficients being the short run and the long run interactive effects of the gross domestic product per capita and gross capital formation being proxy for financial development. This shows how the model shows a correlation analysis

$$r \frac{(\sum \chi\gamma)-(\sum \chi(\sum y)}{\sqrt{[n\sum \chi^2](\sum \chi)^2][n\sum y^2-(\sum y)^2]}} \quad (4)$$

Once the correlation coefficient is a number from -1 to 1 or any number in-between. If two data sets move in lockstep in the same direction and by the same amount, they have a correlation coefficient of 1. If they move by the same amount but in the opposite direction, the number would be -1. If the two sets of data seem to have no relationship at all, they correlate 0.

Results and Discussion

Table 1 shows the measures of central tendency, mean, and median that give the center of the distribution estimates. It is evident that on average, GDP per capita, gross capital formation, household consumption, and government expenditure in the percentage of 6.819531%, -1.854619% -0.9888726%, and 10.2336% respectively for the 14 countries.

Table 1. Summation of data

Variable	Observation	Mean	Standard deviation	Minimum	Max
Gdppln	462	6.819531	0.8191747	4.631275	8.596502
Gcfln	462	-1.854619	0.6294697	-4.378645	-0.2935343
Plcln	462	-0.9888726	0.352097	-1.948901	0.3264126
Gexpln	462	10.2336	1.473431	7.077758	13.76809

Source: Author elaboration

GDP per capita, gross capital formation, household consumption, and government expenditure are positively skewed, while only population growth is negatively skewed. It can observe that the standard deviation for government expenditure was the highest among the four variables. If the standard deviation exceeds 0.05%, this is an indication that the null hypothesis of a normal distribution for the series rejects at this significance level. A maximum of 13.76809% indicates most SSA countries' understudy expenditure was high, while gross capital formation indicating a percentage of capital investment accumulation to the GDP was the lowest of -4.378645%.

Furthermore, Table 2 sections show an empirical connection between all the variables. There exist a positive relationship between all the variables under study. The conventional unit root tests such as ADF by Dickey & Fuller (1979), PP by Phillips (1995), and Phillips and Perron (1988) have been widely used in macroeconomics

dynamics and finance literature. This study will use to check the cross-section dependence, level of unit root, follow by padroni's cointegration test, Hausman test, and PMG-ARDL estimator to check the robustness of this study.

Table 2. Correlation analysis

Variables	Gdppln	Gcfln	Plcln	Gexpln
Gdppln	1.0000			
Gcfln	0.2996	1.0000		
Plcln	0.3013	0.1773	1.0000	
Gexpln	0.2172	0.1166	0.2405	1.0000

Source: Author elaboration

The study performs a test to analyze the independent, consistent with the coefficient estimates to ensure cross-sectional dependence in this panel data(Pesaran, 2020). The study adopts the cross-section dependence (CD) that supports larger cross-section (N) and smaller time series (T) like this study with N=14 > T=33. The cross-sectional dependence test in this section cannot reject at a 0.01% level of significance. This result implies that there is a presence of cross-sectional dependence in our data. Thus, to obtain unbiased estimates of our analysis, we conducted a diagnostic test by applying panel unit root tests in the presence of cross-sectional dependence on the residual estimates (Pesaran, 2007).

Table 3. Cross-sectional dependence

Variable	CD-test	P-value	Average joint T	Mean p	Mean abs (p)
lngdpp	45.898	0.000	33.00	0.84	0.84
lngcf	12.648	0.000	33.00	0.23	0.37
lnplc	25.121	0.000	33.00	0.46	0.59
lngexp	43.995	0.000	33.00	0.80	0.81

Notes: Under the null hypothesis of cross-section independence, CD ~ N (0, 1) P-values close to zero indicate data are correlated across panel groups.

This section corrects the test for only I(0) at the level and only I(1) variables at 1st difference and not for I(2) at 2nd difference variables (Pesaran, Shin, and Smith, 2001). In other words, panel unit root tests such as Levin Lin and Chu (LLC) (Levin et al., 2002), Im Pesaran and Shin (IPS) (So Im et al., 2003) tests were performed. Table 4 shows that all the variables not stationary at levels, meaning that they are I(0) variables using IPS whiles gross capital formation is stationary at 0.05 for LLC. However, all the variables were corrected at 1st difference for IPS and LLC meaning all the variables are stationary at 1st difference. Therefore, variables such as GDP per capita which was in line with the studies of Iheanacho (2016), Olayungbo & Quadri (2019) and government expenditure for LLC follow I(1) process, while GDP per capita, gross capital formation, household consumption

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and government expenditure for IPS all was stationary I(1). These unit root results imply that the variables are mixed stationary, i.e., I(0) and I(1) processes that fit the PMG/ARDL model.

Table 4. Estimation of IPS and LLC Unit Root Test.

Variable	Im-Pesaran-Shin (IPS)				Levin-Lin-Chu(LLC)			
	Statistics	Level	Statistics	1st difference	Statistics	Level	Statistics	1st difference
Gdppln	3.4884	0.9998	-8.4408	0.0000***	0.7200	0.7642	-6.9739	0.0000***
Gcfln	-0.6840	0.2470	-12.8972	0.0000***	-1.6512	0.0494**	-10.3206	0.0000***
Plcln	0.0631	0.5252	-12.6073	0.0000***	-1.0965	0.1364	-10.7558	0.0000***
Gexpln	5.8324	1.000	-8.7686	0.0000***	1.73180	0.9583	-6.1037	0.0000***

Note: *** Significant at the 0.01, ** Significant at the 0.05 level, *Significant at the 0.1 level Source: Authors elaboration (2019)

This section checks the properties of residual-based tests for the null hypothesis of no cointegration for dynamic panels in which both the short-run dynamics and the long-run slope coefficients permit to be heterogeneous across individual members of the panel. As shown in Table 5, the Padroni panel cointegration results disclose that 5 out of the padroni statistics significantly reject the null hypothesis of no cointegration.

Table 5. Padroni's co-integration tests:

Test Stats.	Panel	Group
V	0.3026	
Rho	-2.572	-1.615
T	-5.039	-6.045
Adf	-4.246	-4.036

Source: Author elaboration

Using the error correction term (ECT), the PMG estimation shows a long run for all the variables. A percentage increase in the coefficient of (-0.1678347) will lead to a significant 0.0000*** at a 0.01 level for the GCF log. This result goes in line with the study of Khan et al. (2020), which suggested that GCF affects economic growth in South Asia's contest when looking from an infrastructure perspective.

The variable plc and gexp also show a sign of 0.0000*** for both at 0.01 level. Using causality to determine the long-run relationship for the three independent variables, the ECT results of the upper test of the PMG estimation shows the coefficients (-0.1678347, 0.08027586 and 0.8080295) respectively have causal effects on the z-values of 0.0000*** at significant of 0.01 for all the variable of gcfln, plcln, and gexpln. Similar results were obtained when establishing cointegration, remittances and financial development have positive effects on economic growth both in the short and the long run (Olayungbo & Quadri, 2019; Rana & Barua, 2015). However, using the short run, the ECT was able to correct a model with a coefficient of (-0.2364831) that will lead to a significant of 0.0000*** at 0.01 level. gcfln in the short run was not corrected at 0.01, 0.05,

and 0.1 at all levels because it shows a significant of 0.745. Other variables plcln and gexpln were corrected at all levels for a significant at 0.000***. This study was in line with Chen et al. (2020) and Saud et al. (2019), which identifies positive shocks in financial development that spur growth in the short run and negative shocks in financial development (government expenditure) that increase (reduce) growth. This indicates in the short run, there is no causality for gcfln on the z-values at 0.745 whiles, the plcln and gexpln have causal effects on the z-values of 0.000***.

Table 6. Pooled Mean Group Estimation

D.gdppln	Coefficient	SE	Z	p>[z]	95% confident interval	
Error correction term (ECT)						
Gcfln	-0.1678347	0.0244781	-6.86	0.0000***	-0.215811	-0.1198584
Plcln	0.8027586	0.0537021	14.95	0.0000***	0.6975044	0.9080129
Gexpln	0.8080295	0.0241061	33.52	0.0000***	0.7607824	0.8552766
SR						
ECT	-0.2364831	0.0665183	-3.56	0.000***	-0.366856	-0.106109
Gcfln D1.	0.0151215	0.0465619	0.32	0.745	0.076138	0.1063811
Plcln D1.	0.5143777	0.0909034	5.66	0.000 ***	0.3362104	0.692545
Gexpln D1.	0.5290382	0.1333092	3.97	0.000***	0.267757	0.7903195
Cons	-0.3768913	0.1881873	-2.00	0.045**	-0.7457316	-0.008051

Notes: *** Significant at the 0. 01 levels, ** Significant at the 0.05 level, *Significant at the 0.1 level
Source: Authors elaboration

Overall, this study shows that the effect of financial development and economic growth on poverty in SSA countries is different from what has been reported from other single and cross-country analysis in Africa and outside Africa. Specifically, the results are in with the study of Menyah et al. (2014) for 21 Africa countries, Uddin et al. (2014) observed for Bangladesh, Abdullahi et al. (2004) in the contest of West Africa, and Hassan et al. (2015) observed for Pakistan respectively, confirming the insignificant of financial development on poverty and economic growth on poverty as well. Therefore, the results highlight the specific features of this contest's variables as an intense way of reducing poverty in the studied African countries. Although other variables like trade openness are robust in alleviating poverty in Europe for 27 countries, according to Asteriou et al. (2013), vital variables prove financial development and economic growth effects on poverty.

From Table 7, it tends to notice that there is a probability estimation of 0.08, showing a significant value at a significant level of 0.1. In these contests, because the probability value is 0.9942, the null hypothesis cannot be rejected because the homogeneity issue is removed. The estimation tosses the nearness of a relationship between the individual effects and the independent variables at the 0.1 level. Therefore, the null hypotheses of the PMG chi2 (3) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B) 0.9942 is accepted since it's >0.05 of the PMG estimator this study was in line with similar work of Saud et al. (2019). Therefore, these models support the PMG estimator. Based on the result of the Hausman test it can be noted that the pooled mean group model is appropriate for the model.

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Table 7. Hausman PMG, Sigmamore

	(b) Pmg	(B) DFE	(b-B) Difference	Sqrt(diag (V b-V_B)) S.E
Gcfln	-1.168347	-1.243159	0.0758813	0.7152561
Plcln	0.8027586	0.7561891	0.0465695	1.574213
Gexpln	0.8080295	0.9974809	-0.1894514	0.7053691

Source: Authors elaboration

Conclusion

The study mainly focuses on how we can marry the two to help reduce poverty in Sub-Saharan Africa. Within the same trace, financial development considerably will increase economic growth, and each helps to scale back economic conditions. Another contribution of this paper is to check the variations in each of the countries. There is a relation among the variables both in the long and short-run. The study also tends to found unidirectional causalities to running from economic growth to financial development and from financial development to economic growth in the short run and except for gross capital formation in the long run.

On the other hand, no causative relationship was found between government expenditure and financial development in SSA countries. This finding means a disconnection between financial development and government expenditure in SSA countries mirror in reducing economic condition. Therefore, this study concludes that each monetary development ends up in economic growth in the SSA region. However, the interrelatedness between financial development and the economic process does not matter within the growth process in SSA, thus economic condition.

The findings of this study have generated vital policy implications. The study observes that for a typical trapped-economy, gross capita formation precedes household consumption prices, which leads to expenditure. When the expenditure is channeled to the prices of household products, it leads to poverty reduction. The study from the financial perspective can help the banking sectors reduce expenses on their product to help their customers. This study observed that financial development does promote economic growth within the SSA countries within the initial instance. Firstly, the causative impact implies that the proximity of the growing abilities and investment opportunities at the home countries attract the massive flow of transfers from abroad to the SSA countries. Therefore governmental policies can be channeled to investors to reduce taxes to generate more investors to grow the economy. We disclosed that financial development might be a powerful tool to boost economic growth within the SSA countries with relation running from financial development to economic growth.

The policy recommendation is that improved financial services, financial instruments. Therefore, the payment systems are necessary for economic growth in SSA countries, each within the short and long run. The short and long-run monetary policies in SSA ought to be targeted towards improving the financial sector performance by developing sound financial reforms to deepen the financial sector. If these are well-reformed, it will

lead to poverty reduction and reduce the burdens of the citizenry. There ought to be diversification of the banking services and augmented financial inclusion.

These suggested policies are framing the populace's need in these SSA countries related to the study area. The future challenges can reduce by taking some tough decisions at present, and the government should have to design a layout about poverty reduction and get a plan to integrate financial needs and growth of the economy as both are interlaced issues at the end of this pivot. The pro-poor growth and financial policies should design to reduce poverty by increasing gross capital formation. Thus the provision of technical knowledge should be given to the poorer.

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Financial Development, Economic Growth and Poverty Reduction in India

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Abstract

The paper examines the response of poverty reduction based on financial development and economic growth in India. The ARDL and ECM based model techniques analyze the long-run and short-run relationship among the variables in the model. The long-run estimates depict that financial development and economic growth have not significantly impacted poverty reduction and, on the other hand, resulted in injecting inequality and becoming attended to wealthier sections of the society. The short-run estimates show that financial development and economic growth have successfully tried to reduce poverty in India. The results flash a long-run nature of poverty in India and need to designs and formulations of policies that should be instrumental in reducing poverty. Impulse Response Functions' application indicates that poverty reduction will act as a catalyst for further poverty reduction in India.

Keywords:

Poverty, financial development, economic growth, ARDL, ECM

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Introduction

Economic growth and financial development come as one of the preferred choices in the economic literature. Economic development relies upon the nature and the sources of financing growth and development. Buera et al. (2012) argued that financial firms resulted in increasing factors productivity, income level, wage rate, interest rate, and capital accumulation and formation, which help to improve the income and employment. Jalilian & Kirkpatrick (2002) and Jeanneney & Kpodar (2011) have observed that financial development has a considerable impact on poverty via increasing economic growth. Sehrawat & Giri (2016), in a study on financial development and poverty reduction by using the ARDL and ECM based analysis observed that financial development has positive impact on poverty reduction in India in both short-run and in the long-run. Odhiambo (2010) observed that financial development causes poverty reduction in Kenya both in short-run and in long run. Inoue & Hamori (2012) estimates in an unbalanced panel data analysis observed that financial development reduces poverty in a controlled framework. Abosedra et al. (2016) by using ARDL modeling techniques observed that financial development reduces poverty in Egypt.

It has been empirically examined that economic growth increases inequality and financial growth is more inclined towards more prosperous people. This puts fat on the fact that growth and financial development play a much sensitive role in reducing poverty. This is in line with the pioneering work of Nurske (1953) that outlined 'Vicious Circle of Poverty,' which signifies the poverty itself is a cause of poverty and supports that economic growth increases inequality. World Bank (2019) estimates that 21.9 percent of India's population is 273.1 million below the poverty line in 2011. Acute poverty based on the International poverty line US$1.90 provides that 13.4 percent of India's population is below the poverty line in 2015. It further estimated that out of five people, one person is poor in India. The report further stated that 07 low-income states in India have 62 percent of India's poor population. The axiom map of poverty also depicts that 80 percent of the poor's live in rural areas. The poverty rate in rural areas is 25 percent compared to the 14 percent poverty rate in urban India.

Moreover, 27 percent of the poverty-ridden population falls in extremely rural areas. This also signifies that growth and financial development favor rich people and that too in urban areas. World Bank (1995), Ravallion & Datt (2002), Dollar & Kraay (2002) observed that financial development reduces poverty by trickle-down approach through economic growth. Pradhan (2010) observed that causality runs from financial development to poverty reduction, and economic growth also causes financial development. Uddin et al. (2012) by applying the ARDL bounds test approach and VECM based Granger causality test for the period 1976-2010, observed that there exists a co-integration relationship between these variables. The results show that financial development resulted in poverty reduction. Azra et al. (2012), in a study by applying the ARDL co-integration test and Error Correction Method (ECM), observed that financial development reduces poverty. Uddin et al. (2014) observed that there exists a long-run co-integration relationship between financial development, economic growth, and poverty reduction and observed

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that financial development reduces poverty, but its effect is not linear. Khan et al. (2012), Collins et al. (2009), Imai & Azam (2012), Berhane & Gardebroek (2011) have observed that an increase in income or consumption has a significant impact on poverty reduction. Jalilian & Kirkpatrick (2005), Jeanneney & Kpodar (2011), and Sehrawat & Giri (2018) observed that financial development reduces poverty. Rehman & Shahbaz (2014), in his empirical study on financial deepening and poverty reduction in a multivariate causality analysis observed that financial development has a positive impact on poverty reduction.

In this mapping, the present study tries to determine the relationship between financial development, economic growth, and poverty reduction in India by applying the long run and short-run co-integration relation in a multivariate framework. The study seeks to answer whether financial development and economic growth resulted in poverty reduction or not and the extent of the relationship with it. For this purpose, the paper has been divided into four sections. The first section presents the introduction and the second section outlines the research methodology. The third section presents empirical results, followed by a conclusion and suitable suggestions in the fourth section.

Methods

The study has applied the ARDL and ECM based multivariate co-integration model analysis techniques to examine the long-run and the short-run relationship between economic growth, financial development, and poverty reduction in India during the period 1960 to 2016. The study is based on the hypothesis that poverty reduction in the country is being influenced by financial development and economic growth. The possible relationship is that financial development will push economic growth, and together, both of them will act positively to reduce the level of poverty in the country. In this study, household final consumption expenditure, which is derived from household private final consumption expenditure, is taken as a proxy for the level of poverty and broad money as a percentage of GDP is taken as a measure of financial development, and economic growth measured as a GDP per capita has been considered (McKinnon, 1973; Shaw, 1973; King & Levine, 1993). The relationship between the variables in the model can be expressed as:

$$Po_t = f(FI_t, Y_t)$$

Where (Po_t) represents the level of poverty, (Fi) represents financial development, and (Y) represents the GDP per capita in the country. The above relationship can be algebraically expressed in an equation form as follows:

$$Pot = \alpha_0 + \alpha_1 FI_t + {}_2Y_t + \mu_t$$

The study has applied log-linear model analysis techniques to get more accurate results. The above equation (i) can be written in a logarithmic form as follows:

$$lPot = \alpha_0 + \alpha_1 lFI_t + {}_2lYt + \mu_t$$

The coefficient α_0, α_1, *and* α_2 represent their respective elasticity in the model. The term μ_t is the disturbance term.

This part describes the application of ARDL techniques developed by Pesaran et al. (2001) to find the signs of the long-run relationship between financial development, economic growth, and poverty reduction in India. If the variables are co-integrated, then there will be at least one linear combination of the model variables. The study has applied a unit root test, namely Augmented Dickey-Fuller (1981) and Phillips & Perron (1988), to test the data's time series natures. The study has applied the general to a specific method to test the null hypothesis that there is a unit root ($\gamma=0$) against the alternative hypothesis that the series is stationary ($\gamma\neq0$). In the presence of the non-stationary nature of the data, the study applied ARDL model test techniques to examine the long-run relationship among the selected variables in the model. The numbers of lags in the model are selected based on Schwartz Bayesian Criteria (SBC) at their first difference. The ARDL specification of the equation (ii) is based on the Unrestricted Error Correction Model (UECM) model techniques, and the ordinary least squares (OLS) method can be stated as follows:

$$\Delta lPo_t = \delta_0 + \sum_{i=1}^{n-1} \delta_{1i} \Delta lPo_{t-i} + \sum_{i=0}^{n-1} \delta_{2i} \Delta lFI_{t-i} + \sum_{i=0}^{n-1} \alpha_{3i} \Delta l Y_{t-i} + \theta_1 lPo_{t-1} + \theta_2 lFI_{t-1} + \theta_3 lY_{t-1} + \varepsilon_t$$

Where Δ represents the first difference and ε_t is a disturbance term in the model. The above equation indicates that its past values influence the level of poverty. The null hypothesis is that there is no co-integration vector in the model that is H_0: $¥_1=0$, $¥_2=0$, $¥_3=0$ whereas, the alternative hypothesis that a long-run relationship exists H_1: $¥_1\neq0$, $¥_2\neq0$, $¥_3\neq0$. The acceptance or rejection of the null hypothesis depends upon the value of the F-test statistics. If the test values are more significant than the upper limit of the critical values, then we reject the null hypothesis of no co-integrating vectors in the model. However, if the F-tests statistics' value is less than the lower limit of the bound values, then we accept the null hypothesis of no co-integrating vectors in the model.

Result and Discussion

The study applied the Augmented Dicky-Fuller (1981) test and Phillips & Perron (1988) test to examine the unit root test, and the results are presented in Table 1. The results reveal that dependent variables are integrated of order I (1), while the exogenous variables are a mixture of orders I (0) and I (1).

Table 1. Unit Root Test

Variables	ADF					Phillips-Perron				
	Level	First difference	Significance Level			Level	First difference	Significance Level		
			1%	5%	10%			1%	5%	10%
lPO	0.89	-8.58	-4.13	-3.49	-3.18	1.19	-8.55	-4.13	-3.49	-3.18
lFI	-2.56	-5.14	-4.13	-3.49	-3.18	-2.63	-5.17	-4.13	-3.49	-3.18
lY	-0.09	-7.19	-4.15	-3.50	-3.18	0.78	-10.85	-4.13	-3.49	-3.18

Notes: The unit root test is conducted using the ADF test (Mckinnon, 1996) and Phillips and Perron.

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The application of the ARDL test is based on Pesaran et al. (2001) based on SBC lag criteria, and the result is presented in Table 2. The ARDL test establishes the existence of a long-run relationship between the variables in the model. The computed F- test statistics are greater than the upper bound critical values based on Pesaran et al. (2001) at the given level of significance.

Table 2. Bounds Test Results of the Long-run Relationship

F-Statistics	5.10	
Significance Level	**Lower Bounds**	**Upper Bounds**
1%	2.97	3.74
5%	3.38	4.23
10%	4.30	5.23

Note: Based on Pesaran et al (2001)

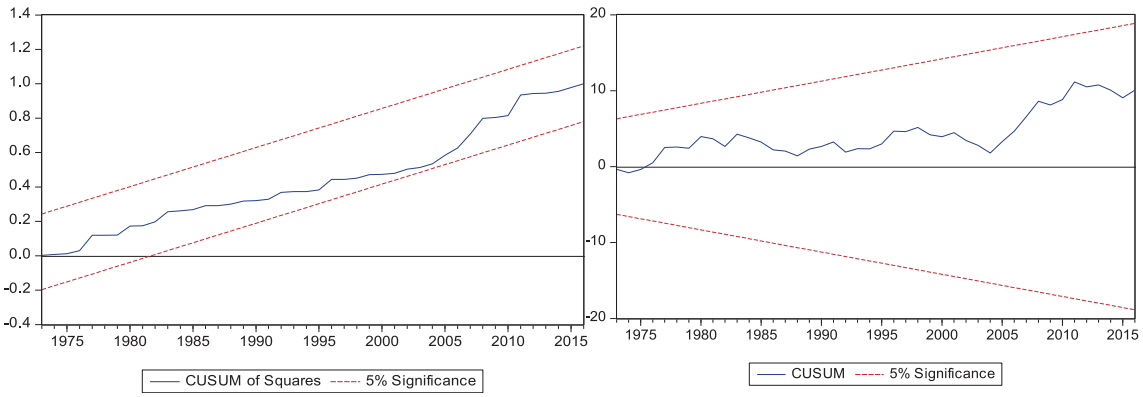
Table 3 presents the estimated long-run coefficients of the selected model. The estimated long-run coefficients show the negative and significant relationship between financial development and poverty reduction. The estimated coefficient of economic growth also depicts that it has no positive impact on poverty reduction in the country in the long run. This exerts the view that growth is tilted towards the affluent section of society. The negative relationship between financial development and poverty reduction in the country shows that a larger part of financial development is not effective in poverty reduction in the country. This relationship also holds a lack of equitable growth or growth that is effective as a trickledown effect. The diagnostic tests reported at the bottom panel of Table-3 indicate that the model satisfies the statistical properties. The adjusted R-square indicates that the model's independent variables explain 81 percent of the variation in the dependent variable. Similarly, the CUSUM and CUSUM square test outcomes also lie within the critical values as shows in Figure 1.

Table 3. The Estimated Long-run Coefficients for the Selected ARDL Dependent Variable (LPO)

Variables	Coefficients	t-statistics
Constant	-0.525	-3.812
Trend	-0.003	-2.948
lFI	-0.526	-2.0352
lY	-1.583	-2.779
Diagnostics Test		
R-square	0.83	
Adjusted R-square	0.81	
Durbin-Watson stat	2.03	
Jarque-Bera Normality test	0.957(0.004)	
Breusch-Godfrey Serial Correlation test	0.004(0.996)	
ARCH Test	1.386(0.229)	
Ramsay Reset Test	0.726(0.399)	

Note: Calculations based on the outcome of the application of ARDL

Figure 1. The Cusum and Cusum Square Test



Source: Figure represents the CUSUM and CUSUM square test based on the outcome of the Long-run estimated coefficients of the ARDL model.

The results of the ECM-based application are presented in Table 4. The results indicate that the ECM is negative and significant at a 5 percent significance level. Table 4 depicts that the coefficients of the ECM as negative and significant. The estimated coefficients indicate a positive and significant impact of financial development and economic growth on poverty reduction. Similarly, financial development and economic growth with a lag by two periods also depict the positive and significant impact on poverty reduction.

Table 4. Results of the ECM for the Selected ARDL model
Dependent Variable: (IPO)

Variables	Coefficients	t-statistics
Intercept	0.000	0.187
@trend	0.003	-2.640
ΔIFI	0.035	0.646
ΔIFI(-2)	0.101	1.983
ΔIY	0.670	9.412
ΔIY(-1)	-0.083	-0.752
ΔIY(-2)	0.169	1.946
ECM(-1)	-0.081	-2.79
Diagnostics Test		
R-square	0.848	
Adjusted R-square	0.816	
Durbin-Watson test	2.059	
Jarque-Bera Normality Test	104.06 (0.929)	
Breusch-Godfrey Serial Correlation Test	0.571(0.569)	
ARCH Test	0.723(0.685)	
Ramsey RESET test	0.037(0.850)	

Note: Outcomes are based on the application of ECM for the selected ARDL model

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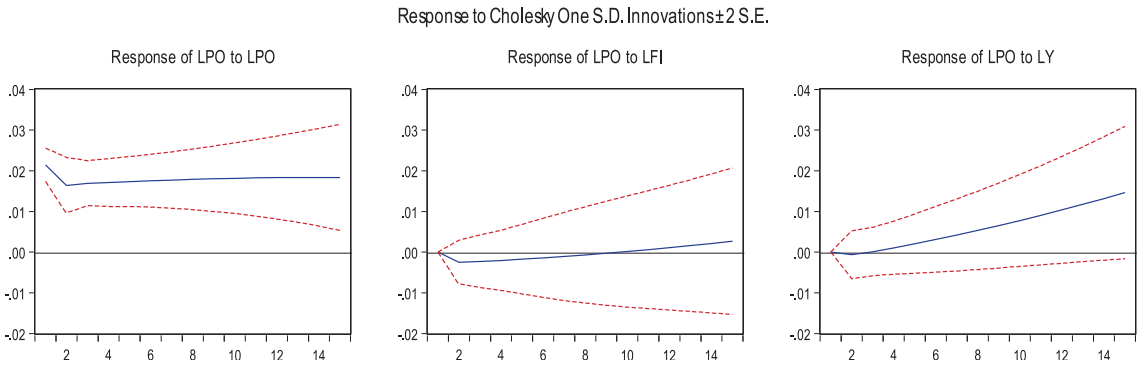
The outcomes depict that financial development and economic growth is instrumental in reducing poverty in the country in the short-run. The short-run relationship between financial developments, economic growth and poverty reduction is also consistent with the findings of Donou-Adonsou & Sylwester (2016), and Sehrawat & Giri (2016). The outcome is also consistent with the findings of Odhiambo (2010) and Rehman & Shahbaz (2014). Thus, outcomes also reveal the long-run nature of India's poverty and require designing and formulating specific policies with structural changes in the socio-economic spheres, which will help reduce poverty in the country from the long-term perspective.

Figure 2. Impulse Response Functions with One-Standard-deviation Shocks



The study also applied the Impulse Response Functions (IRF) to examine the IRF change in poverty reduction to a one-standard-deviation shock to the explanatory variables up to 15 periods. The outcome of the IRF is presented in Figure 2 and Table 5. The response of poverty reduction to one-standard deviation a shock to poverty is positive and exerts that poverty reduction will favorably respond to a further reduction in poverty in the period under consideration. This is consistent with the earlier findings that poverty is itself a cause of poverty in the country. The response of poverty reduction to one-standard deviation shocks in financial development indicates a reduction in poverty over the period under consideration. The response of poverty reduction to one-standard deviation shocks in economic growth depicts that poverty reduction will respond negatively up to the period under consideration.

Table 5. Results of Impulse Response Functions

Shocks to	Response of	Number of Time Periods	Effect
IPO	IPO	15	Positive and remains the same over the time
IFI			Negative and increases over time
IY			Increases over time

Note: calculated based on the outcome of the application of IRF

Conclusions

The study applied the ARDL and ECM based multivariate co-integration model techniques to examine the long run and the short-run relationship between financial development, economic growth, and poverty reduction in India during the period 1960 to 2016. The results depict that there exists a long-run co-integration relationship among the variables in the model. The estimated long-run coefficients show that neither financial development nor economic growth has a positive and significant impact on poverty reduction. However, in the short-run, both financial development and economic growth show a positive and significant impact on poverty reduction. The outcome reveals the long term nature of poverty that needs a change in the economic structure and way to finance the economic development for having a meaningful impact on poverty reduction in the country.

This also calls for required changes in the instruments of poverty reduction in the long run. This exerts the view that growth with inequality rises or growth is skewed towards rich people. The IRF response application indicates that poverty reduction will help further poverty reduction, and changes in the way of financing economic development will be favorable in reducing further poverty in the country. The study's outcome calls for enhancing the role of poor people in development by effective implementation of the financial inclusion programs. In such a reference, the role of micro-financial institutions is essential. Similarly, the expansion of non-farm activities by enlarging multiple cropping patterns, irrigation facilities, cheap and availability of seeds and fertilizers, and financing of micro and small scale units, and full skill employment and social development will be beneficial to poverty reduction in the country.

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Deciphering African Financial Development Interaction With Institutional Quality and Economic Growth Nexus

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Abstract

The paper scrutinized the correlation between financial development interaction with institutional quality and economic growth in Africa. The study adopted 30 different interactions. The study used the Augmented mean group estimation technique to estimate the model. Gross domestic savings/GDP and broad money/GDP positively influenced growth with the majority of interactions with institutional quality indicators. Credit to Private Sector/GDP interaction with Voice & Accountability; and Political Stability has a higher impact on growth than any interaction variable. However, government effectiveness, regulatory quality, and corruption control are weak in Africa; even if interacted with financial development indicators, it mostly reduces economic growth. This study recommends that governments in Africa strengthen financial development indicators; Bank Deposit/GDP, Gross Domestic Savings/GDP and Credit to private sector/GDP, and institutional quality indicator political stability & absence of violence since their interaction has proven to aid rapid economic growth.

Keywords:
financial development, institutional quality, economic growth, interactions

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Introduction

A robust economy and progressively increasing economic growth is the ultimate objective of every county. Every government seeks to achieve this objective by consciously and strategically focusing on the factors that enhance rapid economic growth. Studies have shown that financial development is one factor that boosts economic growth (Asteriou & Spanos, 2019; Effiong, 2015; Ibrahim & Alagidede, 2018; Skare et al., 2019; Sobiech, 2019; Yang, 2018). Also, other research points out that reliable systems or institutional quality contribute significantly to economic growth (Asghar et al., 2015; Effiong, 2015; Elyas et al., 2019; Erum & Hussain, 2019; Iheonu et al., 2017; Kebede & Takyi, 2017).

The theoretical argument in associating financial development to growth, it has come to light that a robust financial system performs numerous vital functions to help the proficiency of intermediation by managing transactions, information, and monitoring costs (Khan, 2008; Nawaz et al., 2014). Previous studies on finance-growth nexus highlight that economies with secure developed financial systems enjoy rapid economic growth. Briefly, countries should adopt the right macroeconomic policies, admonish healthy competition in the financial sector; this will translate into significant economic growth (Asteriou & Spanos, 2019; Sobiech, 2019).

Institutional quality is stated clearly by the World Bank as "the manner in which power is exercised in the management of a country's economic and social resources for development." IQ is clustered into six indicators; Rule of Law, Control of Corruption, Regulatory Quality Government Effectiveness, Voice & Accountability, and Political Stability & Absence of Violence/Terrorism (Kaufmann et al., 2011). The institutional framework of a country consists of formal and informal rules which make the "rules of the game" and that guide interaction in economic, social, and political spheres. Robust institutions create a conducive business structure, which decreases the cost of transactions and enhances efficient production. This helps to develop the private sector, build up human and physical capital, and promote economic growth (Effiong, 2015). Some economies continuously undergo political reforms and institutional improvements in order to improve their ability to transform their resources into a substantial economic benefit in the long run (Elyas et al., 2019).

A study conducted on the effects of FD and IQ on economic growth for the Organisation for Economic Co-operation Development (OECD) countries in 2002-2014, using Generalized Moment Method (GMM) estimator. It was revealed that FD and IQ have a significant and positive effect on growth in some economies. The interactive effect showed that FD might result in economic growth for developed economies due to the strong institutions they have (Kacho & Dahmardeh, 2017). Also, a study by Effiong (2015) concentrated on the effect of FD and IQ on growth with data for 21 south Sahara economies in 1960-2010. It was revealed that IQ is statistically significant and has a positive effect on economic growth, FD however, does not impact economic growth. He tested for the interaction effect impact on economic growth and concluded that it was positive but insignificant this implies the interaction would not help the link between the two factors. The study, however, used one FD indicator and two IQ indicators.

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Hasan et al. (2009) examined the impact of financial depth and IQ on the economic growth of provinces in China for 1986-2002. They stated that property rights awareness, financial market development, political pluralism, and regulatory environment are correlated to rapid growth. Demetriades & Law (2006) scrutinised the significance of FD and institutional issues on economic growth with panel data of 72 economies for 1978-2000. They stated that FD and economic growth would be more effective once the financial system in the institutional framework is implemented efficiently. Balach & Law (2015) studied the correlation between FD, human capital, quality of institutions, and economic performance in South Asian countries for 1984-2008. They concluded that IQ positively impacts economic performance when the financial sector is associated with a stable institutional framework which has suitable human capital.

Law & Azman-Saini (2012) used private credit and stock market capitalization as a representation for financial development to extend the literature on finance-institution nexus by scrutinising the linear and nonlinear IQ and FD liaison. They applied dynamic GMM estimators to 63 developing and developed economies for 1996-2004. It was reported that while IQ appears significant for the banking sector, FD has no impact on the stock market. Six Arab Gulf Countries were studied for the period 1995 to 2012. The results stated that the quality institutions are the transmission trajectory of the financial sector into the desired growth. Therefore, the financial sector cannot kindle economic growth without a strong institutional framework. The framework is, however, based on a better socio-economic environment, better bureaucracy, strong legal foundation, and corruption eradication (Yahyaoui et al., 2019). Generally, FD indicators can be linked with the stock market, banking sector, or trade openness. If FD interacts with IQ, the impact turns out to be substantially significant subject to the country. That is to say, the level of the interaction's effect varies between countries (Hamzah et al., 2019).

Employing panel regression and GMM, Girma & Shortland (2008) studied the impact of democracy on FD, they specified that political stability and the level of democracy are critical to the rate of FD. They opined that the banking sector gains from stable democracy and stock market capitalization increase rapidly from democracy. Huang (2010) stated a positive impact of IQ on FD in the short run, this is more prominent in lower-income countries, French legal-origin economies, and ethnically divided countries. Law & Azman-Saini (2008) examined the effect of IQ on FD developing and developed countries. It came to light that the efficiency of IQ on FD is non-monotonic and differs across countries, which is dependent mainly on the economic development level. A study on 189 countries using dynamic models OLS, fixed effect, random effect, and GMM estimators, shows that IQ is significant to financial development; precisely, regulatory quality, control of corruption, and political stability, positively affect FD. However, the rule of law negatively affects FD, revealing that in most countries, the rule of law is weak. Interestingly, control of corruption positively affects FD emerging economies that indicates that corruption has reduced (Khan et al., 2020).

Furthermore, Rani & Kumar (2019) researched on economic growth, gross capital formation, and trade openness by using autoregressive distributed lag (ARDL) approach,

they opined that there is a long-run causal linkage between the variables. Raza et al. (2019) scrutinised the correlation between foreign direct investment (FDI), good governance and growth, and established a positive connection among the variables in OECD economies. Besides, Bhasin & Garg (2020) studied the influence of the institutional environment on FDI inflow in rising countries, they stated that there is a positive effect of the institutional environment on FDI inflow. Nguyen (2019) stated that Institutional quality hinders the positive effect of FDI on growth. However, growth can reduce the impact of trade openness in areas where FDIs are used to increase the spill-over effect. The impact of inflation on growth is higher when the inflation rate is minimal (Thanh, 2015). Besides, inflation-growth nexus may be determined by other macroeconomic pointers like; financial development and trade openness (Eggoh & Khan, 2014). Moreover, Raghutla et al. (2018) stated that there is a substantial link between FD, trade openness, and growth. They further opined that trade openness does have a positive effect on growth.

The seemly reoccurring and cyclical financial crises have prompted economists, financial analysts, financial governing bodies, and the international community as a whole to seek trustworthy and reliable measures to this turmoil (Law & Azman-Saini, 2012). In order to avoid the shocks from the financial crisis from collapsing economies, there is the need to implement policies and systems that will serve as shock absorbers for the economies. These policies and systems can be enforced through laws, rules, and regulations. A combination of the institutions (policies and systems) and financial development will certainly catalyse economic growth. Theoretically, a consensus has been reached on the benefits that quality institutions have of financial development and economic growth (Asteriou & Spanos, 2019; Law & Azman-Saini, 2012; Salman et al., 2019).

Nonetheless, there is a pressing question in the literature that needs to be addressed; what is the right combination of financial development indicator and institutional quality indicator that will ensure rapid economic growth? Is there any study on Africa as to how best to combine these two indicators to Africa's benefit? Will strong institutions and a solid financial system ever promote economic growth in Africa? This paper seeks to render the answer to these lingering questions. There is therefore a research gap on the right interaction of financial development and institutional quality indicators, most researchers adopt two or three Institutional quality indicators and financial development indicators in their study making it selective or bias. This study expands existing literature in an unprecedented manner, and the paper employs thirty different interaction variables in its analysis. A combination of six institutional quality indicators and five financial development indicators. The study also uses robust means of data analysis thus; using second generation methodology, the Augmented Mean Group estimation technique. To ensure that policy makers can make good use of the study, the paper considers the causal direction of each of the interaction variables on growth. Unlike abound literature, the paper uses Africa as a whole, not just sub-Sahara. The paper carefully uses a rigorous and robust methodology in the data analysis to avoid any biasness.

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Methods

This paper used six Institutional Quality (IQ) indicators, from World Governance Indicators (WGI) compiled by Kaufmann et al. (2011). WGI has been used in different studies as a proxy for institutional quality (Dwumfour & Ntow-Gyamfi, 2018; Elyas et al., 2019; Kebede & Takyi, 2017). The paper adopted five financial development (FD) indicators from the Global Financial Development Indicators (GFDI), it is a proxy for the financial sector in an economy (Eren et al., 2019). The paper also used the natural logarithm of Gross Domestic Product per capita (lnGDP) from WDI to represent economic growth (Eren et al., 2019; Hao et al., 2018; Topcu et al., 2020). The control variables are from WDI; thus, foreign direct investment, gross fixed capital formation, trade openness, government expenditure, and inflation. The study is from 1997 to 2017, and 39 economies in Africa, the countries with available data were used (Elyas et al., 2019).

The technique for the study is in this procedure; correlation analysis test, cross-sectional dependency test, panel unit root test, estimation of the model, and Causality test. The correlation analysis is to determine the statistical sign for a linear relationship within the variables of the study. To verify for a relationship that is amid the variables, the paper will use the formula:

$$r_{xy} = \frac{cov(x, y)}{\sqrt{var(x)} \, . \, \sqrt{var(y)}}$$

Cov (X, Y) indicates covariance between Y and X. in addition, Var (X) and Var (Y) are corresponding coefficients of (X) and (Y). The correlation coefficient is usually between 0 and 1. If the value is closer to 1, then the variables are said to be highly correlated; conversely, if it is closer to 0, then they are weakly correlated (Salman et al., 2019). To detect any possible multicollinearity among the variables, the paper adopted the pairwise correlation analysis.

One critical procedure in panel data study is to check for cross-sectional dependence (CD). This is to check for how variables have an effect on other variables in the panel study. There is the possibility of a spill-over effect in a panel study with a particular trend. That is to say, an incident or occurrence in one cross-section can have an effect on another (Salman et al., 2019). In the case of countries, an explanation to this may be the growing interaction and integration among the economies in question (De Hoyos & Sarafidis, 2006). Testing for CD helps to determine the next test to conduct to avoid biasness in the studies, it also helps to decide on the estimation technique (Canh et al., 2019; Fromentin, 2017; Paramati & Roca, 2019). There are mainly two different CD tests; the CD test suggested by Breusch & Pagan (1980) and Pesaran (2004).

$$LM = \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} T_{ij} \, \hat{p}_{ij}^2 \rightarrow x^2 \frac{N(N-1)}{2}$$

For this paper, N=39, T=21. Besides, $\hat{p}_{ij}^2$ is the error's factor, the null hypothesis as x^2 Moreover, N (N-1)/2 is the degrees of freedom. Breusch-Pagan LM test focuses on

the average of the squared pairwise correlation limits of the residuals, and it is mostly applied when N is stationary and T_{ij} is infinity (Breusch & Pagan, 1980).

$$CD = \sqrt{\frac{2}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N} T_{ij}\hat{p}_{ij}{}^{2} \rightarrow N(0,1)\right)$$

In this equation, $\hat{p}_{ij}$ represents the value to be used in the model. The cross-sectional distributed as N (0,1), where, T_{ij} ∞, and N ∞. The letters, N and T represent cross-section and time, respectively. With the Pesaran CD test, the null hypothesis is written as H0: $\hat{p}_{ij}$ = 0 for i ≠ j and the alternative Ha: $\hat{p}_{ij}$ ≠ 0 for i ≠ j.

There are generally two forms of panel unit root tests; first and second-generation tests. However, there is a third generation test developed by Bai & Carrion-i-silvestre (2009), this test is gradually gaining grounds and was recently used by Beyaert et al. (2019) in their studies for European countries. Our CD test showed that there is CD among the variables; therefore, the second generation panel unit root test was used specifically, Cross-sectional Augmented DF (CADF) panel unit root test. CADF, as developed by Im et al. (2003) states that the test is based on regular unit root factors in a regression. That is to say, DF (or ADF) regression is amplified with the cross-section averages of lagged levels and first-differences of different series.

$$\Delta y_{it} = \alpha_i + \beta_i y_{i,t-1} + \sum_{j=1}^{pi} \rho_{ij}\, \Delta y_{i,t-j} + \varepsilon_{it}$$

$$\Delta z_{it} = \alpha_i + b_i z_{i,t-1} + d_i \Delta \bar{z}_t + e_{it}$$

The growth model is also known as the AK model. Lucas (1988) has gone through several 'interpretations' and 'upgrade' or development. The model is stated initially as:

$$y = AK^{\alpha}(\ell h)^{1-\alpha}$$

The growth model can be expressed in economic growth terms; this is when other macroeconomic variables have been included (Yang, 2018). In the new development, the growth model becomes;

$$G_{i,t} = y_{i,t} = \alpha_i + \beta_i F_{i,t} + \gamma_i C_{i,t} + \mu_i + \varepsilon_{i,t}$$

For the moel, $G_{i,t}$ and connotes growth or real GDP per capita, $F_{i,t}$ signifies financial development, represents the conditioning variables, $\varepsilon_{i,t,}$ and μ_i are the stochastic or error terms. The subscript i and t are cross-sectional and time respectively. In view of this, this paper further developed the model to fit the studies as;

$$y_{i,t} = \alpha_i + \beta_i (FD * IQ)_{i,t} + \gamma_i C_{i,t} + \mu_i + \varepsilon_{i,t}$$

Where *FD * IQ* will be the interaction of financial development with institutional quality. Further expansion of the model, that consider all the conditioning variables will become;

$$lnGDP_{it} = \alpha_{it} + \beta_1 (FD * IQ)_{it} + \beta_2 EXP_{it} + \beta_3 GCF_{it} + \beta_4 INF_{it} + \beta_5 TOP_{it} + \beta_6 FDI_{it} + \varepsilon_{it}$$

In explaining the model, $lnGDP_{it}$ denotes economic growth, $FD * IQ_{it}$ represents the interaction of financial development with institutional quality, EXP_{it} signifies government

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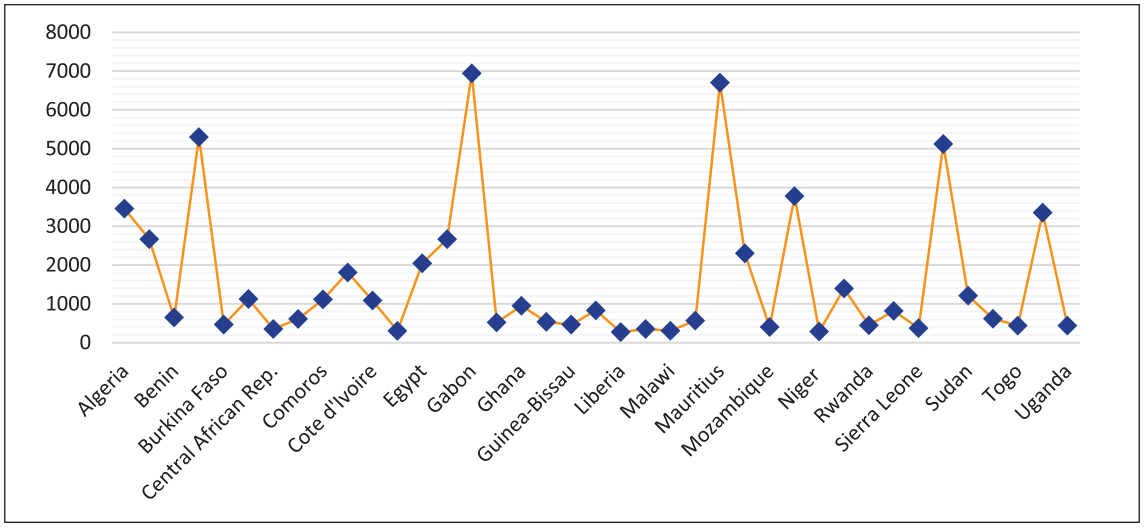
expenditure, then GCF_{it} denotes gross capital formation, also, INF_{it} represents inflation, besides, TOP_{it} characterizes trade openness finally, FDI_{it} denotes foreign direct investment.

The paper resulted in using; Augmented Mean Group (AMG) estimation technique by Eberhardt & Bond (2009). Adopting this estimation technique will eliminate the effect of any possible issue of cointegration (Paramati & Roca, 2019). Using the AMG estimation technique will show numerous relationships except for causality direction. The paper will adopt the panel causality test by Dumitrescu & Hurlin (2012). This is a further development from the initial Granger causality test. The causality direction is vital in making policies. Causality tests separate cross-section units, meaning, it makes coefficients to differ through the cross-section, the test also uses the average statistics of the countries. It precisely shows the causality route of the variables.

Result and Discussion

Figure 1 shows the graphical representation of the GDP per capita averages. Out of the 39 economies, 22 countries representing 56.4% of them have GDP per capita averages below $1,000. This revelation tells us that the countries for the study are mostly developing economies (Dwumfour & Ntow-Gyamfi, 2018). It is also observed that 13 economies from the study, which represents 33.34%, have GDP per capita range between $1,000 and $4,000. Besides, 4 out of the 39 economies obtained GDP per capita average above $4,000, and these are; South Africa $5,121, Botswana $5,300, Mauritius $6,704, and Gabon $6,939.

Figure 1. GDP per capita averages for the economies in Africa (1997-2017)



Source: Authors' computation

Table 1 shows the descriptive statistics of the variables for the study. The mean of all the interactive variables displays negative results. This gives us a general picture that there is either weak financial development or weak institutional quality within the economies under the study. This position has been echoed in a study by Dwumfour &

Ntow-gyam (2018). Besides, the observations of the variables are 702 for the FD and IQ interactions. The missing observations resulted from the computation of IQ indicators by Kaufmann et al. (2011). However, the missing years does not render the study invalid (Dwumfour & Ntow-Gyamfi, 2018; Elyas et al., 2019; Kebede & Takyi, 2017).

Table 1. Statistical Analysis

VARIABLE	OBS	MEAN	STD. DEV.	MIN	MAX
LNGDP	819	6.79847	1.058742	4.63128	9.27951
BMYGE	702	-14.6314	23.67484	-85.8955	112.1355
BMYRQ	702	-12.6244	23.59884	-101.754	116.6342
BMYRL	702	-13.7807	23.95802	-79.4009	105.1918
BMYCC	702	-15.2198	20.47426	-73.3093	58.25354
BMYVA	702	-13.7345	30.07841	-118.019	95.40863
BMYPS	702	-13.8064	32.75113	-141.09	113.5253
PCYGE	702	-4.48699	19.51109	-48.7911	107.7895
PCYRQ	702	-3.66816	18.61935	-38.3831	112.1139
PCYRL	702	-4.81023	16.17195	-44.2597	101.0018
PCYCC	702	-5.85355	14.12149	-41.7172	81.48423
PCYVA	702	-4.2629	24.93552	-97.8763	102.2857
PCYPS	702	-5.28094	21.02013	-93.1857	102.5716
DCYGE	702	-12.441	42.09022	-466.447	122.0316
DCYRQ	702	-11.2122	44.36071	-500.82	131.5564
DCYRL	702	-12.57	40.44397	-477.088	114.3432
DCYCC	702	-13.7999	33.19207	-421.087	101.2104
DCYVA	702	-10.4412	40.14476	-304.797	125.4348
DCYPS	702	-15.3346	47.18638	-455.182	124.9403
GSYGE	702	-6.60801	23.57016	-83.8158	204.6401
GSYRQ	702	-5.82483	23.86974	-103.132	248.9203
GSYRL	702	-7.04164	22.57728	-95.3367	208.5255
GSYCC	702	-7.67212	20.8169	-87.2778	176.3035
GSYVA	702	-8.09658	19.10052	-92.8527	173.0344
GSYPS	702	-5.74862	24.08301	-116.676	183.1498
BDYGE	702	-16.1089	69.65014	-927.688	100.9942
BDYRQ	702	-15.2684	76.08569	-975.291	105.046
BDYRL	702	-14.7151	63.2494	-702.52	91.19741
BDYCC	702	-14.686	49.41306	-637.643	50.48368
BDYVA	702	-12.0122	40.99206	-537.257	87.39079
BDYPS	702	-15.1689	76.27211	-950.144	99.86099

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VARIABLE	OBS	MEAN	STD. DEV.	MIN	MAX
GCF	810	20.48268	7.732852	-2.42436	75.19494
TOP	816	70.40043	32.86974	17.85861	311.3553
INF	812	9.951599	31.20869	-10.0088	513.9069
FDI	815	4.679286	11.61633	-6.05721	159.7189
EXP	808	13.78195	4.725183	2.05759	30.0692

Source: Authors' computation

The pairwise correlation analysis result shows that there is a positive correlation between economic growth and all the interaction of financial development with institutional quality indicators, with the exception of GSY with IQ indicators, which shows a negative correlation. Besides, all the correlation analysis shows a relatively weaker correlation among the variables, which means there is no possible autocorrelation. None of the thirty interaction (financial development and institutional quality) variables were correlated with each other because each interaction variable is used in a different model.

Table 2. Cross Sectional Dependency Test (CD)

Variable	CD-test	p-value	average joint T	mean ρ	mean abs(ρ)
LNGDP	104.566***	0.000	21	0.84	0.87
BMYGE	20.33***	0.000	18	0.18	0.36
BMYRQ	17.009***	0.000	18	0.15	0.36
BMYRL	10.243***	0.000	18	0.09	0.34
BMYCC	13.424***	0.000	18	0.12	0.31
BMYVA	2.561**	0.010	18	0.02	0.36
BMYPS	3.588***	0.000	18	0.03	0.35
PCYGE	35.056***	0.000	18	0.3	0.52
PCYRQ	30.419***	0.000	18	0.26	0.51
PCYRL	18.672***	0.000	18	0.16	0.43
PCYCC	23.66***	0.000	18	0.2	0.45
PCYVA	5.962***	0.000	18	0.05	0.42
PCYPS	10.652***	0.000	18	0.09	0.39
DCYGE	24.382***	0.000	18	0.21	0.54
DCYRQ	29.145***	0.000	18	0.25	0.53
DCYRL	13.371***	0.000	18	0.12	0.42
DCYCC	19.03***	0.000	18	0.16	0.43
DCYVA	4.325***	0.000	18	0.04	0.41
DCYPS	11.987***	0.000	18	0.1	0.4

Variable	CD-test	p-value	average joint T	mean ρ	mean abs(ρ)
GSYGE	11.83***	0.000	18	0.1	0.33
GSYRQ	7.607***	0.000	18	0.07	0.32
GSYRL	7.002***	0.000	18	0.06	0.31
GSYCC	4.84***	0.000	18	0.04	0.31
GSYVA	6.155***	0.000	18	0.05	0.31
GSYPS	6.794***	0.000	18	0.06	0.34
BDYGE	39.927***	0.000	18	0.35	0.62
BDYRQ	39.558***	0.000	18	0.34	0.57
BDYRL	21.417***	0.000	18	0.19	0.51
BDYCC	34.711***	0.000	18	0.3	0.53
BDYVA	7.516***	0.000	18	0.07	0.43
BDYPS	9.304***	0.000	18	0.08	0.4
GCF	14.611***	0.000	20.55	0.12	0.4
TOP	13.739***	0.000	20.85	0.11	0.39
INF	10.162***	0.000	20.65	0.08	0.23
FDI	11.116***	0.000	20.79	0.09	0.28
EXP	2.795***	0.005	20.44	0.02	0.35

Source: Authors' computation. Note: The superscripts ***, ** and * denote the statistical significance at 1%, 5% and 10% levels, respectively.

Table 2 shows there are a presence of cross-sectional dependency within the African countries under the study. There is a strong rejection of cross-sectional independence at 1% significance level for all the variables except BMYVA, which is at 5%. That is to say, an event in one country will have a spill over effect in another country. That is, the effect of an interaction of financial development with institutional quality, whether positive or negative will have an effect in another African country.

Table 3 displays the CADF panel unit root test for the study. At level, it was observed that economic growth was stationary at 1% significance level, while all the explanatory variables were stationary at 1% significance level except trade openness. For the interaction variables, at level, BMYGE, BMYPS, PCYRL, and PCYCC were stationary at 5% significance level, and GSYPS was stationary at 1% significance level. All the other interaction variables were not significant at any level. Nevertheless, at first difference, all the variables were stationary at 5% significance level.

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Table 3. Panel Unit Root Test (CADF)

	Level		1st Difference	
Variable	**Z[t-bar]**	**P-value**	**Z[t-bar]**	**P-value**
LNGDP	-6.527***	0.000	-9.605 ***	0.000
BMYGE	-1.744**	0.041	-8.895***	0.000
BMYRQ	2.140	0.984	-5.684***	0.000
BMYRL	-0.795	0.213	-8.357***	0.000
BMYCC	-0.562	0.287	-6.502***	0.000
BMYVA	1.230	0.891	-7.173***	0.000
BMYPS	-2.031**	0.021	-5.157***	0.000
PCYGE	-0.731	0.232	-2.329**	0.010
PCYRQ	2.050	0.980	-1.644**	0.030
PCYRL	-2.103**	0.018	-4.738***	0.000
PCYCC	-1.975**	0.024	-1.728**	0.042
PCYVA	1.833	0.967	-5.689***	0.000
PCYPS	-0.580	0.281	-4.056***	0.000
DCYGE	1.756	0.960	-5.463***	0.000
DCYRQ	1.895	0.971	-6.952***	0.000
DCYRL	0.238	0.594	-4.986***	0.000
DCYCC	2.130	0.983	-3.852***	0.000
DCYVA	3.050	0.999	-4.937***	0.000
DCYPS	-1.366*	0.086	-5.201***	0.000
GSYGE	0.938	0.826	-8.681***	0.000
GSYRQ	-1.229	0.110	-5.610***	0.000
GSYRL	1.190	0.883	-8.036***	0.000
GSYCC	2.427	0.992	-6.373***	0.000
GSYVA	-0.718	0.236	-9.436***	0.000
GSYPS	-2.714***	0.003	-7.526***	0.000
BDYGE	2.197	0.986	-3.955***	0.000
BDYRQ	3.947	1.000	-3.601***	0.000
BDYRL	2.779	0.997	-3.709***	0.000
BDYCC	2.745	0.997	-2.669***	0.004
BDYVA	3.503	1.000	-3.274***	0.001
BDYPS	3.665	1.000	-2.726***	0.003
GCF	-3.590 ***	0.005	-7.724 ***	0.000
TOP	1.533	0.937	-5.812***	0.000
INF	-7.884***	0.000	-15.736***	0.000
FDI	-2.394***	0.008	-11.065 ***	0.000
EXP	-3.065***	0.001	-10.612***	0.000

Source: Authors" computation. Note: The superscripts ***, ** and * denote the statistical significance at 1%, 5% and 10% levels, respectively.

Tables 4 and Table 5 show the results of the model estimation using AMG, it displays the impact of the interaction variables on economic growth. The result shows that broad money/GDP and domestic credit/GDP if interacted with the IQ indicators, it is mostly statistically insignificant to economic growth. This result opposes the study by Ntow-Gyamfi et al. (2019) who obtained statistically significant relationship. Also, Gross Domestic Savings/GDP's interaction with IQ shows that, they are all statistically insignificant to inclusive growth. However, Credit to private sector/GDP interaction with IQ, it is mostly statistically significant to economic growth. This result is in line with study by Ntow-Gyamfi et al. (2019) who also obtained statistically significant relationship. For Bank Deposit/GDP interaction with IQ, there is a split between statistically significant and insignificant this result is in support of Hamzah et al. (2019) who obtain a similar mixed results of significance and insignificance impact on economic growth. Besides, BMYRQ, BMYCC, PCYGE, PCYRL, PCYRQ, and PCYCC are statistically significant to economic growth, yet the effect is negative. For instance, a percentage change in the interaction of control of corruption with broad money/GDP and credit to private sector/GDP will cause economic growth to decrease by 0.014% and 0.023%. By this, the paper can confidently say control of corruption is very weak in Africa, to the extent that it causes the economies to decline in growth even if interacted with financial development indicators the findings are in line with Song et al. (2020) and Hamzah et al. (2019) . Similarly, a percentage increase in the interaction of regulatory quality with broad money/GDP and credit to private sector/GDP will cause growth to decrease by 0.012% and 0.029%, respectively. This shows that regulatory quality is relatively weak in Africa, making it affect the economy negatively even if it interacts with financial development (Paramati & Roca, 2019).

Findings from the tables suggests that credit to private sector/GDP interaction with voice and accountability, has the highest impact on growth, besides, credit to private sector/GDP interaction with political stability & absence of violence, and the interaction term Bank deposit/GDP with political stability & absence of violence also contributed substantially to economic growth. This shows that, the political system in Africa over the past two decades has been stable and is contributing to economic growth. This findings is in line with Baklouti & Boujelbene (2020). Though BMYGE, BMYRL, BMYVA, BMYPS, PCYVA, and PCYPS are statistically insignificant to growth, there is a positive impact on growth. A percentage point increase in the interaction of broad money/GDP with government effectiveness and voice & accountability will cause an increase of 0.002% in economic growth.

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Table 4. Augmented Mean Group Estimation

	AMG LNGDP is the dependent variable											
Model	**BMYGE**	**BMYRQ**	**BMYRL**	**BMYCC**	**BMYVA**	**BMYPS**	**PCYGE**	**PCYRQ**	**PCYRL**	**PCYCC**	**PCYVA**	**PCYPS**
FD*IQ	0.002	-0.0127*	0.0005	-0.014*	0.002	0.001	-0.0306*	-0.029*	-0.022*	-0.023*	0.007	0.005
	[0.001]	[0.003]	[0.001]	[0.004]	[0.001]	[0.001]	[0.007]	[0.008]	[0.009]	[0.007]	[0.004]	[0.006]
FDI	-0.005	0.011	-0.003	0.016	-0.002	-0.002	0.016	0.017	0.015	0.016	-0.001	0.014
	[0 .003]	[0.014]	[0.003]	[0.015]	[0.003]	[0.003]	[0.012]	[0.010]	[0.013]	[0.012]	[0.003]	[0.010]
INF	-0.002	-0.0005	-0.003	-0.003	-0.002	-0.001	-0.001	0.001	-0.001	-0.001	-0.003	-0.0006
	[0 .001]	[0.004]	[0.001]	[0 .004]	[0.001]	[0 .002]	[0.005]	[0.004]	[0.004]	[0.004]	[0.001]	[0.003]
GCF	0.004	0.016*	0.003	0.0109	0.002	0.004	0.017*	0.015	0.011	0.012	0.003	0.016*
	[0.002]	[0.008]	[0.002]	[0 .008]	[0.003]	[0.002]	[0.007]	[0.009]	[0.008]	[0.008]	[0.003]	[0.008]
TOP	-0.003*	0.004	-0.003*	0.004	-0.003*	-0.004*	0.002	0.002	0.003	0.003	-0.003*	0.002
	[0.001]	[0.003]	[0.001]	[0 .003]	[0.001]	[0.001]	[0.002]	[0.003]	[0.003]	[0.003]	[0.001]	[0.002]
EXP	-0.016*	-0.003	-0.018*	-0.0203*	-0.015*	-0.013*	-0.016	-0.001	-0.009	-0.009	-0.018*	-0.014
	[0.005]	[0.011]	[0.005]	[0.009]	[0.005]	[0 .006]	[0.009]	[0.003]	[0.010]	[0.010]	[0.005]	[0.013]
Constant	6.785*	6.088*	6.854*	6.601*	6.844*	6.827*	6.421*	6.215*	6.406*	6.491*	6.835*	6.484*
	[0.212]	[0.296]	[0.000]	[0.378]	[0.237]	[0.246]	[0.289]	[0.209]	[0.296]	[0.359]	[0.232]	[0.340]
Wald chi2(6)	25.3	22.28	24.34	25.5	22.59	17.21	39.42	22.99	12.94	20.1	25.42	17.62
Prob > chi2	0.0003	0.0011	0.0005	0.0003	0.0009	0.0085	0.0000	0.0008	0.0441	0.0027	0.0003	0.0073

Note: The superscripts * denote the statistical significance at 5%. Asymptotic standard errors are in parentheses.

Table 5. Augmented Mean Group Estimation

	AMG LNGDP is the dependent variable																	
Model	**DCYGE**	**DCYRQ**	**DCYRL**	**DCYCC**	**DCYVA**	**DCYPS**	**GSYGE**	**GSYRQ**	**GSYRL**	**GSYCC**	**GSYVA**	**GSYPS**	**BDYGE**	**BDYRQ**	**BDYRL**	**BDYCC**	**BDYVA**	**BDYPS**
FD*IQ	-0.008*	-0.012*	-0.001	-0.006	0.002	0.001	0.001	-0.004	-0.006	0.001	0.001	0.001	-0.035*	-0.031*	0.002	-0.0005	-0.020*	0.004
	[0.003]	[0.004]	[0.005]	[0.004]	[0.001]	[0.001]	[0.001]	[0.003]	[0.008]	[0.002]	[0.002]	[0.002]	[0.006]	[0.006]	[0.002]	[0.003]	[0.008]	[0.002]
FDI	0.016	0.015	0.013	0.017	-0.003	-0.002	-0.003	-0.005	0.007	-0.003	-0.0007	-0.002	0.011	0.015	-0.002	-0.004	0.005	-0.003
	[0.013]	[0.010]	[0.014]	[0.013]	[0.003]	[0.002]	[0.003]	[0.004]	[0.012]	[0.003]	[0.004]	[0.002]	[0 .010]	[0.011]	[0.003]	[0.003]	[0.010]	[0.003]
INF	-0.004	-0.0007	-0.005	-0.003	-0.003*	-0.002	-0.003	-0.003	-0.004	-0.004*	-0.003	-0.003	-0.001	-0.005	-0.002	-0.003	0.0008	-0.002
	[0 .004]	[0.004]	[0.004]	[0 .004]	[0.001]	[0 .001]	[0.001]	[0.001]	[0.004]	[0.001]	[0.001]	[0.001]	[0 .004]	[0.004]	[0.001]	[0 .001]	[0.004]	[0 .001]
GCF	0.021*	0.017*	0.016*	0.016*	0.002	0.004	0.006*	0.007*	0.023*	0.006*	0.005	0.005	0.021*	0.021*	0.002	0.004	0.017*	0.004
	[0.007]	[0.007]	[0.007]	[0 .007]	[0.003]	[0.002]	[0.003]	[0.003]	[0.008]	[0.002]	[0.003]	[0.003]	[0.005]	[0.007]	[0.002]	[0 .003]	[0.007]	[0.002]
TOP	0.001	0.002	0.002	0.002	-0.003*	-0.003*	-0.004*	-0.004*	0.004	-0.004*	-0.004*	-0.004*	-0.0001	0.0009	-0.003*	-0.003*	0.004	-0.004*
	[0.003]	[0.002]	[0.002]	[0 .002]	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]	[0.002]	[0.001]	[0 .001]	[0.002]	[0.001]
EXP	-0.003	0.004	-0.005	-0.004	-0.018*	-0.015*	-0.019*	-0.018*	-0.026*	-0.022*	-0.017*	-0.014*	-0.012	0.003	-0.019*	-0.019*	-0.013	-0.013
	[0..007]	[0.007]	[0.009]	[0.008]	[0.006]	[0 .006]	[0.005]	[0.005]	[0.010]	[0.005]	[0.005]	[0.006]	[0..009]	[0.011]	[0.005]	[0.005]	[0.014]	[0 .006]
Constant	6.404*	6.198*	6.551*	6.494*	6.854*	6.834*	6.792*	6.736*	6.589*	6.85*	6.753*	6.766*	6.300*	6.133*	6.840*	6.810*	6.279*	6.819*
	[0..324]	[0.288]	[0.317]	[0.342]	[0.242]	[0.233]	[0.217]	[0.209]	[0.331]	[0.241]	[0.227]	[0.244]	[0..324]	[0.267]	[0.235]	[0.240]	[0.365]	[0.243]
Wald chi2(6)	17.46	21.46	9.84	10.82	27.38	19.41	27.78	22.93	26.56	31.12	22.49	18.04	65.04	34.06	26.29	26.43	20.07	23.81
Prob > chi2	0.0077	0.0015	0.1315	0.0940	0.0001	0.0035	0.0001	0.0008	0.0105	0.0000	22.4900	0.0061	0.0000	0.0000	0.0002	0.0002	0.0027	0.0006

Note: The superscripts * denote the statistical significance at 5%. Asymptotic standard errors are in parentheses.

Broad money/GDP if interacted with institutional quality indicators (government effectiveness and voice & accountability), it will enhance economic growth better the finding is in line with the findings of Maruta et al. (2020). Therefore, policymakers can channel more attention to government effectiveness and voice & accountability if broad money to GDP is being considered to boost economic growth. Besides, a percentage increase in the interaction of credit to private sector/GDP with voice& accountability and political stability & absence of violence will cause economic growth by 0.007% and 0.005%, respectively. This shows Credit to Private Sector/GDP interaction with Voice & Accountability, and Credit to Private Sector/GDP interaction with Political Stability & Absence of Violence has more impact on economic growth than the interaction of Credit to Private Sector/GDP with other institutional quality indicators. Consequently, in crafting policy for the economies in Africa, if credit to private sector/GDP is being considered to help boost economic growth, more emphasis should be put on Voice & Accountability and Political Stability & Absence of Violence because it has the potential to increase economic growth.

On the other hand, the interaction variables, credit to private sector/GDP with government effectiveness; and, bank deposit/GDP with government effectiveness, recorded the worse relationship with economic growth, they reduce economic growth substantially, this shows that, governments in Africa are not very effective that is why it as negative impact on economic growth, an improvement in government effectiveness will be beneficial to Africa, this findings is in line with Adzima & Baita (2019). Form table V it can be deduce that, DCYGE, DCYRQ, GSYRQ, GSYRL, BDYGE, BDYRQ, BDYCC, and BDYVA are statistically significant to economic growth but has a negative effect on with economic growth. A percentage increase in the interaction of government effectiveness with domestic credit/GDP and bank deposit/GDP will cause a decrease in economic growth by 0.008% and 0.035%. This tells us that government effectiveness in Africa is weak, so even sif it interacted with IQ it would defiantly have negative impact on growth. In the same light, an increase in the interaction of regulatory quality with domestic credit/GDP and bank deposit/GDP will cause economic growth to decrease by 0.012% and 0.031%. Thus, regulatory quality, coupled with domestic credit/GDP and bank deposit/GDP will cause economic growth really decline.

Finally, DCYCC, DCYRL, DCYVA, DCYPS, GSYGE, GSYCC, GSYVA, GSYPS, BDYRL, and BDYPS are statistically insignificant but have a positive impact on economic growth. A percentage increase in the interaction of domestic credit/GDP with voice and accountability and bank deposit/GDP with rule of law will cause an increase of 0.002% in economic growth. This tells us that, the interaction of domestic credit/GDP with voice & accountability and bank deposit/GDP interaction with rule of law will cause help the economies in Africa to grow a little, therefore if policies on economic growth are being formulated, then it will be prudent to consider framing policies around these indicators since they have the potential of causing economic growth. In a similar instance, a percentage increase in the interaction of bank deposit/GDP with political stability & absence of violence will cause economic growth by 0.004%. That means, the interaction

of bank deposit/GDP with political stability & absence of violence is likely to cause higher economic growth than the interaction of domestic credit/GDP with voice & accountability and bank deposit/GDP interaction with rule of law. For the other control variables, in tables IV and V; gross fixed capital formation generally impacts economic growth positively. In general, inflation negatively affects economic growth. Nevertheless, foreign direct investment, trade openness, and government expenditure vary from one model another, and each model has a different interaction variable.

Table 6. Pairwise Dumitrescu Hurlin Panel Causality Tests

Direction	Zbar-Stat.	Prob.	Direction	Zbar-Stat.	Prob.
LNGDP → BDYCC	5.11524***	3.00E-07	BDYCC → LNGDP	0.43805	0.6613
LNGDP → BDYRL	4.84539***	1.00E-06	BDYGE → LNGDP	0.90861	0.3636
LNGDP → BDYGE	6.15782***	7.00E-10	BDYPS → LNGDP	0.8173	0.4138
LNGDP → BDYPS	3.28621***	0.001	BDYRL → LNGDP	1.84152*	0.0655
LNGDP → BDYRQ	4.66086***	3.00E-06	BDYRQ → LNGDP	0.59424	0.5524
LNGDP → BDYVA	2.1245**	0.0336	BDYVA → LNGDP	0.82501	0.4094
LNGDP → BMYCC	3.97662***	7.00E-05	BMYCC → LNGDP	3.75546***	0.0002
LNGDP → BMYGE	6.66134***	3.00E-11	BMYGE → LNGDP	1.88212*	0.0598
LNGDP → BMYPS	3.4778***	0.0005	BMYPS → LNGDP	2.93006***	0.0034
LNGDP → BMYRL	3.96635***	7.00E-05	BMYRL → LNGDP	4.43571***	9.00E-06
LNGDP → BMYRQ	6.2897***	3.00E-10	BMYRQ → LNGDP	2.13334**	0.0329
LNGDP → BMYVA	4.76544***	2.00E-06	BMYVA → LNGDP	2.25722**	0.024
LNGDP → DCYCC	4.83104***	1.00E-06	DCYCC → LNGDP	1.27252	0.2032
LNGDP → DCYGE	7.1012***	1.00E-12	DCYGE → LNGDP	1.33186	0.1829
LNGDP → DCYPS	4.37568***	1.00E-05	DCYPS → LNGDP	1.74469*	0.081
LNGDP → DCYRL	4.40491***	1.00E-05	DCYRL → LNGDP	2.77605***	0.0055
LNGDP → DCYRQ	5.69867***	1.00E-08	DCYRQ → LNGDP	1.06524	0.2868
LNGDP → DCYVA	4.01906***	6.00E-05	DCYVA → LNGDP	1.19696	0.2313
LNGDP → GSYCC	4.75699***	2.00E-06	GSYCC → LNGDP	-1.0399	0.2984
LNGDP → GSYGE	8.22995***	2.00E-16	GSYGE → LNGDP	0.091	0.9275
LNGDP → GSYPS	9.53309***	0.0000	GSYPS → LNGDP	0.40618	0.6846
LNGDP → GSYRL	5.70364***	1.00E-08	GSYRL → LNGDP	1.10352	0.2698
LNGDP → GSYRQ	7.10013***	1.00E-12	GSYRQ → LNGDP	0.12981	0.8967
LNGDP → GSYVA	8.90117***	0.0000	GSYVA → LNGDP	1.30315	0.1925
LNGDP → PCYCC	6.45008***	1.00E-10	PCYCC → LNGDP	0.11191	0.9109
LNGDP → PCYGE	6.81236***	1.00E-11	PCYGE → LNGDP	2.52828**	0.0115
LNGDP → PCYPS	3.89501***	0.0001	PCYPS → LNGDP	-0.28335	0.7769
LNGDP → PCYRL	5.38969***	7.00E-08	PCYRL → LNGDP	2.29556**	0.0217
LNGDP → PCYRQ	3.68526***	0.0002	PCYRQ → LNGDP	1.8233*	0.0683
LNGDP → PCYVA	4.60556***	4.00E-06	PCYVA → LNGDP	-0.2299	0.8182

Source: Authors' computation: Note: The superscripts ***, ** and * denote the statistical significance at 1%, 5% and 10% levels, respectively.

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Looking at the Pairwise Dumitrescu Hurlin Panel Causality Tests as shown in Table 6, it can be deduce that there is causality running from economic growth to all the Financial Development and Institutional quality indicators at 1% significance, except BDYVA which is at 5%. On the other hand, there is causality to growth from BMYCC, BMYPS, BMYRL, BMYRQ, BMYVA, DCYRL, PCYGE, and PCYRL at 5%. That is to say that, there is dual causality between economic growth and BMYCC, BMYPS, BMYRL, BMYRQ, BMYVA, DCYRL, PCYGE, and PCYRL. Dual causality in this study tells us that the interaction variables will cause economic growth, and economic growth will cause the interaction variables also to grow.

Arguably, the interaction of broad money/GDP with IQ indicators (control of corruption, political stability & absence of violence, rule of law, regulatory quality and voice & accountability) presents dual causality making broad money/GDP a more reliable FD indicator to consider in implementing policies when IQ is being considered. However, the interaction of credit to private sector/GDP with IQ indicators (government effectiveness and rule of law) also needs to be considered since they also have dual causality, just like the interaction of domestic credit/GDP with rule of law. The paper can confidently attest that rule of law is very critical in economic growth since if it interacts with FD indicators (broad money/GDP, domestic credit/GDP, and credit to private sector/GDP) it causes dual causality with growth. Nonetheless, there is no causality from the remaining 22 interactions to economic growth. That is to say there is one-way causality from growth. This means economic growth win cause the 22 interaction variables to grow but they will not necessarily cause economic growth. Therefore, to have rapid economic growth, those 8 interaction variables must be concentrated on in decision making.

Conclusion

In a nutshell, this study considered the relationship of thirty different FD and IQ interactions on economic growth for 39 countries in Africa for the period 1997 to 2017, after going through the robust tests, the study used Augmented mean group estimation technique (AMG) to estimate the model. Our main findings of the study were; Gross Domestic Savings /GDP's interaction with IQ shows that, they are all statistically insignificant to inclusive growth. Broad money/GDP and Domestic Credit /GDP when interacted with the IQ indicators, it is mostly statistically insignificant to economic growth. The significance of Bank Deposit/GDP on growth, depends on the IQ indicator used. It was concluded that, credit to private sector/GDP interaction with voice and accountability, has the highest impact on growth. Financial development indicators; Credit to private sector/GDP and Bank deposit/GDP interactions with political stability & absence of violence contributed substantially to economic growth. On the other hand, financial development indicators, credit to private sector/GDP and, bank deposit/GDP interaction with government effectiveness, recorded the worse relationship with economic growth. For the causal direction, there is dual causality between economic growth and eight interaction variables, of which five are broad money/GDP interactions

with IQ indicators. That means that broad money/GDP interactions with IQ indicators influence economic growth and vice versa. All the other twenty-two interactions have one-way causality.

To expedite rapid economic growth in Africa, this study recommends that, governments in Africa should strengthen financial development indicators; Bank Deposit/ GDP, Gross Domestic Savings /GDP and Credit to private sector/GDP and institutional quality indicator political stability & absence of violence since their interaction has proven to aid rapid economic growth. However the other indicators seems to be promising and an improvement in them will be beneficial.

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Impact of Capital Adequacy on Banks' Performance: Considering the Basel International Regulatory Framework for Banks

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Abstract

This study examines the impact of banks' capital on the performance of banks. The studies adopted a fixed-effect model estimation. This research using time-series data covering the period 2008-2017 for Ghanaian listed universal banks. The result shows that the bank's capital and banks' net profit after tax has a positive and significant relationship with banks' total asset base as a performance indicator. Through correlational analysis, we further discovered a strong negative link between banks' outstanding loans (credit advancement) and banks' performance. This study's fundamental implications are to encourage the monitoring of banks' capital adequacy since it creates opportunities for banks to perform effectively.

Keywords:
capital adequacy, bank performance, Basel III, capital, equity

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Introduction

The term or phrase capital adequacy define as the adequacy of a bank's aggregate capital concerning the risks, which arise from its assets, off-balance-sheet transactions, dealing operations, and other risks with its business. Before the concept of capital adequacy becoming embodied in Basel 1, banks existed in an era characterized by individual and inconsistent ways of addressing capital adequacy. Dow (2017) revealed that banks understood the importance of setting aside capital in the early 1970s through to the early 1980s, which use to address the risks inherent in the banking business.

The G-10 countries adopted the International Convergence of Capital Measurement and Standards. These regulations set up by the Basel Committee on Banking Supervision dub Basel I. Basel I is critical on making available capital for credit risk because lending regard as an essential function of the bank. The bank's capital is set up at 8 % of risk-adjusted assets, of which 4% must be Tier 1 Capital. Basel 1 had some challenges; with the emergence of new financial instruments, sufficient risk management and mitigation techniques were not readily available, which led to banks' exposure to operational, market sovereign risk, and other risks. The final version of the International Convergence of Capital Measurements and Capital Standards draft by the Basel Committees is referred to as Basel II, which focuses on three pillars to solve Basel I's challenges.

Pillar 1 talks about minimum capital requirements, which enable banks to obtain capital levels aligned with their risks. Its core objective is to make sure that regulatory capital set up by the regulator matches up to economic capital as per the bank's internal business processes. Pillar 2 details supervisory framework issues. The supervisory review process defines an institution's capital to support all the business risks and encourage the development and use of better risk management techniques in monitoring and managing the risks. While pillar 3 captures market discipline, it explains the lowest disclosures by banks when in case of publication on their accounts to project absolute transparency and accountability from bank management.

The last as of the Basel framework is the Basel III, which is a global voluntary regulatory framework for bank capital adequacy ratios, stress tests, and market liquidity risks. In response to the financial regulatory deficiencies revealed in the 2007-08 Financial Crisis, the third part of the Basel Accord was formulated. Its purpose is to strengthen bank capital requirements by increasing bank liquidity and reducing bank leverage. Members approved Basel III of the Basel Committee on Banking Supervision in November 2010. However, the deployment was repeatedly extended to 2019 and then to 2022 (Ramirez, 2018).

The CAMELS rating system is a coin by Oyetan as a measure of a banks' financial condition. North American Commercial Banks was the first to adopt this system. CAMELS rating is an abbreviation that stands for: Capital Adequacy, Asset quality, Management quality, Earnings ability and Liquidity, and system, and sensibility (Nicolae, & Maria-Daciana, 2014).

A risk-based capital requirement seeks to match the bank's capital to its relevant risks expose by the bank. Having a risk-based capital regime ensures that financial

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institutions have sufficient capital on hand to withstand losses while maintaining a safe and efficient market. This requirement serves as a protection to financial institutions, investors, depositors, and the economy. According to Demirguc-Kunt et al. (2017), adequately capitalized banking institutions can venture into more significant business expansion. This condition will give move resources to develop the capacity to be more competitive effectively and efficiently in a democratic environment among high-class banks, thereby prompting them to be improving technologically and come up with innovative financial products ideas to remain competitive.

Al-Kattan (2015), in another context, claims that if sufficiently capitalized, banks will have the following advantage over less-financed or inadequately finance banks; be more competitive more products on offer both local and offshore' more comprehensive network cover, price products competitively, and finance a large number of diverse transactions across sectors. Besides, on asset management, capitalized banks will be likely to off their clients with more extended loan repayment periods and have more efficient systems than other banks with the help of new information technology systems. Adequate capitalization is using as a tool to reduce excessive risk-taking by shareholders. This condition will ensure the spread of risk between the owners and the depositors, henceforth limiting the risk of the banks collapsing; the is a bank by research on Financial Markets and Policy conducted by the Kenya Centre for Research. In another view, it acts as a buffer against financial costs of financial distress, thereby reducing the probability of bank insolvency.

Nevertheless, some scholars have argued that capital requirements are considerable costs to banks, which cause some but to fold-up and forcibly merge against their will. Imposing higher capital requirements constrain banks' competitive pressure due to competition on loans, deposits as well as sources of debt and equity investment (Bolt & Tieman, 2004). In moments of high capitalization, banks might respond by giving limited credit, reducing their interest rate on deposits and other time deposits to maintain the required high capital base, which will restrain the banks' operations. The "too-big-to-fail" syndrome may affect financial institutions with adequate capital, and this might lead to riskier investments (Berger, 2008; Berger et al., 2008).

The final goal of banks' management is to record profit at the end of the financial year. The relationship between the return on equity and the capital asset ratio for several banks and the results depicted that return on equity, and capital asset ratio tends to be positively related (Olalere et a., 2017). Insufficient capital requirements or the inability of a bank to meet the capital requirement might cause deposited to refrain from dealing with the banks, which will hurt the bank's overall profitability. This positive correlation between capital and profitability has also been concurred by A study carried out in India that indicated that banks with higher capital requirements could easily absorb unexpected losses and have reduced cost of capital, which means their profit levels are usually high (Kwan & Eisenbeis, 1997). Evidence from studies carried out on United States Banks states that a bank's capital level might depend on their business plan apart from regulatory pressures. A bank that intends to take over another bank might adequately be capitalized to impress regulators without necessarily being profitable.

Banks keep internal non-required, referred to as a bank's buffer capital. This type of capital does not fluctuate over time. Buffer Capital refers to the ratio of excess capital over risk-weighted assets. Some scholars also argue that a bank's excess capital acts as insurance against costs that may occur due to losses on loans or due to random shocks, and the insurance premium is usually equal to the return on equity or interest rate on the subordinated debt that the bank pays to attract new capital. To know the level of buffer capital required from one period to another, banks need structures, systems, and tools sufficient to assess the risk innate in the banking portfolios – often at very granular levels. This condition may demand a review of banks' frameworks and considering making the required investments to bring these up to the level capable of accurately quantifying risk exposure. Shim (2013) suggests that in the event of economic recession, banks must force by regulators to top up their minimum capital levels because there is a positive linkage between risk exposure and buffer capital.

Jalloh (2017) states that banks' regulators should focus on capital adequacy and supervisory review and market discipline to maintain banks' financial strength and stability in Nigeria. In Kenya's case, the Central Bank of Kenya tended to maintain its rules so that banks in Kenya whose capital had fallen below the regulatory thresholds were required to raise additional capital (Molonko & Jagongo, 2017). There is a positive link between more significant equity and EU banks' profitability Olalekan & Adeyinka (2013). Besides that, Davydenko (2011) also found a positive impact between equity level and profitability. Goddard et al. (2004) support a prior finding of a positive relationship between the capital/asset ratio and a bank's earnings. However, the direction of the relationship between bank capital and bank profitability cannot unanimously be predicted in advance (Staikouras & Wood, 2004).

The challenging question in capital regulation is that while regulators believe that banks' increased capital requirement is driven by efforts to lower systemic risk and protect the depositors and the financial institutions as well. Banking regulation critics build their attitudes on the presumption that it decreased profitability in banks because tightened capital requirements will lead to banks' inability to maintain their current business volumes (Elliott et al., 2015).

This condition gives rise to an argument that if banks' sound profitability is not limited by capital requirement, it would not be a better way to guarantee stability as it would allow banks to naturally build a solid cushion base and cover potential losses from recurrent earnings (Rose-Ackerman, 2010). Demirguc & Huizinga (2010) argue for the need to increase the capital requirement for banks, the question remains, what is the right benchmark to enforce capital regulations without it affecting the performance of banks. To adequately address this question, it was necessary to thoroughly analyze the relationship between capital requirements and banks' performance.

This study focuses on the Capital requirement and performance of selected universal banks in Ghana, considering the Basel Accord Framework. This study is the first of its kind in sub-Sahara Africa, and its findings would help the local and foreign universal base in the region. The study seeks to address the following objectives. First, to establish

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whether there is a link between the bank's capital and bank performance. Second, to assess the impact of Banks' profitability on banks' performance. Third, to identify the correlation between non-performing loans and banks' financial performance.

As mentioned earlier, there is an insubstantial amount of study on banks' capital adequacy and its impact on bank performance. Hence, we explore this gap by investigating how the implementation of capital adequacy requirements influences banks' performance. This study is in line with the Basel Accord III framework and Ghana bank regulations 2018. Both policies stressed bank capital adequacy, stress testing, and market liquidity risk. Our study drew on the data from top banks in Ghana (an emerging economy in Africa) for the period from 2000 to 2017 and employed a rich set of empirical approaches, including a panel data analysis of fixed effects models or first differenced models. This research intends to be used by policymakers, especially those in developing countries, to formulate capital requirements, capital adequacy, and bank performance.

Methods

We adopted a panel data regression fixed effect estimation model. The study targeted all universal banks listed on the Ghana Stock Exchange. A total of Eight commercial banks were found at the time of the study. Therefore, only these banks' financial statements covering the period 2008 to 2017 were collated. The Basel Capital Accord is an international standard for calculating the capital adequacy ratio. The accord incorporated various variables that affect a bank's soundness and safety in its framework in its analysis. The framework considers a bank's capital adequacy, asset quality, management, earnings, profitability, liquidity, and market risk sensitivity.

This paper employs panel data estimation models to analyze the panel data and examine the effects of bank-specific factors on bank performance. Data Panel Regression is a combination of cross-section data and time series, where the same unit cross-section is measured at different times. So, in other words, panel data is data from some of the same individuals observed in a certain period of time. If we have T time-periods (t = 1,2, ..., T) and N the number of individuals (i = 1,2, ..., N), then with panel data, we will have total observation units of N x T. If sum unit time is the same for each individual, then the data is called a balanced panel. If the number of time units is different for each individual, then it is called the unbalanced panel. The Following baseline models were used:

The Common Effect model

$$Y_{it} = \alpha + \beta' X_{it} + \varepsilon_{it} \quad (1)$$

Description:

For i = 1, 2, ..., N and t = 1, 2, ..., T.

Where N = Number of individuals or cross-section and T is the number of time-periods. From this model, NxT can be generated equation, which is equal to T equation of cross and as much N equation coherent time or time series.

The fixed-effects model

$$Y_{it} = \alpha_i + \beta 1 X_{it} + \varepsilon_{it} \quad (2)$$

Where;

αi (i=1….n) is the unknown intercept for each entity (n entity-specific intercepts).

Y_{it} is the dependent variable (DV) where i = entity and

t = time.

Xit represents one independent variable (IV),

β1 is the coefficient for that IV,

ε_{it} is the error term

The Random Effect Model

$$Y_{it} = \alpha_i + \beta' X_{it} + U_i + \varepsilon_{it} \quad (3)$$

Description:

For i = 1,2, ..., N and t = 1,2, ..., T.

Where: N = number of individuals or cross-section. T = the number of time-periods. ε_{it} = is the residual as a whole where the residual is a combination of cross-section and time series. Ui = is the individual residual which is the random characteristic ofunit observation the i-thand remains at all times.

Table 1. Description of Variables

Variables	Code	Description of Variables	What it measures
Dependent Variable			
Total Asset Base	TAB	A company's asset base is often construed as its book value. Total asset base is equal to Total assets less Total liabilities	Asset quality
Independent Variables			
Net Income After Tax	NPA	Net income after taxes (NIAT) is a financial term used to describe a company's profit after all taxes have been paid	Profitability
Bank's Total Capital	BTC	Bank capital represents the value invested in the bank by ts owners and/ or investors.	Liquidity
Total Outstanding Loans/ Nonperforming Loans	TOL/NPL	A non-performing loan (NPL) is a loan that is in default or close to being in default.	Sentitivity to Market risk

Result and Discussion

Table 2 shows the descriptive statistics from this research. The number of observations is 50 periods from 2008 until 2017. The result shows the mean, standard of deviation, minimum value, and maximum value from the variables.

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Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Net profit after tax	50	8.570	9.980	-7.900	3.280
Total Asset Base	50	2.670	2.190	3.390	9.560
Non-performing Loans	50	1.230	9.570	1.910	4.570
Total Deposit	50	1.920	1.650	1.770	7.160
Bank's Total Capital	50	3.640	2.870	85360	1.110

The number of observations for all variables is 50 except lnNPA (the natural logarithm of net profit after tax). This condition because from the original data, one bank records losses for two years in a row. The explanatory and dependent variable's natural logarithm was generated to bring all the variables to a common base. Because the years are not sequential, we time-set our data by creating a time dummy variable called time.

Considering equation 1, 2 and 3 our regression models will be;

Common effet model: $\mathbf{TAB_{i,t} = {}_i + NPA_{i,t-1} + BTC_{i,t} + BOL_{i,t} + {}_{i,t}}$

Fixed effect model: $\mathbf{TAB_{i,t} = {}_i + NPA_{i,t-1} + BTC_{i,t} + BOL_{i,t} + {}_{i,t}}$

Random effect model: $\mathbf{TAB_{i,t} = {}_i + NPA_{i,t-1} + BTC_{i,t} + BOL_{i,t} + {}_{i,t} + u_{i,t}}$

Table 3. Selection Method of Regression Data Panel

Test Results	Common Effect	Fixed Effect	Random Effect
Chow Test	0.678	0.000*	N/A
Hausman Test	N/A	0.001*	0.081

Chow Test Chow test is a test to determine the model of whether the Common Effect (CE) or Fixed Effect (FE) is most appropriately used in estimating panel data. The chows test result in Table 3 shows that the best model between the common effect model and fixed effect model is the fixed-effect model. Otherwise, the Hausman test is a test to determine the model of whether fixed effect or random effect. The Hausman test result in Table 3 also shows that the best model in this research is the fixed effect model.

The regression result in Table 4 shows that a bank's capital positively impacts bank performance as proxied by the bank's total assets base. This result indicates that a percentage change in bank capital will lead to a 65 percent change in a bank's performance. This is also a suggestion that when a bank's capital (lnBTC) increases, its total assets base (lnTAB) rises, confirming that capital enhances banks' performance primarily. This finding is in line with the research of Goyal (2013), Mondal & Ghosh (2012), Tran et al. (2016), Berger & Bouwman (2013), and Goddard et al. (2004). For instance, Tran et al. (2016) stated that a bank's capital level determines its performance. Goyal (2013) argues that capital structure has a significant impact on banking performance.

This result is because clients found financial institutions with adequate capital more worthy of doing business. Also, good capital adequacy means banks can take care of their operational risks promptly.

Table 4. Regression Result

	Fixed-Effect		Random Effect		Common Effect	
Total Asset Base	**Coef.**	**P>|t|**	**Coef.**	**P>|t|**	**Coef.**	**P>|t|**
Net profit after tax	0.16934	0.007***	0.013	0.002***	0.212	0.018*
Bank's Total Capital	0.65107	0.000 ***	0.530	0.001***	0.423	0.000***
Non-performing Loans	(0.12780)	0.003***	0.012	0.230	0.052	0.501
_cons	2.45800	0.054	5.520	0.120	7.0523	0.002

Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are reported in parentheses.

With lnNPAt-1, the coefficient is 0.1651 expresses that banks' previous year's profit positively influences their performances. When a bank makes a profit in a given year, there is a likelihood that its profit will affect its subsequent year's performance positively. This result is explainable because profit/income made by banks are either re-invested back into the company (retain earnings) or disbursed to shareholders as dividends or in the form of additional shares. The result shows a strong relationship between a bank's previous net profit and bank performance. Gizaw et al. (2015), Anbar & Alper (2011), and Chen et al. (2018) also get similar findings. Gizaw et al. (2015) show that the profitability of commercial banks in Ethiopia has a significant impact on their performance in a given year. The result shows that banks' non-performing loans are statistically inversely related to the performance of universal banks.

Conclusion

Our research found out that banks' capital adequacy has a robust significant influence on banks' performance. We also realized that the lagged net income of a bank significantly affects its performance positively. Also, the study discovered that banks' non-performing has an antithetical impact on bank performance.

Our research supports the fact made by the BASEL framework that banks' capital can be considered an active factor in the performance, banks safety, and banks' soundness. However, some authors believe that this could lead banks to trading over-cautiously to prevent sanctions from supervisory agencies. Thus, the Central Bank of Ghana and other agencies should critically look at the prudential guidelines' provisions. These findings will help all banks in most universal banks based in Ghana to be more prepared for future minimum capital requirements adjustments. In the case of the selected banks, the revelation is that capital, asset, and loans are an element that conditions banks' performance, and they must serve as indicators when planning for or restructuring the program of capital requirement and or capital adequacy.

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Nonlinearity of Competition-Stability Nexus: Evidence from Bangladesh

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Abstract

Financial deregulation since the 1980s has been stimulating fierce competition among banks and influencing financial stability across the world. In pace with this, Bangladesh's banking industry is also experiencing intense competition since it is composed of many banks. The empirical evidence on competition and stability widely debate to date, perhaps for not considering the potential nonlinearity. Therefore, our study aims to explore the nonlinear impact of competition on the financial stability of Bangladeshi banks over 2010-2017. For achieving this objective, we compute the Boone indicator and Z-score using bank-level data to measure competition and stability, respectively, and examine the nonlinear dynamics of competition-stability nexus employing threshold analysis in a panel setup. Our findings confirm that the competition-stability relationship is nonlinear and implies that financial stability is more substantial (weaker) in a less (more) competitive market. Our results bear specific policy implications.

Keywords:

Boone's indicator, competition, financial stability, panel threshold analysis

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Introduction

The liberalization of the financial system and reforms of banking industries across the borders have altered the functional and competitive atmosphere for banks. Inline, Bangladesh is also experiencing an escalating new-entries in the flourishing banking industry. Banks in the fast-growing and emerging economies like Bangladesh exist at the top of the financial system with immense importance. Because of having a less developed capital market, Bangladesh mostly relies on banks to finance its economic growth and development. Higher demands for banks in developing and transitional economies may cause intense competition in the banking industry.

The empirical investigations show that intense competition may either entice banks to take excessive risks and cause financial debris (Allen & Gale, 2004; Carletti & Hartmann, 2002; Jimenez, Lopez, & Surina, 2013), or may bring efficiency through reducing costs and price of the financial service and motivate banks to maintain a buffer capital that ensures financial stability (Pruteanu-Podpiera, Weill, & Schobert, 2008; Schaeck, Cihak, & Wolfe, 2009; Schaeck & Cihák, 2014; Clark, Radić, & Sharipova, 2018). Moreover, some research findings exemplify inconclusive relationship between competition and stability (Allen & Gale, 2004; Berger, Klapper, & Turk-Ariss, 2009; Saif-Alyousfi, Saha, & Md-Rus, 2020).

These theoretical and empirical literature on financial stability and competition show ambiguous as well as debated conclusions and lead to two different views endorsing the ideas of financial fragility and financial stability. The competition-fragility view, first proposed by Keeley (1990), argues that higher bank competition increases bank's risk-taking incentives, because excessive competition erodes the franchise value of banks by reducing their monopoly rents and hence to survive in competition, banks will engage in more risky activities for example, by disbursing loans to borrowers without proper screening. Therefore, extreme competition is alleged for the failure of the US and the UK financial sectors (Llewellyn, 2007; Milne, 2009). A more recent study by Beck, Jonghe, and Schepens, (2013) claims that in an economy with a developed and strictly regulated financial framework, competition and banking fragility are positively related, and variation of regulation can change the intensity of this relationship.

Alternatively, the competition-stability view argues that in a competitive environment, banks are found to maintain a buffer capital that decreases the propensity of the financial crisis (Schaecket al., 2009). In less competitive market banks tends to charge higher rates on loan to increase profitability, which may raise the risk of bankruptcy (Boyd & De Nicoló, 2005), whereas in a competitive market lower rate charged by banks motivates borrowers to invest in less risky projects and makes the lending safe, albeit lower revenue from low rate can make the banks vulnerable, which makes the competition-risk relationship U-shaped (Martinez-Miera & Repullo, 2010)

To further examine the interaction of banking soundness and competition, Schaeck and Cihák (2014) has analyzed 3600 banks from ten European countries and more than 8900 US banks and found competition as favorable for banking soundness, whereas

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Kasman and Kasman, (2015) found the opposite relation while analyzing Turkish banking industry.

The mixed findings of Berger et al. (2009) and Saif-Alyousfi, et al. (2020) make this mysterious relationship even more interesting by supporting both the stability and fragility view. They find strong positive and negative relation of market power with loan portfolio risk and overall exposure, respectively, and suggest that their coexistence can influence stability or fragility at the same time. Moreover, a recent paper of Saha and Dutta (2020) find that competition contributes to stability; however, there is evidence of fragility in the presence of concentration in the banking industry.

The reason behind these debated and mixed results might be the non-linearity of the relationship between competition and stability, as most of the aforementioned studies assume a linear relationship between them. Though the theoretical paper of Martinez-Miera and Repullo (2010) suggested a U-shaped relationship between competition and stability, it is not properly addressed in the literature yet. Only the study of Jimenez et al. (2013) investigate whether a non-linear relationship between concentration and stability exists in the Spanish banking system; albeit, concentration is a very delicate proxy of competition (Claessens & Laeven, 2004) and could generate a spurious, misleading and suboptimal findings. Besides, lesser concentration does not necessarily mean higher competition, since Berger et al. (2009) suggest that concentration and competition could coexist and can simultaneously induce stability or fragility. Therefore it is imperative to further investigate the nonlinearity of this nexus.

To the best of our knowledge, no study to date has investigated the nonlinearity of the nexus between competition and stability considering an erudite measure of the former, especially in a transitional economy setup. Therefore, considering the debated competition-stability nexus and the empirical gap to explore the no-linearity between them, we investigate this relationship in the context of a transitional economy like Bangladesh using bank-level data of 30 listed banks over 2009-2017.

For this investigation we compute and use Z-score and Boone indicator to measure bank stability and competition, respectively and apply fixed effect panel threshold model (Hansen, 1999) to investigate whether a certain level of competition is critical to achieve stability or to identify the optimum competition from which the stability tends become weaker. To check the robustness of our estimations, we construct and use an alternative Boone indicator. Furthermore, to address the endogeneity, we apply the threshold model introduced by Seo and Shin (2016). The results of our study indicate that though competition contributes to stability; however, the impact becomes moderated at higher level of competition.

Our findings contribute to the existing literature in several ways. First, we calculate the Boone indicator and Z-score and portray the most comprehensive scenario related to the competition and stability of all the listed banks of Bangladesh. Second, our study contribute to identify the optimum level of competition to maintain and foster financial stability by analyzing the nonlinear relationship between competition and stability, which is

still an under-researched area of financial economics. Finally by addressing the endogeneity issues and generating reliable results using a relatively advanced model of threshold analysis (Seo & Shin, 2016), our study also support the policy formulation to ensure the banking stability of a country. Moreover, as our study is based on a fast-growing emerging economy, Bangladesh, which is characterized as a bank dependent financial system, therefore the research approach and robust findings of this study can be applied for other emerging countries to uphold sustainable competition in the financial market, and thus, ensure the economic stability of the nation.

Methods

To analyze the nonlinear relationship between bank competition and stability, bank-level data of competition, financial stability, and control variables- bank size, liquidity, and asset growth rate are hand collected from annual reports of the concerned banks. Our sample consists of all the banks listed in the stock exchange. At present, there are fifty-four commercial banks in Bangladesh, among which thirty banks are listed in the stock exchange.

In addition, country-level control variables- GDP growth rate and financial depth are collected from World Development Indicator (World Bank, 2019) for the periods 2009-2017, which constitute a balanced panel of 270 observations. Prior to the analysis, all data are winsorized at the 1st and 99th percentile to reduce the influence of outliers.

To measure financial stability a wide range of indicators were devised following the global financial crises of 1980s and 1990s, like, Z-score, probability of bankruptcy, standard deviation of ROA, non-performing loan ratio and so on, among which Z-score is very common and used by many researchers (Amidu & Wolfe, 2013; Fu, Lin, & Molyneux, 2014; Kasman & Kasman, 2015; Beck, et al., 2013; Morgan & Pontines, 2014; Saha & Dutta, 2020). Z-score measures the insolvency risk of a bank; a higher value indicates a lesser risk of bankruptcy and higher bank stability. We calculate Z-score as follows:

$$Z\text{-}score_{it} = \frac{ROA_{it} + \left(\frac{E}{TA}\right)_{it}}{\sigma ROA_{it}} \qquad (1)$$

where ROA is the return on assets, E/TA represents the equity to total assets ratio, and σROA denotes the standard deviation of return on assets. We use three-year rolling time windows to compute the standard deviation of ROA to allow for time variation in the denominator of the Z-score.

To determine competition H-statistic, concentration ratios, Lerner index, Boone indicator, and other measures could be used. Structural measures like HHI (Herfindahl-Hirschman Index) and bank-concentration ratio represent competition through level of concentration, which is found as a delicate proxy of competition (Claessens & Laeven, 2004), and thus, could generate misleading outcomes. Moreover, a high degree of industry concentration does not necessarily imply a less competitive market (Owen & Pereira,

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2018). On the other hand, Lerner index is also criticized for not being able to confine the degree of product substitutability (Vives, 2008). Whereas Boone indicator, introduced by Boone (2001, 2008) is found to overcome these shortcomings and is employed by some researchers like Schaeck and Cihák (2014), Saif-Alyousfi et al. (2020), Kasman & Kasman (2015), Saha & Dutta (2020). Following the relevance, this study also uses the Boone indicator to measure the competition. Boone (2008) calculates the level of competition by estimating the elasticity of firm performance, in terms of its market shares, with respect to its marginal costs, as follows:

$$ln(Market\ share)_{it}=\alpha+\beta\ ln\ (Marginal\ cost)_{it} \qquad (2)$$

where the coefficient β denotes the Boone indicator. To ensure the robustness of the estimation, we use market share of total loan (hereafter, Boone-loan) as well as market share of total deposits (hereafter, Boone-deposit) respectively to estimate Boone indicator. In principle Boone indicator argues that competition creates a negative relation between performance and marginal cost that becomes stronger at higher level of competition. Following Schaeck & Cihák (2014), we approximate the marginal costs by calculating the average variable costs as marginal costs cannot be observed directly.

To control the bank-specific heterogeneity and economic condition, we use different control variables. Similar to Jeon and Kim (2013), loan to deposit is used to control the liquidity, a higher value of which signifies lower liquidity. The log of total asset is used to control bank size, which is also used by Kasman and Kasman (2015) and Jeon and Kim (2013). To account for the business growth, asset growth rate is also used as a control variable. Furthermore, GDP growth rate (gGDP) and broad money as a percentage of GDP are used to control the fluctuations of economic activity and financial depth. Description and sources of all variables used are presented in appendix Table-A1.

To explore potential non-linearity in the effect of Competition on Bank stability we use the following fixed effect non-dynamic panel threshold model as developed by Hansen (1999).

$$FS_{it}=\beta_0+X_{it}(q_{it}<\gamma)\beta_1+X_{it}(q_{it}\geq\gamma)\beta_2+\lambda Z_{it}+\upsilon_i+\varepsilon_{it} \qquad (3)$$

where FSit is the financial stability, Xit is the regime dependent variable and Zit is a set of regime independent variables, ui is the country fixed effect and ε_{it} is iid residual with mean zero and finite variance. The observations are divided into two 'regimes' depending on whether the threshold variable qit is smaller or greater than the threshold γ. The regimes are distinguished by the different regression slopes, β_1 and β_2. The hypothesis of no threshold effect can be represented by the linear constraint H0: $\beta_1 = \beta_2$. Hansen (1999) suggests a likelihood ratio statistic (LR) under the null of no threshold effect, with p-values computed via bootstrap analog suggested by Hansen (1996) which shows that this bootstrap analog produces asymptotically correct p-value. Hansen (1999) suggests that the method can be extended in a straightforward manner to higher order thresholds models. To explore whether there is a threshold in the impact of competition on financial stability, we use competition as both the regime dependent variable and threshold variable.

Result and Discussion

Table 1 presents the descriptive statistics of the data used in this study. The mean value and standard deviation of the Z-score are 32.88 and 26.343, respectively, showing an overall stable state; however, the minimum value 1.336, represents some banks are susceptible to financial distress. The minimum values of -0.31and -0.11, the maximum values of 0.036 and 0.07 and the mean values of 0.033 and 0.34 associated with the Boone-loan and Boone-deposit, respectively show a high level of competition in banking industry. The standard deviation of loan to deposit ratio (1.732) and financial depth (3.396) indicate high variations of liquidity across banks and financial development over years. All other variables show moderate variation. To facilitate comparability among variables and simplify the interpretation of our results, we standardized all variables as it creates a unit less measure. Cross-section variation of Z-score and Boone indicators are presented in the appendix Table-A2

Table 1. Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Z-score	270	32.88	26.343	1.336	153.944
Boone-loan	270	0.033	0.001	-0.031	0.036
Boone-deposit	270	0.034	0.017	-0.011	0.07
log (total asset)	270	25.672	0.698	23.19	27.31
Asset growth	270	0.295	1.15	-0.961	14.451
Loan to deposit ratio	270	1.163	1.732	0.394	21.173
gGDP	270	6.292	0.669	5.045	7.284
Financial depth	270	61.662	3.396	54.882	65.848

Table-2 represents the result of the fixed effect panel threshold analysis of equation (3). We use Boone-loan and Boone-deposit as a measure of competition in models 1 and 2, respectively. The significant level of threshold is 1.7846 for both models. As higher negative value of the Boone indicator signifies higher competition, therefore the Boone indicator higher than and equal to the threshold value (≥1.7846) implies lesser competition and the Boone indicator less than the threshold value ((<1.7846) highlights higher competition.

In both regimes (higher and lower competition) of both models, competition contributes to financial stability; however, the coefficient is higher in the second regime (lower competition), which signifies financial stability is stronger in lesser competition and vice-versa. This finding can be explained as competition increases efficiency, reduce the lending rate of banks, and thus reduce the moral hazard of the borrowers, which contributes to financial stability. Nevertheless, at the higher competition, the market power, as well as the earning decreases, and/ or banks may take more risks to maintain the market share by disbursing loans to borrowers without proper screening, which may result in slow down of financial stability. When competition is below the threshold

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(optimum) level, these results support the competition-stability hypothesis like Schaeck, Cihak, & Wolfe, 2009, Schaeck & Cihák, 2014 and Clark et al., 2018; nevertheless, intense competition, higher than the optimum level, moderates financial stability. Among different control variables, bank size has a significant negative impact on stability which implies larger bank may increase risk and/or the operation cost, and thus, hampers stability. Whereas, financial depth has a significant positive impact on stability, signifying financial depth contribute to increase the resilience of financial system.

Table 2. Panel Threshold Analysis

Variables	(1)	(2)
Threshold estimates	1.7846	1.7846
95% confidence interval	[1.6586, 1.7787]	[1.6346, 1.8133]
Regime 1: Higher Competition		
Boone-loan	-0.572***	
	(0.182)	
Boone-deposit		-0.566***
		(0.183)
Regime 2: Lower Competition		
Boone-loan	-1.369***	
	(0.277)	
Boone-deposit		-1.256***
		(0.264)
Regime independent variables		
log (total asset)	-0.436***	-0.437***
	(0.121)	(0.122)
Asset growth	-0.053	-0.052
	(0.057)	(0.057)
Loan to deposit ratio	-0.016	-0.016
	(0.059)	(0.059)
gGDP	-0.003	0.001
	(0.097)	(0.097)
Financial depth	0.994***	0.990***
	(0.166)	(0.166)
Constant	-0.103**	-0.105**
	(0.052)	(0.053)
Observations	270	270
R-squared	0.235	0.229
Number of Banks	30	30

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

The panel threshold analysis developed by Hansen (1999) has a limitation as it assumes that all variables in the model are strictly exogenous. Therefore, the estimation

using the Hansen (1999) model may not be consistent as there is a possibility of reverse causality in our model. The stability of the banking industry may attract more new banks or exiting banks to open new branches to increase the market share. Besides, there can be unobserved heterogeneity among banks in our sample.

Therefore to address the endogeneity issues, we apply an extended model with a potentially endogenous threshold variable developed by Seo and Shin (2016). We assume the threshold variable Boone indicator as the endogenous variable and market share of deposit as the instrument variable. We choose the market share of deposit as an instrument variable because it is strongly correlated with Boone Indicator, without having a direct influence on bank stability. Moreover, Schaeck and Cihák (2014) use the same variable as an instrument for the Boone indicator. As GDP growth rate and financial depth are country-level variables, therefore they are assumed to be exogenous in our model.

Table 3. Panel Threshold Analysis Considering Endogeneity

Variables	Regime 1: Higher Competition	Regime 2: Lower Competition
Boone-loan	-0.979***	-2.391**
	(0.128)	(1.023)
log (total asset)	-0.500***	-0.833
	(0.053)	(1.318)
Asset growth	0.111***	-5.630**
	(0.026)	(2.373)
Loan to deposit ratio	0.060	-13.529***
	(0.060)	(3.952)
gGDP	0.005	0.762***
	(0.033)	(0.149)
Financial depth	1.221***	0.601
	(0.127)	(0.553)
r	0.862***	
	(0.009)	
Constant	-0.479	
	(1.448)	
Observations	270	
Number of Banks	30	

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

The results are presented in Table-3. Similar to the results of the Hansen (1999) panel regression (Table-2), the coefficient of the Boone indicator is negative and significant in both regimes; however, the coefficient is higher in lower competition regime, which signifies financial stability is moderated at the higher competition and vice-versa. Consistent with our result of Table-2, the coefficient of log (total asset) is negative and financial depth is

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positive; however, only significant in higher competition regime. These results imply bank size increases risk at the higher competition and financial depth strengthens the stability at the higher level of competition. GDP growth has a significant positive effect, whereas loan to deposit ratios have a significant negative effect in lower competition, signifying higher economic growth and liquidity contribute to stability at the lower competition. Asset growth is significantly positive and significantly negative at the higher and lower level of competition, respectively.

Conclusion

Since the deregulation of the financial sector, competition in the banking industry around the world has been escalating continuously, and the financial ecosystem is evolving along with new challenges. Against this backdrop, impact of competition on financial stability has become a prime concern among policy-circles and researchers, and an extensive number of studies have been conducted in this area; nevertheless, a consensus is yet to achieve. Besides, the research initiative to explore the nonlinear impact of competition on financial stability is still very scant. Therefore to contribute to this field of study and to fill the empirical gap of exploring the nonlinearity of competition-stability nexus, we studied the banking industry of Bangladesh based on a sample of 30 listed commercial banks for the period 2009-2017. To attain our research objectives, we use bank-level data and calculate the Z-score, Boone indicator (for both deposit and loan market) to measure the stability and competition, respectively, of the selected banks. We employ the Hansen (1999) panel threshold model to identify the optimum level of competition and analyze the heterogeneous impact of competition at different regimes identified by the threshold.

The findings of our threshold analysis show that the competition-stability nexus is nonlinear. Moreover, though in both regimes, below or above the threshold, competition contributes to the financial stability; however, the coefficient is higher in the lower regime of competition. Therefore our results signify that financial stability is stronger (weaker) in a less (more) competitive market.

Our empirical findings contribute to the debate regarding the relationship between competition and stability and have some significant policy implications. According to our results a healthy competition is essential for the stability in emerging economies. Optimum level of competition helps foster financial stability, though beyond the certain threshold it moderates the stability. This fresh insight concerning the moderating role of intense competition from an emerging market perspective will assist policymakers to formulate appropriate policies for endorsing financial stability. Though it is argued that competition in the financial market supports the financial inclusion, financial efficiency and financial development; however, fierce competition may erode the development gain through curbing the stability of financial sectors. Therefore regulators should consider the threshold level of competitiveness to regulate new entrants into the financial sector and encourage healthy competition among financial institutions as competition incentivizes the financial system to improve cost-effectiveness and reallocates revenues from inefficient units to successful and efficient ones.

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Appendix:

Table A1: Sources and measurements of variables

Variables	Description/ Measurement	Source
Dependent Variable		
Financial Stability	$\log(\text{Z-score}) = \log\left(\frac{\left(\text{ROA}+\frac{\text{Equity}}{\text{Assets}}\right)}{\sigma\text{ROA}}\right)$	Author's calculation
Independent Variables		
Competition	Boone indicator: $\ln(\text{Market share})_{it} = \alpha + \beta \ln(\text{Marginal cost})_{it}$	Author's calculation
Control Variables		
Bank size	log(Total asset)	Financial statement
Liquidity	Loan to deposit ratio	Author's calculation
Bank growth	Asset growth rate	Author's calculation
Economic growth (gGDP)	Growth of GDP	WDI, WB
Financial depth	Broad money to GDP	WDI, WB

Table A2: Cross-section variation of Z-score and Boone indicator

Bank Name	Z-score	Boone-loan	Boone-deposit
AB Bank Limited	43.56987	0.468585	0.468585
Al-Arafah Islami Bank Ltd.	28.19283	-0.4547	-0.4547
Bank Asia Limited	44.2354	0.141181	0.141181
Brac Bank Limited	34.05192	1.23933	1.23933
City Bank Limited	16.46487	0.510534	0.510534
Dhaka Bank Limited	21.43155	-0.20853	-0.20853
Dutch-Bangla Bank Limited	26.65651	0.894948	0.894947
EXIM Bank Limited	24.73169	-0.14653	-0.14653
Eastern Bank Limited	36.79347	0.121552	0.121552
First Security Islami Bank Ltd.	40.25451	-0.72097	-0.72097
ICB Islami Bank Limited	22.15171	-2.27247	-2.27247
IFIC Bank Limited	15.55053	0.192848	0.192848
Islami Bank Bangladesh Ltd.	59.32566	1.628667	1.628668
Jamuna Bank Limited	16.98542	-0.31268	-0.31268
Mercantile Bank Limited	24.47242	0.027591	0.027592
Mutual Trust Bank Limited	38.45659	-0.41865	-0.41865
National Bank Limited	18.93471	0.828017	0.828016
National Credit &	45.20552	-0.43368	-0.43368
Commerce Bank Ltd.	45.20552	-0.43368	-0.43368
One Bank Limited	19.14979	-0.40755	-0.40756
Premier Bank Limited	40.39299	-0.18908	-0.18908
Prime Bank Limited	41.21711	0.673823	0.673824
Pubali Bank Limited	23.75729	0.767971	0.767971
Rupali Bank Limited	33.74252	0.197702	0.197702
Shahjalal Islami Bank Limited	21.27317	-0.69738	-0.69739
Social Islami Bank Limited	80.687	-0.65233	-0.65233
Southeast Bank Limited	28.02343	-0.20343	-0.20343
Standard Bank Limited	33.3699	-1.0092	-1.0092
Trust Bank Limited	21.46717	-0.55536	-0.55536
United Commercial Bank Limited	26.40746	0.583471	0.583472
Uttara Bank Limited	59.44604	0.406344	0.406343

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Exploring Philosophy of Co-Movements Between Stocks and Macroeconomic Variables

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Abstract

This study's background is to explore how significant are macroeconomic variables (MEV) in explaining stock movements in the developing economy for every sector and each firm of those sectors. To overcome the deficiencies of traditional index base studies, which provide only cumulative impact and response of MEV and Stock movements, fill the gap of existing literature that is not available for all Pakistan stock exchange (PSX). Panel ARDL Model with Co-Integration is using to achieve this objective. The results show that the overall sector response for changing independent variables was different from the firms from the same sectors in many cases. These results show superiority over the conventional method of using a stock index as the dependent variable, which shows only cumulative response, which was not comprehensive for taking the right portfolio and designing policy for economic development. This study has general applicability to developing economies.

Keywords:

portfolio, sectorial analysis, macroeconomic variables, stock market performance, panel ARDL model

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Introduction

The stock market provides a platform for the participants interested in issuance buying and selling stocks of public limited companies. A stock market is a place where risk and rewards for a set of investments happen simultaneously, whereas most of the time, it also serves as a quick estimator to judge the country's economic condition. Official statistics for the 2020 first quarter of PSX reveals that overall investment stood around 6733 billion rupees in all sectors. This investment involves the, directly and indirectly, financial and physical participation of thousands of people. Stock markets hold investments of millions of participants in the country, thus keeping this fact in mind that it is pertinent to understand the overall mechanism, movements, and cause-effect relationship of this particular avenue by its relevant or proposed stakeholders.

Out of many available MEV tested as explained in past studies discussed in upcoming paragraphs, the most significant take for the current study and were; Inflation (IF), Foreign direct investment (FDI), Foreign exchange reserves (FOREX), Exports (EXP), and Interest rate (IR). When we look at the past literature, it finds that MEV had both negative and positive impact upon Stock market performance, like Boyd et al. (2001) by taking IF as an independent variable deduced that there is a significant and negative relationship of IF with banking sector development. Rapach et al. (2005) examined the predictive power of MEV for SR with a sample of 12 industrialized countries. The results indicate that IF was the most consistent and reliable predictor of stock return in all countries. Hondroyiannis & Papapetrou (2006) conclude that there is no SR on expected and unexpected IF Rates. The model used for the study was Markov switching autoregressive model.

Hasan (2008) shows that there exists a bidirectional relationship between SR and IF. Bekaert & Engstrom (2010) studied the impact of "IF" on the stock market with the fed model's impact. Their study mentioned a high temporal correlation between the yield on equity and yield on bonds in the United States, mainly attributed to co-movement between these yields and "IF." They provide results that countries with a high incidence of stagflation should have a high correlation between bond yield and equity yields, and this was proven right for international data.

Akbar et al. (2012) examine the relationship between "IR, ER" and SMR by using a multiple regression model on kse-100 index from 1998 through 2009; results show both the change in "IR & ER" has a significant impact upon SR for the period under consideration. Arouri &Rault (2011) tested long-run links between stock markets and Gulf Cooperation Council's oil prices. Using bootstrap panel co-integration techniques and seemingly unrelated regression (SUR) method, they suggest evidence for co-integration between oil prices and the stock market in GCC countries. The seemingly unrelated regression results indicate that oil price increase positively impacts stock prices except in Saudi Arabia.

Tiwari et al. (2017) studied the determinants of co-movement in stock returns for the 2007–2008 emergency. Given that the United States (US) was the emergency

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epicenter, they dissect the variables driving the movement between US stock market returns and stock returns in 83 nations. The examination recognizes between the periods sometime recently and after the collapse of Lehman Brothers. The discoveries show that monetary linkages drove co-movement generally. There is also proof of 'demonstration effects' during the initial stage of the emergency.

Espinoza et al. (2012) show that in the past, the US business cycle leads the European one by a few quarters, and as a result, it will be useful in predicting the euro area gross domestic product. Their study investigated whether additional predictive power can gain by adding additional financial variables. The results indicate that additional financial variables do not increase GDP's predictive power; instead, it predicts US GDP with a slight error. Akbar et al. (2012) found a long-run equilibrium relationship between the KSE index and MEV. The study using co-integration after taking IR, MS, ER, FER, and IPI as independent variables, whereas The SP, shows positive relations with IR and MS and the negative relationship of FER and IF, whereas ER and IPI were considered insignificant.

While explaining investors' opinions, Jacobs & Levy (2013) explain that an investor's mindset or the understanding of the market by the investor determines investment approaches. They are of the view that investors who believe that markets are efficient, for the variation in prices are random and unpredictable and a wise approach is a passive investment, whereas those investors who believed that there is a clear-cut pattern in the stock movement consider a simple approach of buying stock with lower-price earnings ratios. Ramli et al. (2018) investigated intra-country comparison for finding the impact of MEV on the performance of SR. The countries selected for this study were South Africa, Brazil, China, Russia, and India, whereas MEV took as MS, ER, and IR. The results indicate that all the selected variables significantly impact the performance of SR in all countries under consideration.

Parab & Reddy (2020), using the Bai-Perron test, examines the impact of selected MEV on stock market returns and causal relationships. The results indicate a significant impact of MEV on stock market returns, varying across structural breaks. In Pakistan's context, Naz & Siddiqui (2020) explains that stock markets are of prime importance for a stable economy, and it is of utmost importance to know the short Run and long association between stock market performance and MEV to design stable economic policies. For this purpose, they tested the association of IR, IF, and ER, and they found that IR & ER positively effects Stock prices, whereas IF negatively impacts stock returns. Likewise, the impact of MEV varies from sector to sector or country to country. As explained in the above literature, when the same variable test on one sector, its outcome was entirely different from other sectors of the same country, or in other words, MEV turns out to be significant and insignificant for the same country but different sectors.

The discussion regarding causality between stock market performance and macroeconomic variables has provided different results for different economies. In the context of PSX, the prime focus of the earlier studies was to test the relationship between the overall performances of the stock market with the selected macro-economic

indicators, or in the case of sectors, only those sectors that were explored so far has the highest market capitalization. However, the individual firms or sectorial importance of the stock market is not exploring comprehensively yet. Considering above stated facts specifically in the context of Pakistan, one can easily understand the main crux of the earlier studies is to test the performance of overall index or indices from large selected sectors with MEV (Khan 2018; Akbar et al., 2012; Pervaiz et al., 2018)

As the existing literature covers either the stock index's overall performance or the selected sectors with the macro-indicators, it allows exploring all the firms' performance and test those sectors that have not taken in the same scenario. This condition will provide a new avenue to the policymakers, relevant participants, regulators, and other stakeholders to understand how they could respond when something is likely to happen in the future about the macroeconomic environment.

The novelty of the study is shown from its objectives, as the study will explore the role of MEV in explaining stock price movements by covering not only overall sector movement of all 35 sectors of PSX but for all selected individual firms from the same sectors as well, whereas in the past only stock index or few selected sectors were explored. This condition will provide not only how the overall sector responds to changing MEV but also how firms' share prices respond to these changes, which is very much significant for investors as investors do not make investments in all sectors and all firms they make investments in selected firms of selected sectors. It will give a better direction to stakeholders, and hence the decision-makers adjust the likely changes in case of expected movements in the macro-economic environment not at the sectoral level but for the firm level.

The study's objectives are: first, to find the impact of selected MEV upon each sector of PSX's overall performance. Second, to find the impact of selected MEV upon the performance of each firm of PSX. Third, fill the gap in the literature for PSX at both macro and micro levels for responsiveness with changing MEV.

Methods

For the current study, the research methodology adopted is research onion. It develops by sounders et al. (2007). The benefit of research onion is, it provides a detailed and systematic step for the research process. The essential fundamental research onion acts as an onion, as every layer has detailed information about the research methodology.

The research philosophy is positivism, which explained that reality is stable and cannot be changed. It can only be observed and described. The facts or the reality under the philosophy of positivism can be measure quantitatively. The research approach deals with the testing of facts and findings with the aid of a suitable design.

The deductive approach is selected for the current study as it is based upon predefined theory. The research strategy is archival research. For the sake of research choice, a mono method will be used, which considers only a single type of method as our current study will be only quantitative so that the mono method will be used. The

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time horizontal for the study is 15 years from 2005 to 2020, and the data is longitudinal, and the nature of data is of secondary. The dependent variable data will be collected from the PSX website, whereas the data for MEV will be taken from the State bank of Pakistan. The selection of the sample was made in two steps. For the sector-wise study, 100% sample i.e., all 35 sectors, will be selected at the first instance. Second, for a firm-wise study, the essential criteria for firm selection are selecting all firms of every sector, provided that firm must have at least one complete year of monthly data available for any year that falls in the selected period. The total numbers of firms registered at PSX were 540, and out of these, 512 firms meet the selection criteria.

The Panel ARDL Model with Co-integration is used (Pesaran et al., 2001). The reason to adopt this technique is that it is suitable not only for a large set of samples but also for a small set of the sample as well, besides this benefit of sample size it provides information about the structural break in data. It supports in the correction of problems regarding residual serial correlation and endogeneity in variables. It is an ordinary least square-based model that is applicable for non-stationary time series as well as for those time series which has mixed order of integration. Moreover, it takes a sufficient number of lags to capture the data generating process from general to specific modeling framework..

Model is consistent of one dependent variable (SMR) and five independent variables i.e. EXP, FDI, FOREX, IF and IR. PMG estimator is used to find long run and short run co-integration and significance of variables.

$$\Delta SMR_{it} = \alpha_i + \alpha_{1i}\,\Delta\, EXP_{it} + \alpha_{2i}\,\Delta FDI_{it} + \alpha_{3i}\,\Delta FOREX_{it} + \alpha_{4i}\,\Delta IF_{it} + \alpha_{5i}\,\Delta IR_{it} + \gamma_i\, SMR_{it\text{-}j} + \beta_1\, EXP_{it\text{-}j} + \beta_2\, FDI_{it\text{-}j} + \beta_3\, FOREX_{it\text{-}j} + \beta_4\, IF_{it\text{-}j} + \beta_5\, IR_{it\text{-}j} + \mu$$

Model is based upon one dependent variable such as stock prices of individual firm shown as IFP and five independent variables i.e. EXP, FDI, FOREX, IF and IR. MG estimator is used to find long run and short run co-integration and significance of variables.

$$\Delta IDFPit = ai + a1i\ \Delta EXPit + a2i\ \Delta FDIit + a3i\ \Delta FOREXit + a4i\ \Delta IFit + a5i\ \Delta IRit + \gamma i\ IDFPit\text{-}j + \beta 1\ EXPit\text{-}j + \beta 2\ FDIit\text{-}j + \beta 3\ FOREXit\text{-}j + \beta 4\ IFit\text{-}j + \beta 5\ IRit\text{-}j + \mu$$

Result and Discussion

This study conducts for all 35 sectors of PSX and 512 firms from those sectors that fulfill the selection criteria. After applying the ARDL model to every sector and then for each selected firm of the same sector for both short-run and long-run relationships. Table 1 and Table 2 shows both short run and long results for the role of MEV in determining stock price movements for every sector. These tables show sector-wise results and indicate that out of 35 sectors, it was significant was every MEV in explaining stock movements.

Table 1 shows the overall sector response for changing MEV in the short run. IR was positively significant for two sectors and negatively significant for 30 sectors. Next, Exp was positively significant for 22 sectors and negatively significant for 11 sectors.

FER was positively significant for 27 sectors and negatively significant for four sectors. IF was positively significant for 24 sectors and negatively significant for six sectors. FDI was positively significant for 27 sectors and negatively significant for six sectors. By positively significant, it is mean that with a change in the independent variable, the change in the dependent variable is also in the same direction. By negatively significant, it means that with a change in the independent variable, the change in the dependent variable is opposite.

Table 1. Overall sector response for changing MEV in Short Run

Short Run	Interest Rate	Exports	Foreign Exchange Reserve	Inflation	Foreign Direct Investment
Insignificant	3	2	4	5	2
Positive Significant	2	22	27	24	27
Negative Significant	30	11	4	6	6
Total Sectors	35	35	35	35	35

Table 2 shows the result for sector response for changing MEV in the long run. IR was positively significant for three sectors and negatively significant for 29 sectors. Export positively significant for 18 sectors and negatively significant for 13 sectors. FER was positively significant for 17 sectors and negatively significant for 12 sectors. IF was positively significant for four sectors and negatively significant for 29 sectors. FDI was positively significant for 24 sectors and negatively significant for eight sectors. By positively significant, it is mean that with a change in the independent variable, the dependent variable changes are also in the same direction. By negatively significant, it means that with a change in the independent variable, the change in the dependent variable is opposite.

Table 2. Overall sector response for changing MEV in Long Run

Long Run	Interest Rate	Exports	Foreign Exchange Reserve	Inflation	Foreign Direct Investment
Insignificant	3	4	6	2	3
Positive Significant	3	18	17	4	24
Negative Significant	29	13	12	29	8
Total Firms	35	35	35	35	35

Table 3 and Table 4 show both short run and long results for the role of MEV in determining stock price movements for 512 firms. These tables show firm, wise results and indicate that out of 512 firms, every MEV in explaining stock movements. In the long run (Table 3), FER was positively significant for 268 firms and negatively significant

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for 81 firms. IR was positively significant for 127 firms and negatively significant for 317 firms. IF was positively significant for 54 firms and negatively significant for 318. EXP was positively significant for 265 firms and negatively significant for 95 firms. FDI was positively significant for 157 firms and negatively significant for 54 firms. By positively significant, it is mean that with a change in the independent variable, the change in the dependent variable is also in the same direction. By negatively significant, it means that with a change in the independent variable, the change in the dependent variable is opposite.

Table 3. Individual firm response for changing MEV in Long Run

Long Run	Interest Rate	Exports	Foreign Exchange Reserve	Inflation	Foreign Direct Investment
Insignificant	68	152	162	140	301
Positive Significant	127	265	268	54	157
Negative Significant	317	95	81	318	54
Total Firms	512	512	512	512	512

In the short run IR (Table 4), FER was positively significant for 237 firms and negatively significant for 72 firms. IR positively affects 285 firms and negatively affect 37 firms. Otherwise, IF positively influence 225 firms and negatively influence 68. Next, EXP positively affects 195 firms and negatively affect 63 firms. FDI was positively significant for 102 firms and negatively significant for 77 firms. By positively significant, it is mean that with the change in the independent variable, the change in the dependent variable is also in the same direction. By negatively significant, it means that with a change in the independent variable, the change in the dependent variable is opposite.

Table 4. Individual firm response for changing MEV in Short Run

Short Run	Interest Rate	Exports	Foreign Exchange Reserve	Inflation	Foreign Direct Investment
Insignificant	190	254	203	219	313
Positive Significant	285	195	237	225	102
Negative Significant	37	63	72	68	77
Total Firms	512	512	512	512	512

The overall sector's response to this MEV in both the short run and long run was different. Some variables which were proved significant in the short run turned into insignificant in the long run, or in many cases, it was positive in the short run and negative in the long run. The Selected firms in the same sector show just like overall sector response, they show a different performance for both the short and long run. Some variables that were proved significant in the short turned into insignificant in the

long run. While comparing results for firms within the same sector, it finds that the impact of MEV was not the same for all firms. Some significant variables for some firms came out to be insignificant for other firms of the same sector. While comparing each selected firm's result with the overall sector outcome, the response was different for both the overall and individual firms for the same variable.

The results of this study are consistent with the studies of (Saleem et al., 2013; Adjasi et al., 2008; Hamrita et al., 2009; Bai, 2014; Giri & Joshi, 2017; Hussain et al., 2012; Kalyanaraman & Tuwajri, 2014; Paramati et al., 2016). All these studies show the impact of this MEV were either positive or negative, whereas the results obtained are not in line with the findings of (Quadir, 2012; Hasan, 2008; Humpe & Macmillan, 2009; Akbar et al., 2012; Ho & Odhiambo, 2019).

Conclusions

This research will fill the literature gap with a more comprehensive explanation of the role of MEV in stock movements applicable beyond the sample country's geographical boundaries. There are almost 130+ developing economies, and one common feature of developing economies is they have identical characteristics in economic and financial structure. As the study conducted in Pakistan is also a developing economy, these results can be generalized conveniently in the same countries.

The practical implication for this study is multifold. For policymakers, it provides guidelines that one economic policy for all sectors is not the right strategy. The results suggest that if we take an example of FDI, it positively impacted 24 sectors and negatively impacted eight sectors, so the government must devise different policies for both sectors. The policies emphasize having more and more foreign direct investment in PSX in all sectors, as some sectors showed a negative response, which will not be suitable for those having an interest in them. Similarly, in both the short and long run, the responses were different, so key policymakers must consider these time frames before designing and implementing new policies.

It is of utmost importance for investors to keep an eye on changing MEV and its impact upon stock movements. This study provides firm, wise details so if any firm from the constructed portfolio shows any negative impact due to changing MEV or if there is an expectation of change in MEV which can adversely impact the portfolio based upon the information provided by this study.

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The COVID-19's Economic Crisis and Its Solutions: A Literature Review

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Abstract

The pandemic of COVID-19 predicts can create a global economic crisis include Indonesia. This paper aimed to answer the first question: how the transmission process from a pandemic became an economic crisis; Second, what macroeconomic policies should take to recover the economic crisis of the COVID-19 pandemic; third, what non-economic measures must consider confirming the macroeconomic policies achieved its target. Using 32 references in the literature review process, we tried to find out the answers to this study's questions. This study recommended that the measures for containment of the virus spread and the execution of fiscal and monetary stimulus should be coordinate internationally among countries and territories.

Keywords:
Covid-19, economic crisis, macroeconomic policy

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Introduction

On December 31, 2019, China revealed that some mysterious pneumonia cases had emerged in Wuhan City, Hubei Province. On January 7, 2020, Chinese authorities announced the detection of the latest human virus, Betacorona, named as 2019-nCoV by the World Health Organization (WHO), which was later named SARS-CoV-2 cause of the Pneumonia outbreak in Wuhan. On January 10, 2020, the viral genome was released and published officially as COVID-19 by WHO (Marty & Jones, 2020).

The impact of COVID-19 spreads the entire world quickly. Since May 7, 2020, WHO noted this virus had infected 215 areas, territories, or countries in the world within five months of being predicted its existence. When referring to the number of confirmed cases, deaths, and the duration of outbreaks, COVID-19 has the worst impact compare to other pandemics (see Table 1). For instance, COVID-19 spreads in 215 countries compared to other pandemics that spread in less than 30 countries. COVID-19 also is known as more dangerous than the previous pandemics, such as MERS (396 times as many victims), SARS (328 times as many victims), and Ebola (119 times as many victims).

Table 1. The Cases of Infection, Death and Area Distribution of The Pandemic of COVID-19 Compared by Other Pandemics

Pandemic	Confirmed cases	Confirmed death	Area and started date	Number of countries, areas, or territories with cases	Time duration of cases
COVID-19 (SARS-CoV-2)	3679499	54199	Wuhan (China), 31 December 2019	215	December-May 2020 (temporary calculation)
Middle East Respiratory Syndrome (MERS)	2494	858	Saudi Arabia, April 2012	27	April 2012-Nov 2109
SARS	8096	774	Vietnam, 26 February 2003	29	26 Feb – 31 Dec 2003
Ebola	3462	2134	North Kivu Province, Democratic Republic of Congo	Central and West Africa	The first outbreak in remote villages in Central Africa 1976, Outbreak in 2014-2016 West Africa as complex and the largest one

Source: Authors' compilation from World Health Organization

Coronavirus pandemic predictions can stimulate the economic crisis. The latest OECD Economic Outlook projects annual global GDP growth to fall from 2.9 percent in 2019 to 2.4 percent in 2020, with GDP contracting in the first quarter of 2020. GDP growth in China is predicted below 5 percent this year. China's latest data shows that the industrial production index falls to 13.5 percent in the first two months of

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2020, the most dramatic decline since the early 1990s. Meanwhile, the prediction state that the spread of a pandemic in Europe and the US can create stagnation or recession throughout Europe, with a significant reduction in growth, which could reach 5 percent. The most vulnerable European region is Southern Europe (Lucchese & Pianta, 2020).

Based on the previous pandemic relationship with the economy, we can know that the pandemic creates a strong regional negative externality. During the Ebola outbreak, although its spread was limited in Africa, mainly it only occurred in three West African countries, with a relatively small number of cases such as Nigeria (20 cases), Mali (8 cases), and Senegal (1 case) and all of the cases quickly control. However, the negative impact turned out to hit the whole economy of Sub-Saharan Africa. This condition happens because of weakening consumer and investor confidence and disruption of tourism and cross-border trade. According to a World Bank report, the cumulative losses of Sub-Saharan Africa countries (not include the three countries directly affected by the Ebola virus) in 2015 exceeded $500 million as the worth of negative externality of Ebola. This phenomenon is similar to the SARS outbreak in 2003. The Asian Development Bank (ADB) in early May 2003 estimated that GDP growth in East and Southeast Asia was reduced by 0.2 percent due to disruptions in the tourism, catering, hotel, retail, and other industries throughout Asia as the negative impact of the SARS pandemic (Gong et al., 2020).

Table 2. Impact of COVID-19's Pandemic on The Economic Growth of Indonesia and The World

Country and Territory	Economic growth (percentage)			
	Before COVID-19	Impact of COVID 19		
	2019	2020	2021	Referred institution
Indonesia	5,02	-3.5 - 2.1	5.2 - 5.6	World Bank
		2.5	5	Asian Development Bank (ADB)
		3	4.3	Moody's
		0.5	8.2	IMF
China	6.1	1.2	9.5	
India	4.2	1.9	7.4	
ASEAN-5	4.8	-0.6	7.8	
USA	2.3	-5.9	4.7	
Euro Area	1.2	-7.5	4.7	

Source: (Kementerian Keuangan, 2020)

Prediction states that COVID-19 negatively affects both global and country economic growth (Table 2). China's economic growth plummeted from 6.1 percent (2019) to 1.2 percent (2020), India fell from 4.2 percent to 1.9 percent, ASEAN-5 dropped from 4.8 percent to -0.6 percent, the USA from 2.3 percent to -5.9 percent,

the Euro Area down from 1.2 percent to -7.5 percent. The number of predictions about the impact of COVID-19 on the Indonesian economy presents the same results. The results show that Indonesia has a decline in growth, i.e., from 5.02 percent in 2019 and plummet become -3.5 to 2.1 percent in 2020 according to the World Bank, down to 2.5 percent according to the Asian Development Bank, decrease to 3 percent (according to Moody's), and decrease to 0.5 percent based on IMF prediction in 2020 (Kementerian Keuangan, 2020)

The exciting facts related to the forecasts of the impact of COVID-19 as previously showed the phenomena that all countries and regions whose growth decline in 2020, return their level of economic growth which the same as to the level before pandemic in 2021 or even they have higher economic growth than 2019 (before COVID-19 pandemic). This fact means that these forecasts assume the shape of economic recovery in the V-shape where the economy plummeted because the pandemic can immediately recover to the initial conditions (before the pandemic).

The economic crisis of COVID-19 is an unprecedented phenomenon because of some reasons as follows: 1) as described in Table 1, the spread and the victims of COVID-19 are geographically broader and more significant in the number of victims than previous pandemics so that the economic crisis which happened become global and worse in both its magnitude and duration. If the previous epidemic's impact impacted the country and regional coverage, then the economic crisis of COVID-19 is predicted a truly global impact. 2) The previous significant economic crises, namely the Asia Pacific crisis in 1997-1998 and the world financial crisis in 2008, are caused by economic factors. Massive capital outflows from the Southeast Asian region affect the Asia Pacific crisis (Irawan, 2005). The problem in the US subprime mortgage market affects the 2008 financial crisis (Crotty, 2009). Meanwhile, the COVID-19 economic crisis is due to the non-economic factor. Thus, to overcome the economic crisis caused by this pandemic, it must be understood how a COVID-19 pandemic phenomenon can turn into an economic crisis. This condition is the first question that will be answered in this study. Policymakers for keeping the number of infected people must handle two things by national health facilities. First, slow down the virus's spread through physical distancing, use masks, and regularly wash the hands. Second, measures are taken to block the spread of the virus, such as a lockdown or closing activities that have implications for gathering people and quarantine the territories. Meanwhile, in terms of overcoming the economic recession or depression, based on the experience of the previous economic crises, including the great depression in the 1930s, the Keynesian macroeconomic policy was the choice (Herrero, 2020), namely by taking expansionary fiscal and monetary policies. However, fiscal and monetary policy to overcome the pandemic must consider the domestic and global conditions (Zhao et al., 2020). For this reason, the second and third questions of this study to be answered are what macroeconomic policies should be taken to recover the economic crisis of the COVID-19 pandemic and what non-economic measures must be considered to help the macroeconomic policies achieved their target, i.e., the economic recovery.

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This paper is a preliminary study to understand the impact of the COVID-19 pandemic on the Indonesian economy. This study will contribute as follows: First, to give policymakers a complete picture of economic policies that are important to overcome the destructive economic impact of the COVID-19 pandemic and the non-economic requirement that must be fulfilled to achieve economic recovery. Second, this study can be an essential reference for the next researchers who will empirically verify the impact of COVID-19 on the Indonesian economy and simulate economic policy's economic recovery effect.

Methods

To answer the three questions of this study, we applied the following methods: First, searching for references from the Internet used keywords, i.e., pandemic, COVID-19, economic crisis, and macroeconomic policy. We have collected about 170 references that suit the keywords. Second, from the 170 initial references, we selected 32 among them because they related to issues that were fulfilled as reference for this study, i.e., research about economic predictions of COVID-19 impact on the country, region, and even global coverage. Second, the empirical impact of the previous epidemic -such as AIDS and Ebola- is a benchmark to estimate the impact of the COVID-19 pandemic on the economy. Third, reports from government and international institutions regarding the economic impact of COVID-19 on the economy. Fourth, Researches related to health management to reduce the spread of the pandemic, either directly related to COVID-19 or other diseases such as AIDS and Ebola. Fifth, researches related to the economic crises in Indonesia. Through using 32 references in the literature review process, we find out the answers to the questions of this study.

Discussion

From Pandemic to Economic Crisis

Theoretically, how a pandemic transmission becomes an economic crisis show in Figure 1. It assumes that there are two categories of goods and services: essential goods and services. Example goods and services use for containment the viral infection (such as food, ventilators, masks, hand sanitizers, doctor and paramedics services) and other goods and services are categorized as non-essential ones because they do not play an essential role in dealing with stopping viral infections.

Three panels in Figure 1 reflect the impact of COVID-19 on both essential and non-essential of goods and services market and GDP. In panel (a), the initial equilibrium situation for essential goods and services is at point E1, where the equilibrium quantity is Q1, and the market price at equilibrium is P1. During the pandemic, the demand for essential goods and services such as food and medicine rise significantly. In panel (a), shifting the demand curve from D to D1 reflects the increase in demand for essential goods and services; the shifting effect of the demand is that the price of essential goods rises from P1 to P2, and the amount of traded goods rises at Q2.

When the demand for essential goods such as medical equipment and medicines increases, many non-essential goods switch to producing these essential goods, something similar happened in Indonesia. Significant increase in the number of health equipment manufacturers for containment COVID-19 as data showed on April 4, 2020, compared to data on February 29, 2020. Mask manufacturers increased 77 percent (from 22 producers on February 29, 2020, to 39 producers on April 4, 2020). The highest increase in the personnel protective equipment industry, i.e., raising its producers by 567 percent from three manufacturers in February, became 20 manufacturers in April 2020. An increase of 186 percent occurred in the hand sanitizer producer from previously only 36 manufacturers to 103 manufactures.

Then, there was an increase in imports of these essential goods in the pandemic's economic regions. As a result, supply increased slightly in response to this increase in demand, shifting the supply curve from S to S1. This supply curve shift is not too large for two reasons. First, shifting from non-essential goods to essential goods (for instance, from car to a ventilator) happened. However, the company that has just turned to produce these essential goods does not have the quality of technology, skills, and experience to produce these essential goods in large quantities as same as the quality of technology of the regular company that usually produce these goods in a situation before the pandemic. Second, import demand for essential goods such as health equipment has also increased globally because this epidemic has gone global (demand for imports of medical supplies such as masks, ventilators, testing kits, and protective equipment personnel has increased in all countries across the world). This increase in supply causes a new equilibrium market at E3 where the quantity of goods is traded, Q3, and its price, P3, which is lower than P2. The equilibrium price, P3, is higher than P1 (market equilibrium price when normal conditions or without a pandemic).

Panel (b) illustrates the market's reaction to supply and demand changes in non-essential goods markets because of the pandemic. A pandemic causes a decrease in demand for non-essential goods such as cars. Panel (b) shows the initial position of the non-essential goods market equilibrium at E4, where the quantity traded is Q4 and the price, P4. Demand drops sharply and graphically showed by shifting the demand curve from D to D1, price fall from P4 to P5, and the quantity traded falls from Q4 to Q5. Due to the closure of businesses and factories of these non-essential goods permanently or temporarily, many producers leave the market. This phenomenon reduces the supply of non-essential goods. Two factors, i.e., 1 caused the drop in supply) Many non-essential goods producers turn to produce essential goods (for example, General Motors in the USA). The drop in demand for non-essential goods that occurred globally caused the demand for these goods' exports also plummet. The supply cut in panel (b) indicates a shift in the supply curve to the left from S to S1. This shift causes a slight increase in prices, i.e., at P6 with the number of goods traded at Q6. The price of P6 is still lower than the initial price, P4, because the drop in demand prevents the price from returning to the initial level (P4).

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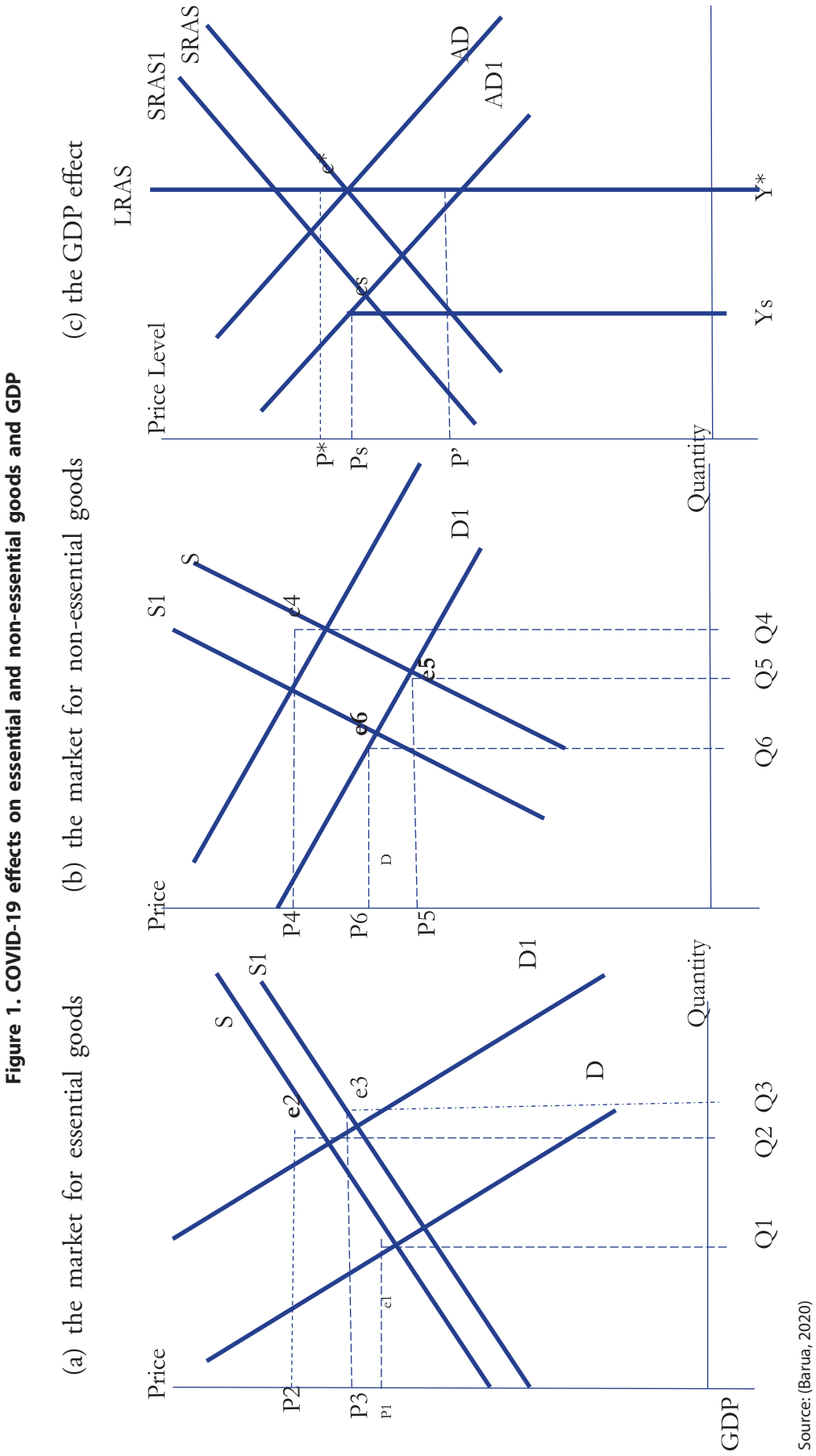
Figure 1. COVID-19 effects on essential and non-essential goods and GDP



Source: (Barua, 2020)

Panel (c) illustrates the process of how pandemic becomes to recession through the AS-AD curve. In the initial situation, at AD-AS, long-run full-employment equilibrium. Goods and services assumed in the economy are classified as essential goods and services (personnel protection equipment, ventilators, masks, hand sanitizers, doctors, health and hospital services, and food) and non-essential goods and services (all goods and services that have no contribution to protecting our selves from COVID-19 infections).

The virus's direct effect is the increasing number of infected people and fatalities, thus requiring the government or the community to take containment and mitigation actions (World Bank, 2020). The closure of business activities and workers unable to work in factories and other workplaces, trade and business disruption also occurs as a result of losing access to goods, travel bans, and restrictions on the entry of goods, people, and other capital generate disruption aggregate supply (Asian Development Bank, 2020). This disruption is shown graphically by shifting the short-term AS curve to the left, i.e., from SRAS to SRAS1.

In the short term, the pandemic also causes aggregate demand disruption. This aggregate demand disruption refers to the experience of Sub Saharan Africa due to: 1) Disruption of trade and value chains, which then suppresses commodity exports; 2) decreasing foreign financing (foreign direct investment, foreign aid, remittances, tourism revenue, and capital flights) (World Bank, 2020). Meanwhile, according to the Asian Development Bank (2020), aggregate demand disruption occurs due to a sharp and temporary decline in consumption and investment in China and other countries affected by the pandemic. Spillover from the drop of aggregate demand is transmitted to other sectors and economies through trade and production.

The impact of the negative shock on both AD and AS causes the economy to be at es where GDP (output), Ys smaller than full-employment output, Y* and Ps, price levels are lower than full-employment price levels (P*). This condition means that the economy in a short-run condition likely face lower national output (income) coupled with deflationary pressure. If this phenomenon continues, it will create an economic recession.

Furthermore (Sachs, 2020) explained that there could be mutual interactions between aggregate demand and supply shock. When containment measures occur, such as lockdown, it implies weakening the circular flow of income. When household spending decreases and the economy in an uncertain situation causes a decrease in demand, it affects the company by losing its revenue. After that company ran out of cash to pay labor wages, this situation becomes further pressure on household spending. This situation is meaning supply shock induces the demand and vice versa. Another domestic impact of the lockdown creates unprecedented capital outflow from emerging markets that halved the company's value. This condition is also associated with the depreciation of the domestic exchange rate that impacts rising prices of imported goods. Nevertheless, exports also plummeted because export goods produced by emerging countries such as Indonesia have links to disrupted global supply chains. This turbulence can continue in the future until the COVID-19 spread is successfully locked.

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In the long run, if the economy can restore its output (indicated by the SRAS1 curve shifting to SRAS) but fails to increase aggregate demand, then the economy is in a situation where GDP is at Y* but the price level will continue to fall at P' (see panel c, Figure 1). This situation suggests, in the long run, should come with a significant and upward demand shock. In this situation, the importance of the monetary and fiscal policy's existence to shift the AD curve to its position before the crisis.

Lessons from the Previous Pandemics

The study of past epidemics identified several channels through which economic costs can arise. Loss of labor productivity through death and illness was an important channel, especially in severe pandemics, such as in the case of the 1918 influenza. Economic costs also arose due to weak consumer sentiment, high exposure to the service sector, the impact of social distancing, and potential financial amplification. All the channels that caused these economic costs to arise still relevant in today's case for the COVID-19 pandemic (Boissay & Rungcharoenkitkul, 2020).

Several insights from the previous pandemics explained as follows; first, estimates of the economic cost of epidemics vary widely, depending on the severity and treatment. Influenza 1918 is generally the costliest pandemic in modern history. Correia et al. (2020) estimate that this pandemic curtailed manufacturing activity by about 20 percent. While Barro et al. (2020) estimated the negative impact of this pandemic on global GDP. Social distancing measures were introduced to contain the 1918-influenza pandemic, but these vary between jurisdictions, and there was no synchronous halt in economic activity. Correia et al. (2020) found that states in the USA that introduced containment measures earlier got relatively higher medium-term growth. This phenomenon showed that, at that time, the economic costs were mainly due to loss of lives, which was spread for three years (see also Fan et al., 2016). Many studies have estimated the hypothetical cost of the 1918 influenza pandemic in the modern era. GPMB (2019), for example, estimated the economic cost of 1918 influenza has a value of about 5 percent of global GDP. The milder pandemics showed a lower economic cost. The estimated economic cost for the SARS epidemic is merely 0.1 percent of global GDP (Lee & Mckibbin, 2004). The economic costs of the H1N1 "bird flu" and Ebola epidemics are also relatively small. The economic costs for the H1N1 pandemic have a value of 0.1 percent of global GDP. Meanwhile, Ebola merely reduced the GDP growth in Guinea by 2 percent, Liberia by 3.4 percent, and Sierra Leone by 3.3 percent, respectively (World Bank, 2014).

Second, economic costs can manifest through both supply and demand effects. In response to pandemic risk, workers limited their social interactions by reducing labor supply and consumption. Arnold et al. (2006) examined the supply side channel in the influenza 1918 pandemic. They concluded that, in the first year, this pandemic reduced GDP by about 2.3 percent. The same study has been done related to SARS to assess the demand-side. This study assumed the severe effects of the pandemics were in industries whose products required collected customers. They found out that overall demand-side effects would reduce GDP by 2 percent.

Third, pandemics have long-term adverse effects on the economy. On the supply side, in the 1918-influenza pandemic, the most expensive costs were mortality and workforce reduction. A one-time reduction in the labor force will increase the ratio of capital to labor and decrease the return rate on capital and lower the rate of capital accumulation and GDP growth over the years (Fan et al., 2016).

Pandemics can also cause a continuous decline in total demand. Jordà et al. (2020) studied the long-term effects of 12 major European epidemics dating from the 14th century. They found that the pandemics are usually followed by decades of low natural interest rates due to high precautionary saving and reduced investment opportunities. Indeed, unlike war, pandemics do not destroy physical capital and usually result in a prolonged surplus capital per surviving worker.

There is a good lesson from previous pandemics studies that are still relevant to the COVID-19 case. If the epidemic reaches a global scale with many fatalities, the economic losses will also be very high and persistent. It means that containment measures are needed, although expensive from economic costs, because they give economic benefits in preserving the workforce. Besides that, these measures will save human lives as the ultimate goal to handle pandemics. The COVID-19 pandemic is different from previous ones for the following reasons: first, the global spread of Covid-19 is faster than previous ones due to the international integration of markets and regions. Second, asymptomatic carriers have caused the transmission of COVID-19 faster than previous ones, such as SARS. This situation led to a large-scale lockdown policy implemented globally in an almost synchronous manner (Boissay & Rungcharoenkitkul, 2020). Then, this phenomenon caused a sudden stop in global economic activity that had implications for the recession and, more than that, a crisis of the economy.

Economic Recovery of COVID-19's Pandemic

According to Szlezak et al. (2020), the shape of the economic recovery process of the COVID-19 pandemic will result in four recovery patterns, namely; 1) V-shape. The pandemic caused the plummeting economy, marked by both a sharp decline in economic growth and increased unemployment, but the economy could recover back to the pre-crisis position in a short time. 2) U-shape, Growth dropped dramatically, and unemployment increased. The rate of economic growth recovery takes a long time. The gap between the old and new economic growth paths remains large, which shows damage in the supply side of the economy, mostly lost output, and requires a much longer time to return to pre-crisis conditions, 3) L-shape, as the worst shape. The country's economic growth has never been restored to its output before the crisis, but its growth rate has declined. The distance between the old and new paths of growth is widening, with continuing output lost. This condition means that the crisis has left permanent structural damage on the supply side. This L-shape is the worst damaging form due to the pandemic economic crisis, 4) W-Shape, multiple, or repeated V-shape. This shape can happen because of a second (third and so on) wave outbreak. This shape is also classified as a bad form of a country's economic recovery process.

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The study of Boston Consulting Group shows that most company leaders worldwide predict a pessimistic recovery of the world economy because 51 percent of them predict the pattern of economic recovery is U-shape, 25 percent L, and 16 percent W-shape. Only 8 percent of those assess the process of economic recovery with optimism, i.e., having V-shape. There is a common prediction that the COVID-19 crisis has large economic damage.

The difficulty in overcoming COVID-19's macroeconomic crisis lies in the magnitude of the uncertainty within it. The first uncertainty is how long the virus confinement. It is known that restrictions on the human population's movement and activities have an essential role in suppressing viral infections, but there is no certainty how long the confinement should be ended because confinement has contributed to economic recession. The tighter the act of containment is for saving human lives, the harder recession experienced by the economy (Eichenbaum et al., 2020).

The absence of a similar historical precedent to the previous economic crisis case make the economic crisis of CORONA also can be classified as an unprecedented and complicated economic crisis (Bank of Spain, 2020). At the same time, Boissay & Rungcharoenkitkul (2020) said an essential difference between COVID 19 and previous pandemics such as SARS, MERS, and flu. In the current situation, the bad impact of Coronavirus more dangerous than the pandemic before for at least two reasons, i.e., 1) international integration in the COVID-19 era is more significant than previous pandemics so that making pandemic spread more globally too and 2) the presence of transmission factors can occur by carriers without symptoms which causes faster transmission compared to previous pandemics.

According to Herrero (2020), a pandemic's economic impact depends on how it is handled from a health and economic perspective. There are two measures for overcoming a pandemic. The first, mitigation, focuses on slowing down but not always stopping the spread of the virus. The purpose of mitigation measures is to reduce the demand for health care so that all virus victims can still be managed by a country's health infrastructure while protecting those most risk people. The second, suppression, aims to reverse the pandemic's growth, but its risk is a pandemic could rebound at any time when suppression measures are stopped. Mitigation actions cause the pandemic existence longer but have a less extreme economic impact. Suppression overcame the pandemic more quickly but brought extreme economic consequences because of disruption in Aggregate supply and demand. However, the hope is that the economy can recover more quickly as long as there is no increase in the number of cases exposed to pandemics. It should be noted that a pandemic tends to have a period of 18 months until the vaccine is available.

The choice of disease management that will be taken, whether mitigation or suppression, causes different economic consequences. Mitigation, which takes living with pandemic longer, has a less bad impact on the economy. It is estimated only to negatively impact aggregate demand but less impact aggregate supply because the population will not be fully locked down. In other words, depression (deflation and recession) is most likely to occur due to mitigation. If the government chooses to suppress a pandemic,

as China does, especially in Hubei province, supply shocks happened and maybe greater because most businesses and jobs that require physical presence cannot be carried out in full lockdown. In this situation, aggregate supply and demand are disrupted. In that context, stagflation (inflation and high recession) is the most likely scenario.

Macroeconomic Policy for Overcoming

Economic policy is carried out to present a V-shape in economic recovery, where economic growth is recovering at least the same level before the pandemic. The economic policies undertaken for economic recovery consist of two items: first, measures for locking the spread of COVID-19. These measures aim to stop negative AS shocks. Second, fiscal and monetary policy stimulus to shift the aggregate demand curve to the right (see panel c at Figure 1). This stimulus is to accelerate recovery from the economic crisis. These actions were carried out by all countries affected by the pandemic (Baldwin & Di Mauro, 2020).

Measures and policies as stated above, have been carried out by many countries in the world, including Indonesia, namely 1) prevention of the spread of COVID-19 (lockdown, rapid and massive test, travel band/ restriction, physical distancing, working from home, a study from home, prohibiting public activities and penalties for non-compliance), 2 Allocating public expenditure for public health infrastructure and facilities like emergency hospital space, ventilators, protective medical equipment, medical personnel; 3) measures to subsidize or support income for workers who are forced to lay off or the unemployed 4) general or targeted cash transfers; 5) Assisting affected business, e.g. wage subsidies, tax cuts, moratoriums on debt repayments, credit lines, and 5) reduced stress on financial systems; interest rate cuts, reduced reserved requirements, lower rates and longer maturity on the discount window (Loayza and Pennings, 2020); Kementerian Keuangan, 2020; and Baldwin & Di Mauro, 2020)).

Some other essential actions need to be taken during a health crisis (when the outbreak starts until the situation shows a decline in the number of infection cases). The first action at the national level, i.e., First, a proactive management approach and collaboration among stakeholders, including government, media, NGOs, the community, health professionals, and individuals, is vital in overcoming this pandemic problem (Evans, 2020; Zhao et al., 2020). Second, authentic, transparent, open, and accurate data avoid the occurrence of either an attitude of underestimation or excessive concern to the pandemic, which makes economic loss get worse (Gong et al., 2020). Third, the success of overcoming the health crisis is necessary because, in the case of a pandemic, this health crisis implies presenting an economic crisis. Therefore, actions that overcome the health crisis must involve competent experts who deeply understand the pandemic and the virus itself. Learning from the failure of China's early warning system to prevent COVID-19 from becoming an epidemic that caused a global outbreak of CORONA lies in their epidemic governance system dominated by bureaucracy and politicians. While the scientific/professional community's capacity in this regard, such as virologists, doctors,

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and epidemiologists, are ignored. This condition is one of the main factors contributing to the virus outbreak's damage early warning system in China (Gu & Li, 2020). Fourth, in the future, the importance of providing health care infrastructure and vaccines for anticipating other kinds of new epidemics or pandemics (Paget, 2009).

In international cooperation, containment of the spread of viruses that are not internationally coordinated will increase the likelihood of a repeated outbreak across the world. This condition means repeated locking of the virus is needed and will have implications for larger fatalities and greater economic losses (Kohlscheen et al., 2020; Loayza & Pennings, 2020; McKibbin & Fernando, 2020).

Economic policies must be carried out internationally among countries and territories (Kohlscheen et al., 2020; Loayza & Pennings, 2020). International policy cooperation is needed to improve monetary and fiscal stimulus effectiveness at the national level and avoid beggar-thy-neighbor policies such as competitive devaluation. According to Herrero (2020), international macroeconomic policy cooperation for overcoming the current economic crisis nowadays is more important than during the 2008 financial crisis for several reasons; First, the shock to the real economy is greater than the global financial crisis of 2008, considering that more than 200 countries are directly affected by COVID-19. Second, the COVID-19 pandemic attacks the real economy's heart, i.e., the company's cash flow and household income. Third, the non-banking portion of the financial system has become huge and does not directly access central bank liquidity. Fourth, the global financial system is more interrelated than in the past. For Indonesia, the cooperation and coordination of macroeconomic policies to overcome the COVID-19's economic crisis are essential. Because economic liberalization has caused financial sectors (from both domestic and foreign) to be the most significant source of economic instability in Indonesia (Irawan & Warjiyo, 2005) thus, to overcome the impact of instability stemming from the globalization of COVID-19 cannot rely solely on the strength of domestic economic policy.

Conclusion

This study provides the following conclusions: firstly, the aggregate supply shock is the initial impact of a pandemic. Then there is a mutual effect between shock aggregate supply and demand. In the short-run equilibrium condition, the impact of the negative shock in both AD and AS causes an economy to achieve a situation where GDP (output) is below (smaller) than full-employment output, and the price level is lower than the full-employment price level. This condition means the short-run economy's economy has a lower national output (income) coupled with deflationary pressure. If this phenomenon continues, it will create an economic recession.

Secondly, economic policies in the pandemic intend to increase public health care capacity and provide incentives for the people to comply with all activities that can lock down the spread of the virus. Meanwhile, the pandemic aftermath measures are carried out to contain the virus spread through social distancing until the vaccine is found to

prevent further waves of outbreaks and accelerate economic recovery by executing fiscal and monetary stimulus.

Thirdly, measures for containment of the virus spread and execution of fiscal and monetary stimulus should be coordinate internationally among countries and territories. Unilateral action has a great chance of failing to overcome the economic crisis due to a pandemic. Locking the spread of not coordinated viruses will increase the likelihood of wider and repeated the pandemic outbreak. International macro policy cooperation is needed to increase monetary and fiscal stimulus policies carried out at the national level.

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Cryptocurrencies in Modern Finance: A Literature Review

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Abstract

The focus on cryptocurrencies in the finance and banking sectors is gaining momentum. In this paper, we investigate the role of cryptocurrencies in modern finance. We apply a narrative literature review method to synthesize prior research and draw insights into the opportunities and challenges of leveraging cryptocurrencies. The results indicate that cryptocurrencies offer businesses and individuals lower transaction costs, higher efficiencies, increased security and privacy, meaningful diversification benefits, alternative financing solutions, and financial inclusion. Challenges exist related to the integration of cryptocurrencies in modern finance. These include the lack of regulatory standards, the risk of criminal activity, high energy and environmental costs, regulatory bans and usage restrictions, security and privacy concerns, and the high volatility of cryptocurrencies. The current review is useful for scholars and managers, including those seeking to have a more balanced understanding of these emerging financial instruments.

Keywords:
cryptocurrencies, finance, efficiency, challenges, business

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Introduction

After the global financial crisis of 2008, public trust in conventional banking systems was a concern. Most specifically, the first signs of economic turmoil appeared on March 16, 2008, when Bear Stearns and Lehman Brothers declared bankruptcy (Wilson, 2019). The shock's ramification did not stop at these institutions; instead, the debt contagion continued to spread and hit other financial powerhouses such AIG, the Bank of America, Citigroup, JPMorgan Chase, Goldman Sachs, and Morgan Stanley. Beyond the United States, the global financial crisis also spread to Europe and Asia. For example, following the crisis, Finland reported decreases in industrial production, private investments, and exports (Söderlund & Kestilä-Kekkonen, 2014). In China, most financial institutions and foreign banks were suspended and then stopped recruiting staff (Marquez-Velazquez, 2010). Banks reported a significant shortage of liquidity after shadow banks had financed themselves using short term unsecured or collateralized market borrowing (Milne, 2018). At a global level, the reputation of banks and other financial institutions (e.g., insurance companies) was tarnished in the public eye.

In the aftermath of the 2008 global financial crisis, an unknown person, group, or organization operating under the pseudonym 'Satoshi Nakamoto' introduced an electronic peer-to-peer system based on the cryptocurrency bitcoin (Nakamoto, 2008). Bitcoin is a decentralized digital currency introduced in 2008 and deployed at the beginning of 2009. It came as a response to the financial institutions that often privatized profits and socialized losses (Lerer & McGarrigle, 2018). A significant impetus behind the creation of cryptocurrencies was the need to create a system that allowed quick and cheap transactions without the intermediation of any trusted third parties (e.g., banks) (Bação et al., 2018; Chapron, 2017; Kfir, 2020; Kolber, 2018; Sudzina, 2018). Similarly, many scholars, enthusiasts, and futurists consider bitcoin a future alternative for state-issued currency (Bouri et al., 2018; Bouri et al., 2017; Hong, 2017).

Since the bitcoin launch, more than 1,600 cryptocurrencies have entered into circulation (Wilson, 2019). Beyond the hype, cryptocurrencies are presently used to buy real goods and real services in the real world (Dostov & Shust, 2014; Guadamuz & Marsden, 2015). Cryptocurrencies present a significant shift away from the traditional design, management, and regulation of financial systems (Shahzad et al., 2018). The technology behind the proliferation of cryptocurrencies is blockchain (Hashemi Joo et al., 2019; Lu et al., 2019; Searing & MacLeod, 2019). Blockchain technology is defined by Treiblmaier (2018) as "a digital, decentralized and distributed ledger in which transactions are logged and added in chronological order to create permanent and tamper-proof records." Blockchain technology is based on peer-to-peer connectivity and cryptographic security, allowing a decentralized approach with enhanced transparency and trust instead of the centralized and opaque nature of traditional monetary systems. Briere et al. (2013) opined that cryptocurrencies, especially bitcoin, are new financial instruments and alternative investments with diversification benefits. Many cryptocurrencies are used as a medium of exchange for daily payments, and they inherently have similar characteristics to other financial markets, particularly precious metals (Omane-Adjepong et al., 2019).

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Blockchain technology has attracted considerable attention from central banks and international retail banks (Dashkevich et al., 2020; Polasik et al., 2015). Many financial institutions capitalize on blockchain to establish financial technology (often referred to as FinTech) startups to leverage blockchain in delivering financial services and underpin cryptocurrencies (Milne, 2018).

This paper strives to investigate the role and importance of cryptocurrencies in modern-day transactions and economic systems. A narrative literature review is conducted to synthesize prior research on cryptocurrencies from the finance perspective. Despite recent attempts to understand the phenomenon of cryptocurrencies, there is still a lack of scholarly insights that analyze cryptocurrencies' opportunities and challenges in modern financial systems. For example, Flori (2019) makes a comprehensive review of the financial applications of cryptocurrencies. Nevertheless, the scope of his study is narrowly focused on bitcoin. Chohan (2017) conducted a thematic review on cryptocurrencies. However, several points in Chohan's research remain theoretically unexplored and conceptually unelaborated, such as the challenges of cryptocurrencies in the financial ecosystem. Additional reviews have been published recently, addressing the relationship between privacy and cryptocurrencies (Harvey & Branco-Illodo, 2020; Herskind et al., 2020). However, they lack a comprehensive analysis of other factors influencing the uptake of cryptocurrencies in the financial ecosystem. Therefore, the study's novelty resides in providing a more balanced and more in-depth understanding of the opportunities and challenges brought about by the usage of cryptocurrencies in finance.

This study will fill in the current gap in the literature concerning the lack of comprehensive analysis of cryptocurrencies from the finance perspective. Moreover, business and finance researchers are still unfamiliar with the new opportunities these emerging digital financial instruments can offer to individuals, organizations, and financial institutions (Charfeddine et al., 2020). The research also identified a lack of reviews focusing on the opportunities and challenges of cryptocurrencies in modern finance. This study is one of the first attempts towards understanding the role of cryptocurrencies in reshaping and disrupting current financial systems. We argue that by clarifying what cryptocurrencies are, how they work, and how they can be used, we enrich the current literature, which is still notably inconclusive and deficient regarding the far-reaching possibilities cryptocurrencies in modern financial systems. Thus, our research objectives will answer the following research question "what are the opportunities and challenges of cryptocurrencies in modern finance?

This study offers several contributions. First, it sheds light on these emerging financial instruments' role in simplifying cross-border transactions, improving transactional privacy and security, providing innovative financing mechanisms, and promoting more financial inclusion. Dorfleitner & Lung (2018) document that the popularity of cryptocurrencies in the financial context has been marked by exponential market volume growth. We also contribute to this literature by a timely review, and we add to the debate by scrutinizing the themes discussed in the cryptocurrencies literature.

Methods

To answer the research question, we conducted a narrative literature review using different academic databases, such as Google Scholar, Scopus, Web of Science and Springer Link. A narrative literature review is a methodological approach that aims to establish a comprehensive understanding and critical evaluation of knowledge relevant to a particular topic and to potentially reveal weaknesses or problematize concepts, theories, or claims that deserve further research (Boell & Cecez-Kecmanovic, 2015). A narrative literature review is not meant to be exhaustive; instead, it is selective in the content it uses, aiming at advancing and contributing to theory development (Cronin et al., 2008). Unlike systematic literature reviews, compiling a sample of data does not necessarily require it to be representative, as learning as much as possible about a topic is the most important (Wetherell & Potter, 1992). The use of a narrative literature review enables us to investigate the different ways that cryptocurrencies have been conceptualized in prior studies as well as to assess the theoretical underpinning of this emerging paradigm in finance.

Being a relatively new research area (García-Medina & Hernández, 2020) that needs sound elaboration and clear conceptualization, and given the multiple perspectives from which cryptocurrencies have been approached, undertaking a narrative literature review of these financial innovations is more appropriate to help us address our research objectives. Our research method is well-established because narrative literature reviews have been commonly applied in several management, finance, and economics related studies (Gott et al., 2011; Ricciardi, 2004; Sharma & Kumar, 2010; Wet, 2005).

Beginning with a focus on the origin and foundation of cryptocurrencies, we referred to the paper of Nakamoto (2008) as it represents the first reference on cryptocurrencies and has been recognized as the seminal work that has laid the foundation for a large number of studies examining bitcoin and blockchain technology. Prior research that explores the operating fundamentals of blockchain, its functioning, and its applications have been referenced in order to differentiate between the technology underpinning Bitcoin (the blockchain protocol) and the cryptocurrency, bitcoin (Rejeb et al., 2018; Rejeb & Rejeb, 2020; Treiblmaier et al., 2020). Subsequently, we searched for articles, books, chapters, and conference papers that have in their titles, abstracts or keywords the words: "finance" and "cryptocurrencies". The identified sources included in this review were screened for relevance on the basis of three questions: "Does the source have a minor or major focus on cryptocurrencies in the finance context?", "Does the source present the opportunities of using cryptocurrencies in modern finance?" and "Does the source provide insights into the challenges of adopting cryptocurrencies in today's financial systems?" We considered these questions during the screening of sources' titles, abstracts, keywords, and research objectives and questions while looking for ideas or concepts pertaining to cryptocurrencies.

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Result and Discussion

Overview of Cryptocurrencies, Blockchain and Related Concepts

According to Trautman (2014), cryptocurrencies are a subset of digital currencies that may have either centralized institutions or are based on a decentralized network. In simple terms, cryptocurrencies are a new type of currency (Duque, 2020; Hudson & Urquhart, 2019) that is digital and produced from cryptographic algorithms, exchanged across the Internet using protocols such as peer-to-peer networking (Nakamoto, 2008). Another way to define cryptocurrencies is the fact that they are based on the use of complex cryptographic techniques to provide users with a secure and safe medium of exchange (Bulut, 2018). The creation of value (or money) and the triggering of transactions are governed by the mining process, which is a set of mathematical algorithms that are implemented within the underlying protocol (Adhami et al., 2018; Cennamo et al., 2020). Most cryptocurrencies are created to introduce new units of currency with a limited total amount (Baur et al., 2015). Unlike state-issued currencies, cryptocurrencies are not governed by established laws, but by technology (Dodd, 2018). Accordingly, this makes cryptocurrencies a new invention that is different from traditional currencies. In the field of finance, the advent of cryptocurrencies represents a new area that requires additional public and academic attention (Aslan & Sensoy, 2020; Baumöhl, 2019; Cerqueti et al., 2020; Corbet et al., 2019; Platanakis et al., 2018; Vidal-Tomás et al., 2019).

At the time of writing, the cryptocurrencies market was valued at approximately USD 300 billion, with nearly 80% of that value in Bitcoin tokens. The landscape for cryptocurrencies has grown exponentially over the years (Babkin et al., 2017; Dimitrova et al., 2019). From a technical perspective, cryptocurrencies work through a peer-to-peer, distributed, and decentralized network (Nakamoto, 2008). That said, there are no specific regulatory bodies (Alonso & Luis, 2019; Ng & Griffin, 2018; Yalaman & Yıldırım, 2019) that verify and control the transactions and the transfer of value within the network. Second, cryptocurrencies operate within a robust, unhackable peer-to-peer infrastructure underpinned by blockchain technology (Clark & Burstall, 2018; Karpan, 2019; J. Wang et al., 2017). The technology helps to guarantee that financial transactions and value transfers between two parties, regardless of their type, are carried out directly and without the intermediation of a third party (Keogh, Dube, et al., 2020; Keogh, Rejeb, et al., 2020; Treiblmaier, 2019). In finance applications, the power of blockchain technology lies in its ability to solve the double-spending problem (Treiblmaier, 2019). This is the likelihood that the same digital token can be spent more than once because a digital token consists of a digital file that can be duplicated or falsified (Chohan, 2017). Cryptocurrencies use the public Internet, which provides speed, resiliency and efficiency (G. Wang, 2019). The absence of trust between the exchange partners is empowered by public-key cryptography mechanisms used to secure the conclusions of money transactions (Korpela et al., 2017; Rowan et al., 2017; Uddin et al., 2019).

A common misconception among the general public is the confusion between the terms “bitcoin” and “blockchain.” As previously stated, bitcoin was the first successful cryptocurrency that used blockchain technology (Nakamoto, 2008). The decentralized

approach brought about by blockchain enables the execution of transactions based on cryptocurrencies to be simplified and to bypass the intermediation of banks, securities settlement systems, and brokers (Rejeb, 2018a; Rejeb et al., 2018, 2019a). Moreover, blockchain constitutes a global network (Kim, 2018; Pinna et al., 2018) that helps to generate new units of currency and to facilitate the transfer of existing units from one party to another through transaction broadcasting and computational proof-of-work protocols. All cryptocurrencies use the peer-to-peer design of blockchain to facilitate instant transactions. Since cryptocurrencies are not state-issued currencies (Bech & Garratt, 2017; Bunjaku et al., 2017; Fantacci, 2019; Gurrib et al., 2019), they are not monitored by central banks, and hence they are often called decentralized currencies. Cryptocurrencies aim to overcome the challenges related to gold-based and fiat currencies, operating on an algorithmic base with a deterministic supply (Bartos, 2015) and growth rate defined according to the rigor and precision of mathematics. In the Bitcoin system, for example, money creation is scheduled so that the number of units will converge to 21 million units (Fabian et al., 2016).

More recently, there are about 16.523 million units of bitcoin in circulation, which means that 79% of bitcoin has already been mined (Wilson, 2019). The limit of the number of bitcoins being minted (i.e., mined) helps ensure a stable supply of this cryptocurrency as no individual, financial institution, or government has the power to control the supply of bitcoins or to inflate their value. Every unit of cryptocurrency has its own address with the public and private key. Transactions are triggered using the private key. At any point in time, there is a fixed number of cryptocurrencies, and the blockchain enables a network user to prove ownership of a particular cryptocurrency and to verifiably transfer ownership without the recourse to a third party (Brito et al., 2015). In the cryptocurrency financial system, users can gain value by engaging in particular transactions with other users (e.g., sale of products) or by mining (Courtois et al., 2014; Hayes, 2015; Lim et al., 2014). The latter is the process of recording several transactions as a block in the blockchain (Conti et al., 2018). Miners are specialized nodes (i.e., computers) that pick up transaction records, verify them and create new blocks by performing complex computing operations and cryptographic functions. In the example of bitcoin, miners solve the mining puzzle (Houy, 2014) in approximately ten minutes and receive bitcoin rewards in return.

One of the main concepts of the blockchain is records or transactions (Rejeb, 2018b; Rejeb et al., 2019b; Rejeb & Bell, 2019; Rejeb & Rejeb, 2019). Blockchain transactions can be characterized as a process when the involved parties acquire or lose a certain status (e.g., the status of the owner) (Lanko et al., 2018). In order to create new records (e.g., transactions), the hash of the first block (or the previous block) of the record should be forwarded to the miner who employs it and generates a hash of the second block (Tama et al., 2017). The process of introducing a new block into blockchain and solving the hash is what we have already mentioned, mining or proof-of-work (Nakamoto, 2008). It simply means the execution of a specific algorithm (for example, Bitcoin uses "Proof-of-Work, Ethereum uses "Proof-

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of-Stake") that allows the creation and the addition of new blocks to the blockchain. This approach prevents attackers from validating an invalid transaction. Moreover, the miners perform computationally costly tasks to participate in what essentially constitutes a lottery for the right to add the next block to the chain (Catalini & Gans, 2016; Michelman, 2017). Before the transaction records are posted to the blockchain, a great number of participants (i.e., nodes that control over 50 percent of the total computer power in the network) reach an agreement or a consensus, after which the next block is added.

After the block is successfully introduced with its new identity (represented by the block hash) in the blockchain, it is propagated and distributed among all the nodes of the network to ensure that they are all updated with the last version of the blockchain. A reward, in the form of a crypto-token such as Bitcoin or Ether, is rewarded to the miner who performed the work and verified the correctness of the transaction. In doing so, miners will be motivated to commit computing resources to solve the puzzles and to set off the costs incurred in the blockchain (e.g., electricity costs) (Hsieh et al., 2018; Symitsi & Chalvatzis, 2018). This procedure is continuously reiterated as more transactions are introduced to the network.

Opportunities of Cryptocurrencies in Modern Finance

As previously stated, the use of blockchain technology in leveraging cryptocurrencies can mitigate the cost of trust (Berg et al., 2019), which is an essential element that manifests itself in various ways in the financial system. These costs include the intermediary's commissions, the fees of entering and upholding contracts, settlement procedures, cybersecurity, and user authentication. Money depositors must trust banks to secure their savings (Baldwin, 2018; Maurer et al., 2013; Raymaekers, 2015; Zook & Blankenship, 2018).

The financial sector has multiple challenges and experienced recent crises. For example, millions of people around the world lost their jobs and homes as a consequence of the 2008 global financial crisis. Although cryptocurrencies are not a panacea for all financial problems, it is still important to explore how these economic and financial instruments can impact financial stability and establish a more resilient financial sector. It is widely argued that centralized financial institutions concentrate risks, socialize losses and collect significant economic rents (Zhang, 2017). Cryptocurrencies can address several issues inherited in the current financial systems, such as the lack of trust, transaction inefficiencies, and instability (Nakamoto, 2008).

The traditional approach of cross-border payment is characterized by its inefficiency, high cost, and liquidity blockage. Payment processes are not transparent, and they present several uncertainties regarding pricing and fraud risks. Accordingly, payments in cryptocurrencies could mitigate several of these issues. According to Buhalis et al. (2019), cryptocurrencies can be used to prevent fraudulent exchanges or payments, making service transactions straightforward and efficient.

The most extensive use of cryptocurrencies is online payment options. The proliferation of cashless payments and the use of credit cards have contributed to the emergence of cryptocurrencies as the most popular form of payment on the Internet. Digital currencies have the potential to affect cash flows and supply chain structures because exchange partners could potentially trade, exchange value, and settle their payments using cryptocurrencies (Y. Wang et al., 2019). By simplifying payments through cryptocurrencies, Pournader et al. (2020) posit that companies can make instant money transfers, reducing commissions necessary to pay for goods and services. For example, Ripple is an open-source, peer-to-peer decentralized digital payment platform that enables near-instantaneous transfers of currency regardless of their form. Ripple used the blockchain to connect existing bank ledgers and facilitate near real-time cross-border payments. Ripple can handle more than 1,500 transactions per second. Ripple users are equipped with a pair of signing/verification keys to send payments securely. Each Ripple transaction submitted to the network requires a transaction fee specified in the blockchain. Today, some online shops allow their consumers to make their payments in cryptocurrencies, such as bitcoin, Litecoin and Peercoin, despite the fact that cryptocurrencies are not yet accepted in many countries (Mendoza-Tello et al., 2018; Omane-Adjepong & Alagidede, 2020; Vandezande, 2017). The payments in cryptocurrencies can be carried out among accounts or wallets, independently of a central party, resulting in lower transaction costs, increased security and privacy (Till et al., 2017). On these points, Nica et al. (2017) argue that the popularity of the Bitcoin system is attributed to the low transaction fees it offers to users, which makes it a viable alternative to conventional payment services. However, to achieve this cost advantage, Alonso-Monsalve et al. (2020) note that cryptocurrency trading should operate on the basis of different assumptions that may not hold in specific situations, including quick links between users, low transaction costs, and high liquidity.

The settlement time of cryptocurrencies is much shorter than other payment methods. In the case of bitcoin, the settlement time of ten minutes on average is much faster than with any non-cash financial transaction, which may take days or weeks (Nakamoto, 2008). Although transferring a large amount of cash is a risk and problematic issue in the physical world, cryptocurrencies can be transferred very rapidly and covertly between users. Of note, the Bank of England already released a discussion paper, highlighting the potential use of cryptocurrencies to facilitate interbank settlement (Glaser & Bezzenberger, 2015). According to Richards (2018), some stakeholders in the payments area argue that the availability of cryptocurrencies could be a viable alternative for central bank settlement instruments that not only reduces risk but also increases the efficiency of business transactions. The use of cryptocurrencies can also mean that transaction accounts no longer need to be held on the balance sheets of banks. Instead, all transactions in cryptocurrencies could be recorded on a single mutual distributed ledger (or a blockchain) to facilitate banking arrangements. The cryptocurrency implementation often utilizes the proof-of-work mechanism to record all transactions in a public ledger, and in this way, protect consumers from fraud (Cocco

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et al., 2017). In addition, cryptocurrencies could solve the disruption of payment processes due to specific settlement failures.

Cryptocurrencies are appealing for merchandisers because chargeback is not possible. It means that there is no need for customers to file a complaint with their credit card company to dispute the payment with the goal of cancelling or reversing that payment (Wilson, 2019). Similarly, cryptocurrencies eliminate the need for settlement in central bank reserves and allow a return to monetary operations based on the quantity of money rather than the price for borrowing and lending of money in short term money markets (Milne, 2018).

Although cryptocurrencies were created for the sake of exchanging goods and services, a report from Coinbase and ARK Invest estimates that the majority of users consider cryptocurrencies, and particularly bitcoin, strictly as an investment (Burniske & White, 2017). Likewise, cryptocurrencies are a new type of speculative asset, which is attractive to investors who wish to make profits. For example, Katsiampa (2017) finds that the bitcoin market is characterized by its highly speculative nature. As per Dyhrberg et al. (2018), the low adoption of bitcoin and its sufficient market depth contribute to the general perception that bitcoin is an investible asset. The literature on bitcoin price is increasingly growing, providing evidence that cryptocurrencies exhibit independent price behavior from other conventional financial instruments, such as bonds, stocks, and commodities (Baur et al., 2018; Bouri et al., 2017). The high volatility in cryptocurrencies investment is compensated by the high expected return. Similarly, the low correlation of cryptocurrencies with stocks, bonds, commodities, and foreign exchange rates creates a potential for diversification for investors. The opportunities brought by the diversification benefits of cryptocurrencies have garnered considerable attention with research reporting various findings. Remarkable among the prior studies is the work of Bouri et al. (2017), who posit that bitcoin can be hedged in a limited number of scenarios and remains a good option for diversification techniques similar to stocks, bonds, gold, and other commodities. However, Dorfleitner & Lung (2018) argue that in case cryptocurrencies are used as an investment rather than just a payment or exchange medium and held for diversification reasons within an investor's portfolio, the behavior of cryptocurrency returns and their volatility might be sharply different on weekends. Therefore, cryptocurrencies are not only perceived as an alternative currency but also an object of investment. Similarly, a study by Citigate Dewe Rogerson revealed that every fifth adult resident in England who never had a cryptocurrency would like to buy it by 2021 (Volosovych & Baraniuk, 2018).

Cryptocurrency-based economies, as well as mounting investor interest in investing in crypto assets, have led to new ways being sought to fund blockchain-based projects and raise capital. The fundraising mechanism through which new companies and startups raise capital from the public by selling tokens (i.e., a record in the blockchain or other distributed information system that certifies the ownership of a user of a particular asset.) is called Initial Coin Offering (ICO) (Demidenko et al., 2018). Usually, the ICO starts with the announcement of a project to be financed and the requested marketing activities

to attract as many prospective investors as possible. Simply put, ICOs are usually initiated by disseminating a new business idea to the public explained through a white paper, in which the proposer team, the target sum to be collected and the given number of tokens that will be distributed among subscribers according to a predetermined exchange rate with one or more existing cryptocurrencies are set out. Although the ICO market is still at the infancy stage, the size of this market is substantial because the scope of the ICO has exponentially expanded beyond its initial purpose (Momtaz, 2019)

The ICO is often viewed as one of the significant innovations in entrepreneurial finance. In line with Härdle et al. (2020), The use of ICO constitutes a promising financing channel for entrepreneurs, though it is not fully understood by some investors, and companies are still offering an ICO without economically viable use cases. According to Amsden and Schweizer (2018), the ICO market already exceeded the whole venture capital industry in Europe. The reason for this soaring development lies in the fact that the ICO represents an opportunity to participate in a project or in decentralized autonomous organizations (DAOs). DAOs are simply a new type of firm that can be run through the use of smart contracts (i.e., self-executed computer programs) and the Turing-complete programming language, such as Ethereum. DAOs can also be arrangements of smart contracts, each with their own specific sets of tasks, designed to work together securely within their intended area of application (Zook & Blankenship, 2018). Besides the hardcoded and fully transparent policy guidelines, monetary policies associated with cryptocurrencies can be supported by a set of underlying protocols that enable the development of DAOs which can function as policymakers (Calcaterra et al., 2020). In contemporary times, the use of ICO is spreading across the entire globe, and several nations and businesses are involved in ICO projects. For example, the ICOs collected exceeded USD 5.2 billion dollars in 2017 alone (Ibba et al., 2018). Despite their promisingly high returns, ICOs are precarious investments because the process is as yet unregulated, leaving room for scams, thefts, and deceptive projects. As stated by Momtaz (2019), the ICO market is subject to ongoing regulatory uncertainty with several uncoordinated interventions like the bans in China and South Korea that resulted in considerable market reactions.

The tokens sold through ICOs can be transferable, fungible or interchangeable with others on the same platform (Crosby et al., 2016). Furthermore, ICO tokens are also tradable on secondary markets, even before the ICO is complete. In reality, the tradable feature of these tokens serves to motivate agents and prospective investors to engage in the venture.

The main idea of ICOs is to create decentralized applications (often shortened to Dapps). Dapps are developed based on smart contracts that are embedded in the blockchain network. A critical element of Dapps is the mechanism of distributing tokens. This mechanism includes three processes; the mining process, the fundraising process, and the development process. As previously mentioned, the mining process is the distribution of tokens to users who contribute most to the operation of the Dapps, as is the case in Bitcoin. In contrast, the fundraising process represents the distribution of tokens to

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the funders of the initial development of the Dapps. Lastly, the development process is the generation of tokens through a predefined apparatus that are available only for the development of the decentralized application. Unlike the IPO process, which can take several months, the issuance of ICO tokens takes only a month or two (Hu et al., 2018). After the conclusion of an ICO, the purchased tokens can be traded on some cryptocurrency exchange platforms.

Hundreds of startups and companies are currently exchanging cryptocurrencies. Cryptocurrencies have significantly supported the global rise of e-commerce. The development of the cryptocurrency market creates a new trust model for e-commerce (Mendoza-Tello et al., 2019), increases monetary circulation (Mendoza-Tello et al., 2018), and allows efficient and private online and cross -border commerce (Foley et al., 2019). In 2012, it was estimated that e-commerce had already reached its pinnacle exceeding USD 1 trillion, and since then, it has seen an annual increase of approximately 15 percent due to the use of cryptocurrencies (Jaag & Bach, 2015). Similarly, measures of usage for bitcoin reported between 60,000 and 70,000 transactions daily, with a total transaction volume of between EUR 15 and EUR 30 million (Peters et al., 2015). Many of these important transactions are owing to the high speed, low cost and efficient nature of virtual currencies.

The blockchain protocol and cryptocurrencies are not only incredibly useful for large companies; small businesses can also benefit from micropayments and exchange party transactions. As empirically evidenced by Vincent & Evans (2019), cryptocurrencies have a significant positive relationship with financial inclusion and financial sector development. The authors further note that countries featured by a high level of cryptocurrency use tend to have higher levels of financial inclusion and financial sector development. In the view of Larios-Hernández (2017), the technology underpinning cryptocurrencies, namely, blockchain, supports a novel type of inclusive entrepreneurship for the bottom of the pyramid (BoP), offering opportunities that improve social and economic conditions for disenfranchised communities. Likewise, Kaponda (2019) believes that one of the goals of the ecosystem of digital financial services is to encourage the use of cryptocurrencies, empower social communities, and to target national goals like financial inclusion, economic health, and the sustainability of the financial systems. Although problems in the blockchain include scalability limitations (i.e., the number of transactions that can be processed in a second, 7 to 10 transactions in the case of bitcoin), it is expected that the next generation technology adopted by the Internet of Things Application (IOTA), tangle, can solve this problem and leverage cryptocurrencies for the transfer of value (i.e., money) in an open-source ecosystem among people as well as machines. IOTA cryptocurrency is purposefully developed for the selling of data from IoT devices (i.e., physical objects that are seamlessly integrated into the information network). In addition, transactions using IOTA are feeless, and they suit the demanding IoT ecosystem. Sharma et al. (2020) assert that the cryptocurrencies created based on IOTA tangle are usually supported with features of management, fair ordering, secure services, and ad hoc transactions.

In sum, the use of cryptocurrencies in everyday transactions and financial ecosystems is steadily increasing. As cryptocurrencies continue to grow, there is a potential that they may replace the role of traditional currencies and become more and more plausible. However, several challenges lie ahead, inhibiting the wide-scale implementations of cryptocurrencies as an exchange medium of value and a source of profits. This is discussed in the next section.

Challenges of Cryptocurrencies in Modern Finance

The growing momentum of cryptocurrencies and FinTech brings certain risks that raise several questions and concerns regarding the viability of the future integration of virtual currencies in the monetary and financial system, particularly in the absence of legislation and regulatory standards (Avdeychik & Capozzi, 2018; Mendoza-Tello et al., 2018; Nica et al., 2017).

Today, there is exponential growth in the development of online black markets. The advent of bitcoin has already revived black markets and provided numerous opportunities due to their quasi-anonymity, which makes it difficult to trace the identity of the operators and users (Baldimtsi et al., 2017). According to Kerr (2018), bitcoin represents a perfect tool for carrying out business on the digital black market because it undermines the policing efforts of authorities. Cryptocurrencies have the potential to induce structural changes in how the black markets operate. In the illegal darknet marketplaces, cryptocurrencies are usually used to facilitate the sale of weapons, drugs, and other illicit goods (Miller, 2016). For example, an enormous number of outgoing mail from a large Australian drug dealer led the authorities to seize over 24000 bitcoin, along with a wide array of drugs and cash (Foley et al., 2019). Similarly, cryptocurrencies encourage the monetary system that is used for illegal transactions, including drug trading, money laundering, and child pornography. As a result, the omnipresence of black markets in controlled economies threatens the stability of people's lifestyles, their activities, and their incomes (Scharding, 2019).

Cryptocurrencies are associated with illegal activities due to their ability to challenge government supervision of monetary policy and bypass existing regulatory schemes. Likewise, cryptocurrencies are considered the largest unregulated markets in the entire world. Alonso & Luis (2019) state that there is no regulation or rulings on how to operate using cryptocurrencies for some European countries, such as Austria, Belgium and Croatia. The decentralized nature of cryptocurrency-based transactions makes it harder to trace and, thus, may help disguise criminal activities (Afzal & Asif, 2019). In 2011, the online black market known as the "Silk Road," established by Ross Ulbricht (operating under the pseudonym of "Dread Pirate Roberts"), was shut down by the Federal Bureau of Investigation (FBI). The FBI estimated that over 9.5 million bitcoin was used to purchase illicit goods from the Silk Road website (Wilson, 2019). This incidence alerted citizens, companies, and governments to the use of bitcoin and other cryptocurrencies for illicit trade. Nevertheless, once cryptocurrencies are exchanged for fiat currencies, it is easier to detect the sources of money, as was

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the case with Silk Road. Consequently, the use of cryptocurrencies must strictly adhere to anti-laundering regulations (Fadeyi et al., 2020).

As cryptocurrencies gain more recognition and popularity, they are likely to spill over into other domains and affect other industries. The underpinning technology of cryptocurrencies, blockchain, is heavily dependent on the consumption of energy, graphic processing units, and power-intensive computing abilities to mine cryptocurrencies (Fadeyi et al., 2020). Vaz & Brown (2020) estimate that a payment transaction on the Bitcoin platform uses around fifty-eight times the energy of that for Visa credit transactions. Considering the fact that Visa relies on multiple banking and institutional systems that need enormous amounts of energy to function, the authors argue that this energy consumption is still dwarfed by the energy use of cryptocurrencies. Furthermore, the mining processes of cryptocurrencies have received similar adverse publicity following reports that cryptocurrencies involve the vast consumption of energy and have a harmful impact on the environment (Wilson, 2019). In this regard, some analysis has compared the considerable computing power needed for verifying and maintaining bitcoin transactions to the annual energy consumption of countries such as Ireland and Paraguay (Campbell-Verduyn, 2017). In another study, the Bitcoin network is estimated to consume as much energy as Austria (Afzal & Asif, 2019). The energy consumption required for the validation of every bitcoin payment is almost USD 2.00 per transaction (Milne, 2018). Even the processes and resources committed to a single bitcoin transaction could supply electricity to a British home for a month, with environmental costs socialized and economic gains privatized. The initial application of blockchain, namely the Bitcoin, has been designed with no consideration of the environmental effects of the technology (Truby, 2018). Although the current mining technology is oriented to be more power-efficient in the future, the high rate of electricity consumption and emissions are expected to rise to the extent that mining cryptocurrencies may not be profitable in the foreseeable future.

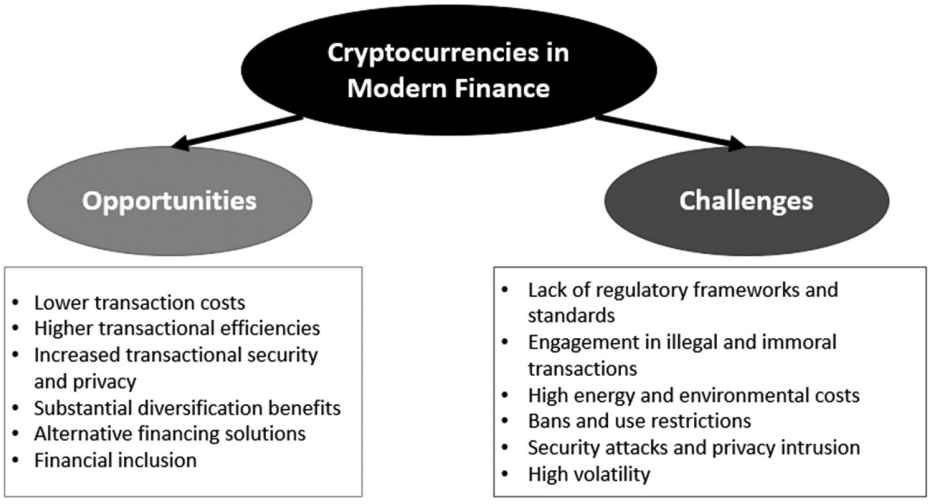
On a broader scale, several countries such as Germany, China, and the US have opposed the use of cryptocurrencies. Some bankers also discourage the idea of investing in cryptocurrencies, and specifically bitcoin. A few countries have adopted an explicit position regarding the use of cryptocurrencies and restricted their use in several activities. As a case in point, the German central bank has warned investors from investing in cryptocurrencies. Likewise, China has banned residents from trading cryptocurrencies and made ICOs illegal (Button, 2018). Developing countries such as Iran have also expressed concerns regarding cryptocurrencies, and the Central Bank of this country has recently announced that cryptocurrency trading is illegal (Alam & Zameni, 2019). The growing use of cryptocurrencies as a medium of payment increases the likelihood of tax evasion. In this respect, Marian (2013) noted that two critical attributes of currencies drive the rise of illicit transactions. First, there are no conditions as to the number of wallets that users can possess, allowing them to transact with high privacy. Second, the disintermediated approach of cryptocurrencies allows users to bypass the supervision of financial intermediaries. Rehman et al. (2019) argue that the pseudonymization of

cryptocurrencies makes payment networks unable to be easily monitored and regulated by governments.

Although several countries are collaborating to eliminate tax evasion, cryptocurrencies can act as a tax haven, thus defeating governments' ability to audit and prosecute tax evaders. A more worrying fact is also the possibility of utilizing cryptocurrencies to finance terrorism. It is their capability to cloak transactions with a high level of privacy and anonymity, which makes payments in cryptocurrencies highly suitable for the financing of transnational terrorist activities and global criminal structures.

Although cryptocurrencies are hinged on the robust security features that are enabled by blockchain technology, users are not immune to hacking, fraud, theft, and privacy intrusions. Cybercriminals have already been able to target exchanges and successfully steal thousands of bitcoins. For example, in its short history, bitcoin has experienced over 40 thefts, including a few incidents in which the stolen value of bitcoin exceeded USD 1 million (Bunjaku et al., 2017). Security concerns are still a significant issue in the handling and storage of cryptocurrencies. Hackers may attack a user's wallet and steal the cryptocurrency units. In 2016, an application built on Ethereum protocol proved faulty and resulted in the theft of Ether tokens worth roughly USD 70 million at the time (Auer, 2019). Moreover, the security of cryptocurrencies relies essentially on asymmetric public and private keys encryption. However, the knowledge of the private key equally represents the ownership of bitcoin (Wei et al., 2019). As a result, the loss of private key or other credentials may result in the loss of control over the wallet. This also means that the cryptocurrency user will not be able to recover the funds since there is no central authority that monitors the system. The theft of private keys can be carried out using several techniques such as the installation of buggy or malicious codes, phishing, key loggers, and Trojan horses that effectively capture all user keystrokes and pass them to a remote attacker. Therefore, these security loopholes raise serious concerns for those wishing to invest in cryptocurrencies (Bonneau et al., 2015).

Figure 1. The Opportunities and Challenges of Cryptocurrencies in Modern Finance



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Unlike government-issued currencies, cryptocurrencies are neither represented in physical form nor does a regulatory authority control them. They merely derive their value from the expectation of the community and the confidence of those taking part in the respective system. A significant drawback of cryptocurrencies is their high volatility, mainly because of their design and free exchangeability (Jaag & Bach, 2015). In fact, cryptocurrencies are subject to high volatility as there is no central authority guaranteeing the stability of their value. For example, the price for a single bitcoin climbed from USD 13 in January 2013 to USD 1242 on November 29, 2013, just falling short of the price of an ounce of gold (Hughes & Middlebrook, 2014). The volatility of cryptocurrencies can be leveraged and intensified if financial institutions engage in speculative investments, resulting in chain reactions and financial crises. Similarly, the prices of cryptocurrencies can create bubbles. The magnitude of volatility and uncertainty related to cryptocurrencies make it challenging to provide reliable estimates for reporting and auditing purposes, especially from a compliance and tax reporting perspective. Srokosz & Kopciaski (2015) argued that the high volatility of cryptocurrencies could be a critical factor that hampers trust in their usage for transaction payments. Tucker (2013) noticed that a high volatility level increases the risk of holding cryptocurrencies and the likelihood of their manipulation through signaling false positive statements in order to sell the purchased cryptocurrency at higher prices. In such a scenario, when investors sell out their cryptocurrencies, the supply increases resulting in the decrease of the price of a given cryptocurrency and severe losses for other holders. Figure 1 summarizes the findings of the review and the points discussed earlier in this section.

Conclusion

In this paper, we have synthesized the literature on the role and challenges of cryptocurrencies in modern business and financial systems. The mounting popularity and pervasiveness of cryptocurrencies reveal that the existing financial ecosystems are, in many instances, unable to respond to citizen's needs and concerns in the wake of the devastating 2008 financial crisis. The applications of cryptocurrencies can range from simple to complex financial transactions. Many of the benefits of cryptocurrencies are tangible and reflected in their ability to drive more efficient online transactions, lower costs, and streamlined payment processes. The use of cryptocurrencies also implies an increased level of efficiency in trading and exchanging value through the Internet. Cryptocurrencies help to spur innovation and create new business models. A cryptocurrencies-based ecosystem can provide opportunities for new market entrants and support startups through facilitating the process of fundraising. For instance, initial coin offerings enable entrepreneurs and investors to finance new projects without the recourse to intermediaries and endorsements of traditional investors and financial bodies.

The programmability of cryptocurrencies prompts the development of autonomous decentralized organizations and the proliferation of automated trusted machine-to-machine transactions. With the recent emergence of the machine economy, there is a potential for cryptocurrencies to simplify the trading and exchange of data generated from the Internet

of Things devices (e.g., sensors) in data marketplaces. Despite all these advantages, several challenges remain. One of the biggest hurdles in the spread of cryptocurrencies is the lack of governance in peer-to-peer networking transactions. Users are at risk of being victims of fraud and cyberattacks. In addition, cryptocurrencies are underpinned by blockchain technology, which could enable malicious actors to operate without oversight. In cases where bugs affect cryptocurrencies or the private key is stolen, users can lose their wallets and their ability to transact with other parties. Besides these drawbacks, the mining and generation of cryptocurrencies require substantial electric energy consumption that often necessitates economies of scale. Investors and businesses might also consider the use of cryptocurrencies to facilitate tax evasion, money laundering and the financing of illicit activities.

Although this study aims to explore the advantages of cryptocurrencies and the factors inhibiting their development into a widely used currency, it does not cover in great depth all information surrounding this fast-emerging area in the evolving global financial ecosystems. Hence, future studies may provide additional insights through comprehensively considering other research directions.

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Relationship between Managers' Support and Training Application with Motivation to Learn as Mediator

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Abstract

This study aims to assess the association between managers' support, motivation to learn, and training application. The survey method utilizes to collect data from employees at Central Government Agencies in Putrajaya, Malaysia. The SmartPLS was employed to evaluate the quality of survey questionnaire data and test the research hypotheses. SmartPLS path analysis model's findings displayed that managers' support affects training application by the mediation with motivation to learn. This finding provides essential recommendations that practitioners may use to understand different motivations to learn and formulate a training master plan that may inspire employees to maintain and accomplish their organizations' strategies and goals in times of global competition and economic uncertainty.

Keywords:
manager's support, motivation to learn, training application

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Introduction

In a globalized world, many futurists predict that mobility of goods, services, capital, and labor are significant variables that create unpredictable mega changes, such as knowledge-based economy, international joint-venture agreements, planned cross border business, industrial revolution 4.0 (Gegenfurtner et al., 2020; Laudicina et al., 2019). To cope with such changes, organizations have to pay more attention to improving human resource management functions, particularly training programs.. This function perceives as a strategic weapon in upholding and increasing an organization's performance and competitiveness in the new world order (Laudicina et al., 2019; Roblek et al., 2018; Karp, 2020). The approach to training management differs according to different organizational development stages. In an early stage of organizational development, training programs are viewed as a simple personal function, such as informal, routine, and ad-hoc activities to improve and manage day-to-day workloads, task performance, and organizational tactical plan objectives (Ismail et al., 2016; Roblek et al., 2018). Although such practices are essential, they do not offer much help in maintaining and upgrading employee performance in achieving long-term organizational objectives (Gegenfurtner et al., 2020; Turner & Baker, 2017; Roblek et al., 2018).

The training program usually recognizes a critical human resource management function where it may use to accomplish organizations' goals and approaches in facing worldwide competition (Lee et al., 2017; Turner & Baker, 2017; Roblek et al., 2018). Under this new perspective, on the job (e.g., attending residency certification courses, in-service training) and off the job (e.g., attending conferences overseas), training objectives, content, methods, and procedures properly design to develop essential employees' knowledge. Thus, enhancing employee's skills, emotional and cognitive abilities, and competencies needed in the 21st century (Hughes et al., 2018; Rantatalo et al., 2018). Implementation of such training designs may lead to the sustaining of organizational strategic vision and missions in the current economy (El Hajjar & Alkhanaizi, 2018; Turner & Baker, 2017; Karp, 2020).

Many successful organizations are alert to training programs' significance, thus motivating them to allocate high budgets in accomplishing their objectives. For example, the US Bureau of Economic Analysis revealed that large organizations had increased 18% training budgets over five years. Whereas, the 2018 Training Industry Report disclosed that a total of USD 87.6 billion of training investment allocate to three types of expenditure, namely USD 11 billion for equipment and service expenditures (e.g., e-learning, accommodation), USD 29.6 billion for training expenditures (e.g., travel allowance) and USD 47 billion for training providers (e.g., internal staff, freelancers, suppliers) (Pontefract, 2019). These investments may help organizations maintain and enhance their competitive advantage and dominate stock markets in a global economy (Lee et al., 2017; Turner & Baker, 2017; Roblek et al., 2018).

An in-depth investigation of the recent literature about organizational training highlights that well-designed training programs will not support their aims if managers do not have sufficient competencies to provide practical support in organizations (Mohamad

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et al., 2020; Turner & Baker, 2017). Managers' support is a leading edge of the job and off the job training programs in competitive organizations. This condition is viewed as such because it can (a) stimulate trainees to learn technical and interpersonal skills; (b) inspire trainees to be creative in using problem-solving techniques; (c) help trainees to identify current training needs and problems; (d) strengthen trainees' learning and guidance whether before, during and after training. These training benefits may motivate trainees to accomplish their strategic business visions and missions in the era of unpredictable economic conditions (Kim et al., 2019; Mohamad et al., 2020).

According to Govaerts et al. (2017) and Kim et al. (2019), managers' support in training programs defines as the willingness of managers to practice emotional aid appropriately (e.g., encouragement, caring, and open-minded) and instrumental aid (e.g., provide training opportunities, training provisions, and attractive training locations) before, during and/or after training programs (Schindler & Bukholder, 2014; Govaerts et al., 2017; Karp, 2020).

As leading-edge training management, managers' support perceives as a remarkable innovation effort in dynamic organizations (Karp, 2020; Mohamad et al., 2020). Many training management studies advocate that managers' ability to implement emotional and instrumental aids in training programs properly may significantly impact employees' motivation to learn in organizations (Govaerts et al., 2017; Ismail et al., 2019). In an organizational training viewpoint, motivation to learn is often seen as an important intrinsic motivation feature showing employees' desire and willingness to attend, involve, and acquire training content (Kanfer et al., 2017; Hee & Rhung, 2019). The capability of employees to master new knowledge, latest skills, up to date cognitive and emotional abilities, positive attitudes, and other current capabilities in training programs may stimulate them to solve daily work problems, improve daily performance, and accomplish organizational tactical and strategic plans (Ismail et al., 2019; Lee et al., 2017; Karp, 2020).

Undeniably, motivation to learn recognize as a leading edge in the administration of training programs (Govaerts et al., 2017; Mohamad et al., 2020). Some latest training management studies published in the 21st century have extended previous studies by discovering the role of motivation to learn as an essential mediating variable in the relationship between managers' support and training application (Kim et al., 2019; Mohamad et al., 2020). From a training management perspectives, training application is normally seen as a critical element of training effect essential employees have a high desire to learn new competencies in training programs, and they have a high willingness to apply such competencies directly or indirectly to execute daily job operations in their organizations (Kim et al., 2019; Mohamad et al., 2020; Mohamad et al., 2019).

Many researchers concur that within the field of training management, managers' support, motivation to learn, and training application are distinct, but interconnected concepts (Mohamad et al., 2020; Mohamad et al., 2019). For example, managers' ability to adequately provide emotional and instrumental aids in training programs will strongly invoke trainees' motivation to learn. As a result, this motivation may lead to a higher training application in organizations (Mohamad et al., 2020; Mohamad et al., 2019).

A plethora of studies on training management has looked into the direct effects model in understanding training application within the context of commercial and non-commercial organizations (Abdul Aziz, 2016; Ismail et al., 2019). These studies emphasized examining situational and employee characteristics explaining the influence on training application. It finds that employees have different abilities to transfer and apply the skills learned in the workplace. For example, 40 percent of the skills acquired during the training process are immediately transferred at work, 25 percent remain for six months, and only 15 percent for a year (Burke & Baldwin, 1999; Facteau et al., 1995). Present studies have highlighted the inconsistent related previous studies whereby an indirect effects model, particularly motivation to learn as a significant mediating variable in training management models, was neglected (Govaerts et al., 2017; Mohamad et al. 2020; Ismail et al., 2019). A consistent correlation between managers' support and training application was also not found (Chiaburu & Marinova, 2005; Chiaburu & Tekleab, 2005; Mohamad et al., 2020). Hence, managerial support can have an indirect effect on training application through motivation to learn. Limited past empirical studies have highlighted the need to address the mediating effect of motivation to learn in the relationship between managers' support and training application.

This study aims to provide useful recommendations to management in designing and administering training programs in the public sector, as motivation to learn is an emerging issue (Kodwani & Prashar, 2019; Setti et al., 2015). Management may enhance employees' motivation to learn by providing the support that matches employees' needs and expectations (Afsar & Umrani, 2018; Seiberling & Kauffeld, 2017). Additionally, implementing a transformational oriented leadership style, such as participative decision making, autonomous, delegation, and empowerment in planning and implementing on the job and off the job training programs may lead to an improved motivation to learn (Afsar & Umrani, 2018; Chiaburu & Tekleab, 2005; Karp, 2020).

Findings from present studies suggest that other specific aspects of training programs need to consider guiding employees to transfer what they have learned in training sessions when returning to their organizations (Ismail et al., 2019; Kodwani & Prashar, 2019). This condition may help management design training management based on behavioral science techniques, such as establishing realistic job goals, creating job-related training content, and increasing challenges by enlarging and enriching existing job and job rotation. This condition can enhance by introducing mentoring, coaching, and counseling by competent and talented employees (Kodwani & Prashar, 2019; Mohamad et al., 2020). The efforts may stimulate employees to impart the necessary knowledge, up-to-date skills, latest cognitive and affective abilities, positive attitudes, and other capabilities consistent with difficult situations (e.g., industrial revolution 4.0, global business competition, and COVID-19 pandemic). These competencies will enhance employees' motivation to learn, achieving job targets, and solving daily issues at the workplace. As a result of the positive behaviors, organizational strategy and objectives are maintained and supported.

Although the relationship between managers' support, motivation to learn, and training application has extensively investigated, the effect size and nature of motivation

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to learn as an essential mediating variable has not been adequately discussed in the context of this study (Mohamad et al., 2020; Mohamad et al., 2019). Many researchers debate that this situation may be due to several reasons: First, many earlier studies have much described the features of managers' support, such as conceptual definitions, aims, types, and importance of this concept in Malaysian Public Organizations (Nadeem & Ahmad, 2017; Mohamad et al., 2019). Second, numerous earlier studies have applied a descriptive approach to explain the internal nature of motivation to learn, especially conceptual definitions, dimensions, and significance of this construct in Malaysian Public Organizations. Conversely, public servants' mediating effect on learning has not been given enough attention in the organizational training research literature. Third, many previous studies have been conducted by government officers using an applied research method to design training programs and link their effect on specific public servant activities, such as digital work systems and logistic issues. This study paradigm has usually utilized simple descriptive and association methods to accomplish short-term objectives and solve immediate problems (Mohamad et al., 2019). Consequently, the findings of this study have only provided broad recommendations, and this may not offer much aids in helping practitioners to understand the complexity of motivation to learn the concept and formulate a training master plan to sustaining and supporting the Malaysian Public Organizations' vision and missions in times of the globalized and turbulent economy.

This research was undertaken at the Central Government Agencies in Putrajaya, Malaysia. Confidentiality of agencies is maintained. These central agencies are established to carry out planning and implementing government policies, assisting government planning in national development, monitoring government economic policies' performance, proposing new management methods, and planning national financial policies. In order to support these objectives, leadership of the government agencies has planned and implemented executive development programs to equip their managers with adequate knowledge and skills on supportive leadership style. This leadership approach helps managers understand the human skills and knowledge requirements and enhance their abilities to develop employee performance through systematic in-house training activities, such as coaching, mentoring, and counseling.

For instance, the Public Service Department (2019) reported managers' willingness to offer satisfactory support through instrumental aids and emotional aids in performing daily job have enhanced the motivation of employees to learn the latest skills, equipped with knowledge and effective behaviour. As a result, this positive change may help the organizations change positive job-related attitudes, particularly employees' readiness to apply competencies they received from training sessions into the office. However, the affiliation is attractive; the role of motivation to learn as a mediating variable has not been investigated in Central Government Agencies in Putrajaya Malaysia (Syed Ibrahim, 2007). Thus, there is an urgent need to investigate the nature of this relationship. This circumstance inspires the researchers to extend the literature by examining the mediating effect of motivation to learn in the relationship between managers' support and training application. The objectives of the present study are to examine three primary relationships:

First, is to examine the relationship between managers' support and training application. The second is to examine the relationship between managers' support and motivation to learn. Finally, examine the impact of motivation to learn in the relationship with managers' support and training application.

Method

This study employed a cross-sectional method to permit the researchers to accurate, relevant, and high-quality data using a survey questionnaire (Creswell, 2015; Sekaran & Bougie, 2016). At the early stage of data collection, a survey questionnaire was drafted based on the training management literature. The survey questionnaire consisted of 3 sections: First, managers' support evaluates using eight items adapted from the management support in training program literature (Tharenou, 2001; Burke & Badwin, 1999; Chiaburu & Tekleab 2005). Managers' support consists of two dimensions, namely the psychological and physiological support. Second, motivation to learn examine by using five items adapted from the organizational learning literature (Machin & Treloar, 2004; Kim- Soon & Ahmad, 2012). The two study's objectives, namely the desire to learn and training benefit. Third, the training application evaluates by using six items adapted from the training transfer literature (Machin & Treloar, 2004; Ismail et al., 2015; Madagamage et al., 2014). Training g applications consist of three dimensions, the transfer of knowledge, skills, and attitudes. Respondent characteristics are using as control variables due to the study's focus on attitudes of employees.

Employees in the sampled agencies are the unit of analysis. A purposive sampling technique is used to distribute 400 survey questionnaires to employees who work in various levels and categories within different organizations' departments. The random sampling was not applicable due to the need of maintaining employees' confidentiality. Hence, the purposive sampling technique was used. The researchers managed to collect only 300 (75%) usable questionnaires out of the 400 distributed. All questionnaires were answered after receiving consent from the employees and ensuring anonymity on the participants' part. Furthermore, Harman's Single Factor test, as suggested by Podsakoff et al. (2003), is used to detect bias responses in the questionnaires. The test indicated that the variance value was 49%, and this value was less than 50% (Podsakoff et al., 2003), indicating that the bias responses are not present in the survey questionnaire data.

SmartPLS was used to analyze survey questionnaire data based on the guidelines established by Hair et al. (2017). The data analysis procedure is: Firstly, confirmatory factor analysis was carried out to evaluate the validity and reliability of the research instrument. Secondly, standardized beta and t-value were used to test the research hypotheses. Thirdly, R^2 value was used to determine the overall research model's strength based on three key criteria: 0.26 strong, 0.13 moderate, and 0.02 small (Cohen, 1992). Fourthly, the f^2 value was employed to assess constructs' effect size based on three important criteria: 0.35 strong, 0.15 medium, and 0.02 small. Fifthly, the Q^2 value was utilized as a criterion to predict the overall strength of the research model. Six, to maintain root mean square

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residual (SRMR) value is used as a measure model fit. Seventhly, the type of mediating effect was determined based on the guidelines established by Zhao et al. (2010). Finally, the Q2 value was employed to predict the overall performance of the research model (Evermann & Tate, 2016).

Table 1. Respondent Characteristics and Sample Profiles (n=300)

Respondent Profile	Profile-sub	Frequency	Percentage
Age	< 28 years old	38	12.67
	28-23 years old	64	21.33
	34-39 years old	114	38.00
	40-45 years old	53	17.67
	> 45 years old	31	10.33
Gender	Male	89	29.67
	Female	211	7033.
Race	Malay	274	91.33
	Chinese	10	3.33
	India	10	3.33
	Others	6	2.00
Highest Education	Lower Secondary Assessment (PMR)	2	0.66
	Malaysian Certificate of Education (SPM)/ Vocational Certificate/ Polytechnic Certificate	50	16.67
	Malaysian High School Certificate (STPM)/ Diploma/ Malaysian Higher Islamic Religious Certificated (STAM)	62	20.67
	Bachelor Degree	130	43.33
	Master's Degree	50	16.67
	Doctor of Philosophy (PHD)	6	2.00
Services Group	Management and Professional	181	60.33
	Supporting	119	39.67
Position Grade	JUSA and above	2	0.67
	54 to 56	14	4.67
	48 to 52	39	13.00
	41 to 44	98	32.67
	29 to 40	59	19.67
	19 to 26	79	26.33
	1 to18	9	3.00
Length of services	< 5 years	67	22.33
	6 -10 years	90	30.00
	11-15 years	91	30.33
	> 15 years	52	17.33

Results

Empirical Result

Table 1 shows that most respondents are between the age of 34 to 39 years old (38%), female employees (70.3%), Malay (91.3%), degree holders (43.3%), management and professional group (60.35), position grades were from 41 to 44 (32.7%), and length of services was between 11 years and five years (30.3%). Table 2 shows the results of reliability and convergent validity analyses. The outer loading values for the correlation between items and constructs were more than 0.70, and the values of the average variance extracted (AVE) for each construct were more than 0.50. Further, each construct's composite reliability was more than 0.70), meaning that the constructs have met the reliability and convergent validity standards.

Table 2. Results of Reliability and Convergent Validity Analyses

Constructs/ Variables	Outer Loading			AVE Values	Composite Reliability
	Managers' Support	Motivation to Learn	Training Application		
Manager's Support					
A1. encouragement to attend training programs	0.721			0.649	0.936
A2.concern about the need for skills in executing job	0.842				
A3. encourages acquirement of new skills	0.845				
A4. open in discussing training issues	0.837				
A5. encourages to improve on current skills	0.819				
A6.clearly explains the objectives of training program	0.773				
A7. provides information about the training program	0.807				
A8. suggests training programs that are interesting	0.791				
Motivation to Learn					
B1.motivated to learn skills in learning module		0.850		0.691	0.918
B2. interested to attend the training program being organized		0.856			
B3. gives full concentration on training module		0.781			
B4.increase the motivation to execute the tasks given		0.827			
B5. improve the current skill's quality		0.838			

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Constructs/ Variables	Outer Loading			AVE Values	Composite Reliability
	Managers' Support	Motivation to Learn	Training Application		
Training Application					
C1. complete tasks within an efficient time frame			0.764	0.684	0.928
C2. adopt the skills being learned for organizational excellence			0.875		
C3. adjust the technical skills with changes in tasks			0.828		
C4. develop the decision-making skills that are work-related			0.851		
C5. able to enhance work-related comprehension			0.821		
C6. able to master the knowledge at work place effectively			0.819		

Note: In the bracket is the confidence interval values of 5% and 95%

Table 3 indicates the findings of discriminant validity. The Heterotrait-Monotrait Ratio (HTMT) values for each construct were less than 0.85, and the confidence interval values in the bracket for each construct were less than 1.0, showing that the constructs have fulfilled the convergent validity criteria.

Table 3. Discriminant Validity HTMT Analysis and HTMT Confidence Interval

Constructs/ Variables	Managers' Support	Motivation to Learn
Managers' Support		
Motivation to Learn	0.613 (0.457, 0.660)	
Training Application	0.642 (0.149, 0.303)	0.857 (0.564, 0.715)

Note: In the bracket is the confidence interval values of 5% and 95%

Table 4 indicates the findings of descriptive statistics and variance inflation factor (VIF). Each construct's mean value varies between 5.861 and 5.964, indicating that the echelons of managers' support, motivation to learn, and training application range from a high level (4) to a very high level (7). The correlation coefficients for the relationships between a) independent variable (managers' support) and dependent variable (training application), b) independent variable (manager' support) and mediating variable (motivation to learn), and c) independent variable (manager's support), mediating variable (motivation to learn) and dependent variable (training application) have values of variance inflation factor lesser than 5.0, showing that all constructs are free from serious collinearity

problems. Overall, the result further indicates that all constructs have met the validity and reliability criteria**.**

Table 4. Descriptive statistics and Variance Inflation Factor Analysis

Constructs/ Variables	Mean	Standard Deviation	Variance Inflation Factor (VIF)
Managers' Support	5.861	0.654	1.463
Motivation to Learn	5.964	0.620	1.000
Training Application	5.905	0.591	1.463

Table 5 shows the results of testing research hypotheses for the direct effects model. First, managers' support has a significant relationship with the training application. Hence H1 is supported. Second, managers' support has a significant relationship with motivation to learn. Hence H2 is supported. These results indicate that training transfer and motivation to learn are affected by managers' support. The explanatory power, the entry of managers' support into the investigation, has contributed to about 31% in training application and motivation to learn. This result is greater than 26%, meaning that this research model has a substantial effect.

Table 5. Hypothesis Testing Result H1 and H2

Hypothesis	Relationship	β Values	t Value	R^2 (%)	Result
H1	Managers' Support → Training Application	0.227	5.659	0.31	Supported
H2	Managers' Support → Motivation to Learn	0.044	12.802	0.31	Supported

Note: Significant level t> 1.96

Further, the effect size (f2) and predictive relevance (Q2) are evaluated. The effect size test finding shows that the f2 value for the relationship between managers' support and training application is 0.097, which is lower than 0.15, indicating that the effect of managers' support on training application is small. The f2 value for the relationship between managers' support and motivation to learn is 0.463, which is more than 0.35, depicting that the effect of managers' support on motivation to learn is substantial. Furthermore, the predictive relevant test result shows that managers' support has a Q2 value of 0.188, showing that the model has predictive relevance. Next, the model fit test results show that the estimated root mean square residual has a value of 0.06, which is smaller than 0.08, meaning that this model is suitable (Hu & Bentler, 1999).

Table 6 shows the results of testing research suppositions for the indirect effect model. The relationship between managers' support, motivation to learn, and training application are significant. Hence H3 is supported. The findings indicated that motivation to learn acts as a significant mediating variable between managers' support and training

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application. Next, the entry of managers' support and motivation to learn into the investigation has contributed 63% to training application, and this value is greater than 26%, meaning that this research model has a substantial impact.

Table 6. Hypothesis Testing Result H3

Hypothesis	Relationship	β Values	t Value	R^2 (%)	Result
H3	Managers' Support → Motivation to Learn → Training Application	0.025	5.213	0.63	Supported

Note: Significant level t> 1.96

Furthermore, the mediation effect size shows that motivation to learn is a partial mediating variable in the relationship between managers' support and training application. Moreover, effect size (f2) and predictive relevance (Q2) are also assessed. The effect size test's finding shows that the value of f2 for the relationship between motivation to learn and training application is 0.779, signifying that motivation to learn has a substantial effect on training application. Next, the predictive relevant test result displays the relationship between motivation to learn and training application having a Q2 value of 0.399, indicating that the model has predictive relevance. The model fit test outcomes show that the estimated root mean square residual value is 0.06, which is lower than 0.08, meaning that this is a suitable model. Further, the model performance prediction test is performed using PLS Predict. Table 7 shows that the sum of linear regression (LM) values is greater than the PLS-SEM root mean squared error (RMSE) value, meaning that this model has achieved a high power level of predictive (Shmueli et al., 2016).

Table 7. Predictive Analysis of PLS-Predict

No. of Item	PLS-SEM	LM RMSE	LM-PLS SEM	PLS SEM-LM
A1	0.764	0.771	0.007	-0.007
A2	0.721	0.725	0.004	-0.004
A3	0.669	0.669	0	0
A4	0.734	0.731	-0.003	0.003
A5	0.711	0.707	-0.004	0.004
A6	0.73	0.737	0.007	-0.007
A7	0.721	0.723	0.002	-0.002
A8	0.789	0.78	-0.009	0.009
B1	0.534	0.54	0.006	-0.006
B2	0.544	0.544	0	0
B3	0.537	0.54	0.003	-0.003
C1	0.552	0.555	0.003	-0.003
C2	0.606	0.613	0.007	-0.007
C3	0.552	0.559	0.007	-0.007

Note: PLS RMSE is the root squared error in the PLS model
LM is a linear regression in a linear model

Discussion

This study indicates that motivation to learn acts as a significant mediating variable in the relationship between managers' support and training application. In this study, most participants rate the stages of managers' support, learning motivation, and training application as high. This result explains that managers' capability to offer adequate emotional and instrumental aids can help employees attend training, thereby acquiring the necessary knowledge, latest skills, informed emotional and cognitive capabilities, positive attitudes, and present competencies. Consequently, this situation leads to a rise in training applications in organizations.

This research has three crucial contributions: theoretical contribution, the robustness of research methodology, and practical contribution. This study's results reveal three critical outcomes in terms of theoretical contributions: First, managers' support in training programs has enhanced training application. This outcome is consistent with the notion of Eisenberger et al., (1997) Organizational Support Theory. It explains that managers' ability to promote a high level of support (e.g., give more attention, appreciating, and fulfilling the social need) can enhance the employees' positive behaviors. Meanwhile, this theory is consistent with the Transformational Leadership Theory (Bass & Avolio's, 1998), suggesting four important transformative leadership features. The managers' ability to support employees by giving encouragement, motivation, inspiration to accomplish things, and guidance; can affect the results of employees' behavior. The theory posits that its application in a training program is usually interpreted as managers' support. This notion has received support from past studies relating to organizational support (Ismail et al., 2016; Mohd Yusof, 2012).

The notion of this theory has received strong support from the training management research literature. For example, numerous previous studies conduct using a direct effects model in diverse organizational samples, such as perceptions of 160 employees of a government department in Shah Alam, Malaysia (Mohd Yusof, 2012), perceptions of 163 military personnel at a Peninsular Malaysia ground forces (Ismail et al. 2016), perception of 159 employees in various industries in India Chatterjee et al., (2018). These empirical studies reported that the ability of managers' to properly provide emotional aid and instrumental aid in planning and administering training programs had led to a more excellent training application in the respective organizations (Ismail et al. 2016; Mohd Yusof, 2012; Chatterjee et al., 2018; Mohamad et al., 2020).

Second, managers' support in training programs has enhanced motivation to learn. This outcome is consistent with the main idea of Blau (1964) Social Exchange Theory. This theory suggests that social relationship seeks to maximize the benefits and minimize the individual's costs in achieving life purpose. The theory also suggests that the main idea of social exchange is often interpreted as managers' support. This idea is backed by organizational support (Abdulkarim et al., 2009; Govaerts et al., 2017; Ismail et al., 2019; Mohamad et al., 2020).

The main idea of this theory has received strong support from the research papers in training management studies. For example, numerous past studies have been carried

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out using a direct effects model in diverse organizational types, such as perceptions of 287 employees at the institute of public administration, Saudi Arabia (Abdulkarim et al., 2009), 111 trainees in Belgium (Govaerts et al., 2017) and 123 pharmaceutical employees in Peninsular Malaysia (Ismail et al., 2019), perceptions of 115 employees who work at various departments and divisions within an organization (Mohamad et al., 2020). These surveys indicated that the managers' ability to provide a regular emotional aid appropriately (e.g., stimulating, caring, open-minded) and instrumental aid (e.g., budget and location) in designing and administering training programs had been an essential antecedent of motivation to learn in the respective organizations (Abdulkarim et al., 2009; Govaerts et al., 2017; Ismail et al., 2019; Mohamad et al., 2020).

Third, the relationship between managers' support in training programs and motivation to learn has enhanced training application. This outcome has supported the spirit of Bandura's (1979) Social Learning Theory. This theory posits that learning is part of the mechanism of knowing and imitating the actions of other people. For example, individuals exposed to a positive environment will affect their motivation for learning, thus changing that person's behavior. This theory's application displays that the spirit of social learning is often translated as motivation to learn. The spirit of this theory has received strong supports from the research articles in training management research literature.

Limited further studies were conducted using an indirect model to examine the mediating role of motivation to learn between managers' support and training application. For example, Abdulkarim et al. (2009) show that managers' ability to encourage employees to provide sufficient emotional aid and instrumental aid had strongly upgraded employees' motivation to learn necessary knowledge, new skills, and effective behavior. As a result, this motivation may lead to a more significant training application. Additionally, Abdul Aziz (2016) found that managers' capability to offer satisfactory emotional aid and instrumental aid in training programs had powerfully invoked employees' motivation to learn new knowledge, latest skills, and positive behavior. As a result, this motivation may lead to a higher training application. Next, Reinhold et al. (2018) find that managers' ability to provide adequate emotional aid and instrumental aid had strongly invoked employees' motivation to learn.

Consequently, this may lead to a higher training application. Next, Mohamad et al. (2020) show that managers' capability to offer satisfactory emotional aid and instrumental aid in training programs had strongly invoked employees' motivation to learn new knowledge, latest skills, and positive behavior. Consequently, this may lead to a higher training application (Abdul Aziz, 2016; Reinhold et al., 2018; Mohamad et al., 2020).

Concerning the robustness of the research methodology, the survey questionnaire's measurement scale has met the standards of validity and reliability analyses. Thus, this achievement of accurate and reliable results is reproducible. Concerning the practical contribution, this study's findings can be used as essential guidelines by practitioners to enhance training programs in organizations. The first recommendation is based on the outcomes of importance-performance map analysis (IPMA) generated via SmartPLS. This outcome is used to identify the priority actions in solving organizational training

issues. Table 8 explains that motivation to learn is viewed as the most important (0.614) and highest performance (82.806). On the other hand, managers' support is viewed as the least important (0.207) and lowest performance (81.049). This result shows that managers' support should be given further attention to enhance training application in the studied organizations.

The second part of the recommendation is related to improving the methodological and conceptual constraints present in this study. First, training methods and content should be updated to support the current organizational strategy. To help employees understand and apply such training content, leaders need to encourage managers, executives, and supervisors to implement a managerial coaching technique. This training method treats managers as a coach where they cannot be egoistic with their rank status and too rigid with protocols, but need to facilitate and guide subordinates in acquiring and implementing professional knowledge, skills, and behavior to execute daily tasks responsibilities. Implementation of this training program may drive employees to meet their organizations' key performance indicators. Second, training assessment methods should appropriately design to measure employees' ability in using cognition, emotions, and/or psychomotor to meet daily job demands and accomplish tactical and strategic planning objectives. Third, performance-based pay should provide to the employees that can apply new competencies from training sessions to achieve yearly job targets (e.g., meet customer demands and save organizational cost).

Table 8. Importance-performance map analysis results (IPMA)

Construct	Training Application	
	Important (Total Impact)	Performances (Index Value)
Managers' Support	0.207	81.049
Motivation to Learn	0.614	82.806

Fourth, a supportive leadership style should be encouraged to change traditional job-oriented management to human-oriented management. This new management style will treat employees as valuable human capital where they often consult and involve in making training decisions. This management practice may stimulate employees to continuously learn new competencies to solve daily job problems, improve daily job performance, and support the organizational development agenda. Finally, recruitment and selection policies should be oriented to hire employees who have professional certificates, relevant knowledge and experience, good service records, and good personalities to take up important positions. Organizations may use such employees as coaches, mentors, and counselors to facilitate junior managers, executives, supervisors, and frontline employees to improve daily job performance, teamwork, honesty and compliance with organization rules, and commitment to stakeholders' vision and missions. If the recommendations are given attention, this may stimulate employees to support the organizational training objectives.

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Conclusion

This research tested the conceptual framework developed according to the training management literature. The findings of testing the research hypotheses revealed that motivation to learn did act as an essential mediating variable in the relationship between managers' support and training application. These findings have expanded previous studies mostly published in Western and Asian countries. Therefore, extant research and practice in organizational training suggest that motivation to learn should consider as a crucial element in managers' support. Future studies proposing that managers' ability to regularly and adequately provide aids in performing daily tasks and responsibilities will enhance positive attitudinal and behavioral outcomes should carry out. Therefore, the positive outcomes may lead to maintaining and enhancing organizational competitiveness and performance in global competition and unpredictability in the economy.

This study also presents numerous propositions to strengthen the future study. Firstly, some critical respondents' personal and service backgrounds should be considered in future studies as it may predict the similarities and differences of respondents' attitudes toward the relationship between variables of interest. Secondly, a comparative study should measure the relationship between interest variables in public and private organizations. Thirdly, a bigger sample size should take as it can better represent the population under study. Fourthly, specific dimensions of managers' support such as positive climate, peer interactions, and social conversation need to highlight as they are widely discussing in the organizational training literature. Fifthly, other training application features need to explore, such as training performance, training maintenance, and training generalization, should be given more attention as essential outcomes of the relationship between managers' support and motivation to learn in a knowledge based organization. Finally, other motivations to learn such as being proactive, readiness, and goal attainment should consider because they highly recognize as essential linking variables between managers' support and training application in dynamic organizations.

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Position and Prejudice: Exploring the Stereotypical Transformation of Female Identity at Workplace

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Abstract

Gender-based stereotypes have hampered gender equality in the workplace opportunities, and females face identity crises and labeling by their coworkers, which mitigates their chances to climb on the ladder of Leadership. This study strived to explore female coworkers' perceived identity and the transformation in that perception when those females become leaders and the role of stereotypical thinking in it. With the qualitative approach, this study used case study methods. This research collects the data through nineteen in-depth interviews from private companies, and a framework developed using thematic analysis. The results revealed that employees positively perceive their female coworkers, but they are perceived with stereotypes and negativity when they become their leaders. Organizations need to initiate grooming programs when they promote females for harmony and a productive environment.

Keywords:
women leadership, female identity, stereotypes, workplace

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Introduction

Since the last decade, the discussion of identity has been a center of attention, sparked abundant interest, and become the most prevalent theme in contemporary studies of the organization. Frequently, the word "identity" develops a thought of two different types of identities, the individual's own identity and social identity. An Individual's own identity generally discusses observations and estimations of individuals about themselves, which are significant, and the social identity defines others' perception about a person (Rudman, 2002). Perceptions of the person determine how they understand incoming facts and make judgments (Wang, 2013). The definition of social identity relates in leaders' social category to a portion of the self-conception linked to its affiliation. Gender identity is based on a given feature and relates to the portion of a self-concept shared with other people of the same sex. It is essential to distinguish between gender identity and sexual identity based on one's biological features. Gender identity is, in comparison, related to cultural expectations of convictions, conduct, and sentiment connected with social classifications of men and women (Deaux & Stewart, 2001; Ely & Padavic, 2007; Karelaia & Guillén, 2014).

In the last decades, the growth of socially raised identities has acquired expanding consideration in literature and research in psychology and students' concerns (Jones & Mcewen, 2000). However, Some identities like racial identity (Cross Jr., 1995; Helms, 1995), ethnic identity (Phinney, 1990, 1992), sexual identity (McCarn & Fassinger, 1996), and gender identity (O'Neil et al., 1993) holds critical attention. Leadership and followership's identity process plays an important part in specifying 'who will lead' and 'who will be led' as well as 'how leaders and followers will influence' or 'can be influenced.' However, most of the progressive models and linked research have specified a particular element or dimension of identities such as race or sexual orientation. Gender's identity was classified based on their power and status Gender between males and females as it is pertinent to a network of relationships that are much attached to the organizations' hierarchies (Caleo & Heilman; Ely, 1995).

From an identity perception point of view, the gender aspect of Leadership is the concern, as historically, leadership traits are perceived to be masculine. However, research indicates that women leaders have a higher association with innovation and profitability, higher customer awareness, and better social responsibility documents (Dezsö & Ross, 2012; Glass et al., 2016; Glass & Cook, 2015; Webb, 2004). Women's management representation also improves chances for women of lesser levels, thereby decreasing the general segregation amongst organizations (Glass & Cook, 2015; Gorman, 2005; Ely, 1995; Stainback & Kwon, 2012).

Women are still less likely to be perceived as prospective leadership candidates and less favorable in their performance of such positions (Eagly & Karau, 2002; Meister et al., 2017; Ragins & Winkel, 2011). Nevertheless, recognizing these advantages can be hindered by the disadvantages that female leaders come to experience as the objective of negative stereotype-based expectations. Pakistan is struggling to diminish the gender discrimination gap in every walk of life. This research gap suggests the necessity to know

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people's perceptions regarding women (Samo et al., 2018). Whether the Leadership of females or males, it is essential to concern the factors other than being a leader to figure out this phenomenon. Several theories like leader-centric to discuss leadership questions, but research regarding followers-centric theory in the leadership ground has not been done sufficiently (Uhl-Bien et al., 2014).

The Leadership of women should thoroughly and intensely explore if followers' perception consider. When followers and their opinions about Leadership are discussing, an important concept that followers raise for their leaders is stereotypes. Due to cultural influence, followers incline to develop some stereotypes about different phenomena (Samo et al., 2018; Yzerbyt et al., 1998). Researchers need to understand the barriers for women when they become bosses in their job. The stereotypes regarding female colleagues and female leaders have been explored earlier. However, it is important to understand the transformation of female identity from a colleague to the boss. This study explores how the female's identity, from an equal colleague to a leader, gets transformed because of stereotypical beliefs.

Predominantly, Leadership is intimately connected to male sexuality in which the leading role for the male gender is considered apparent. This issue has been emphasized by feminist awakening as in some other areas, Potentially leading roles were also available for women, but even then, the path was misleading in opposing ' male leadership, ' creating ' female Leadership (Due Billing & Alvesson, 2000). Till now, almost an equal proportion of women leaders are still in paucity in the world of business, ultimately leading to more women's training and development initiatives but without significant returns (Bierema, 2017). This hampering or harnessing the efficiency of Leadership is not just about the "sexual orientation," but rather about the intersection of multiple identities (Madsen & Andrade, 2018)). On the other hand, such identities might be real or even just the general perception in followers ' minds, which is being called stereotypes about women leaders. Some of these relative annexations have been recommended by (Ford, 2010) in the Leadership qualitative studies- in what way multiple identities and situations are different fetches out mysterious realities for the phenomenon of Leadership. When individuals become leaders, they want to be seen as leaders, by themselves and by others, and can thus make efforts to demonstrate leading behavior (Lord & Brown, 2003; Schlenker, 2011).

Due to the ability to assume leadership positions and persist in leadership roles, the conflict of the Leadership of women in leaders' identity is a likely important precedent of the two components of the drive to lead (Karelaia & Guillén, 2014). Identity is a collection of meanings affixed to individuals. Some general characteristics categorize every individual as a member of a particular group among people recognized by sociologists – race, gender, education, and occupation (Carli & Eagly, 1999). Besides, people are recognized as part of diverse groups socially, and each of the perceived membership of a social group often forms an essential part of their different social identities. As the theory of social identity claims (Ashforth & Mael, 2011), such values embrace a social element relating to a persons' social characters and his/her proof of identity with a

community or social category to which he/she belongs. Social Identity is being argued as a multidimensional notion by researchers (Karelaia & Guillén, 2014). Gender Identity is grounded on attributed features and alludes to the portion of the individual's own self-concept joint with some other individual of the similar gender. Critically, gender identity is to be eminent from sex identity, which is decided by an individual's biological features. In differentiation, gender identity is connected to social desires of beliefs, conduct, and sensitive circumstances related to men and women (Deaux & Stewart, 2001; Ely & Padavic, 2007).

Although the literature and research about gender identity and Leadership are emerging, it remains constrained and has numerous holes that permit consideration. Much of the concentration on gender in our culture has been reasonably disproportionate, and when we look at Leadership and gender, we get this play out. Three keyways have been identified in which the Leadership and gender focus is lopsided. (a) For decades as well as today, gender and Leadership work are frequently engrossed on females alone or heavily, instead of individuals of all genders. (b) Traditional leadership conceptions and studies assume a mannish reference innate and unexamined; and (c) research sometimes highlights the gap between women and men, limiting the possibility of a deeper understanding of identity groups and leaving out people who are not recognized as women and men (Haber-Curran & Tillapaugh, 2017).

The perceived clash between becoming a leader and becoming a woman is especially essential since, although it has been said that the behaviors and characteristics which are typically expected from leaders and women always contrast dramatically (Eagly & Karau, 2002), however, stereotypes of gender role provide women with a more community-driven attitude: warm, caring, supportive and self – employed (Eagly et al., 2000). In contrast, effective leaders are regularly portrayed as having and requiring agentic characteristics such as confidence, heading, competitiveness, and problem-solving (Martell et al., 1998). Agentic characteristics are given more to men than women, which reveals the stereotype of a "think leader-think man '' (Heilman et al., 1989; Powell et al., 2002; Schein, 2001). Therefore, female leaders might feel pressure to oblige the clashing requests emerging from prescriptive views on how leaders and women should behave (Eagly & Johannesen-Schmidt, 2001). Hence, to the degree that a woman sees that the burdens of one character meddled with the execution of another sense of clashing meanings, custom, and demands inalienable in these identities, she may encounter identity conflict (Ashforth & Mael, 2011; Biddle, 2002; Settles, 2004). If a woman acts — or accepts that she should act in a way that contradicts the meaning of being a leader or being a woman, the conflict in the woman's identity can be a threat to either her Leadership or her gender (Petriglieri, 2011).

The motivation to lead someone and power may be the main steps to reach and sustain Leadership. At this stage, women lag behind men (Schuh et al., 2014). Women in certain cultures appear less motivated for Leadership because women in these cultures are not allowed independently to pursue their careers (Cheryan et al., 2015). Leadership may come into being because of the impact that some power base

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can inspire. In this context, women are perceived to be stereotypically based on indirect power, in which men are even more aggressive and thus are guardians of direct power (Samo et al., 2018). If negative, this will be a stereotypical threat that leads to people who are treated poorly and misjudged (Steele, 2002). Even in modern societies like the United States, men seem to think that their ability to work is better than women (Kiser, 2015). Stereotype presents women as women but not as leaders, which always makes them more difficult to demonstrate (Glass & Cook, 2016). Thus, women's Leadership must be studied from the perspective of followers, taking into account the cultural limitations and possible stereotypes in Pakistan. Underrepresentation within the organization is likely to extend the identity of women leaders struggle since organizations with relatively fewer women are more likely to enact stereotypes of gender and to have an agentic culture of the organization with a leadership definition (gender-wise) values stereotypically men behaviors more than behaviors socially anticipated from women (Kulik & Olekalns, 2012). In a general sense, the patriarchal society set up work parts based on sexual orientation, coming about within the advancement of "work planned by men and for men," which contributed to gender separation and stereotyping (Seo et al., 2017).

Gender wise discrimination can raise gender biases toward women's capacities to lead, which regularly gives a negative assessment of women leaders and potential leaders (Weyer, 2007). As revealed in existing literature, the production of barriers for women's advancement in work contributes to stereotypical perceptions of women's attributes and leadership roles instead of their actual abilities (Wood, 2008). Managerial positions are traditionally perceived as roles for men, especially in senior management, since men are associated with a high organizational status, power and authority, and responsibility rather than women who are attributes of such positions (Lyness & Heilman, 2006). The gender-based social position also improves the categorization of men and women as different social groups that contribute to a glass ceiling's tenacity, which prevents women from moving to top leadership positions in organizations (Paustian-Underdahl et al., 2014). However, in the female arena, this is not the case. This finding shows that men can perceive changes in gender-based social status in organizations, articulated by women's success as a threat to their top position (Netchaeva et al., 2015). Therefore, this study deemed it pertinent to explore the perceived identity of female coworkers and the transformation in the perception of that identity when they become leaders and the role of gender-based stereotypes in it.

Method

We used the case study method to explore the similarities and differences by studying multiple cases and extract the themes to understand the stereotypical beliefs and the changes in it regarding women coworkers and women leaders (Dooley, 2002; Yin, 2009). The case study method of qualitative research helped in understanding the cases and commonality between them. Since the research question revolves around how female colleagues' perceived identity gets changed once they become leaders, the case

study approach of qualitative research suits this exploration. Besides that, multiple case strategy used within the case study approach.

Since, in qualitative studies, there is no fixed sample size or a commonly accepted formula to calculate the sample size. Therefore, it generally depends upon the saturation point. Therefore, we kept collecting data from the selected cases until we reached saturation point (Elo et al., 2014), as we got the repetitive answers when we are doing the eighteenth interview. However, we conducted one more interview to validate the saturation point, and thus the sample size of this study is nineteen case base interviews. We followed a purposeful sampling strategy (Creswell, 2014) as we needed those employees who are currently working under female leaders, and those females leaders were once their coworkers. To ensure credibility in sampling (Thyer et al., 2019), we tried to select the samples in a way that mitigates the bias. Since the study aimed to explore the stereotypes and transformation of female coworkers' identity to female leaders, the data has to be taken from the followers of female leaders. Therefore, when we selected a case, we made sure by taking opinion from the female leaders and other coworkers if there is any personal grudges or issues between that follower and leader, and if there was any, as it was revealed in a couple of cases, we dropped that sample from interviewing.

In the initial stage, informant–centric words or terms and phrases were used to identify the concepts and generate the codes for our data (Meister et al., 2017; O'Reilly et al., 2012). Two of the authors were conducting interviews, the first author was listening to the voice recordings of interviews, and the other was observing every respondent's reaction to get a clear idea about how women employees' identity is being perceived. Later on, we analyzed each transcript by making their codes and possible themes from the data we collected. In this early stage of analysis, we explored and identified employees' perceptions (male/female) about their female leaders regarding the time when they were coworkers and then about the current time when they are the leaders.

Results and Discussion

Table 1 presents a brief profile of the participants, as their confidentiality was ensured to them as per research ethics. Therefore, their names and company names are kept in confidentiality. Figure 1 presents the framework of our findings. These findings are presented in two separate stages; one represents female coworkers' perceived identity, and the other represents the later stage when the same female coworkers become leaders. This study has strived to identify the transformation in that identity and the gender-based stereotypical interjections in that transformation.

Perceived Identity of Female Coworkers

Generous and Supportive

Generous or supportive is one of the perceived identities of female coworkers that find. Even though there are multiple forms of social support, as (Bélanger, 2001) talks about coworkers relation because when you work in an organization, you need

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your colleagues' support. Moreover, having supportive and helpful colleagues feel close to their work and their coworkers, they start trusting each other and make promises that they would listen to them or their problems if they ever needed it. The data gathered in this research also comply with this concept. As one of the male colleagues said:

> *When she was my colleague, she always supports me in every way. In 2015 I got an opportunity to present my paper for a conference and I was not getting permission from my Boss but then Dr. Rakshanda, who was my colleague, she was the person who asks the boss and encourages her to allow me to move ahead and to present my paper in the conference.*

Table 1. Profile of Participants

Participants	Gender	Age	Company
Participant 1	Male	26	Advertising Agency
Participant 2	Male	27	Advertising Agency
Participant 3	Female	24	Advertising Agency
Participant 4	Male	36	Interior Designer
Participant 5	Female	39	Interior Designer
Participant 6	Male	46	Interior Designer
Participant 7	Male	48	FMCG
Participant 8	Male	41	FMCG
Participant 9	Male	34	FMCG
Participant 10	Female	34	FMCG
Participant 11	Female	28	Telecommunication
Participant 12	Female	32	Telecommunication
Participant 13	Male	33	Telecommunication
Participant 14	Female	43	Telecommunication
Participant 15	Male	41	Telecommunication
Participant 16	Male	39	Retail Chain
Participant 17	Male	37	Retail Chain
Participant 18	Female	37	Retail Chain
Participant 19	Female	34	Retail Chain

Competitive

Furthermore, their identity as a coworker was also perceived as competitive. The participants viewed their then female coworkers as competitive at that time. In professional people or usually in this male-dominated surroundings, some research also indicates that women can be competitive just like men (Ahmed, 2011; Johnson & Powell, 1994; Nekby et al., 2008). One of the female respondents said

> *Moreover, she always works hard to achieve their goals. I must say females are no less than males*

And male respondent also said;

> *My all-female colleagues were like, "we want to get work done and our work should be the best" Because in the end we all have to report to some boss and also have to meet the deadlines so why not now.*

Although females as coworkers are perceived to be competitive, generous, and supportive, they are also perceived as less conformist and bossy colleagues.

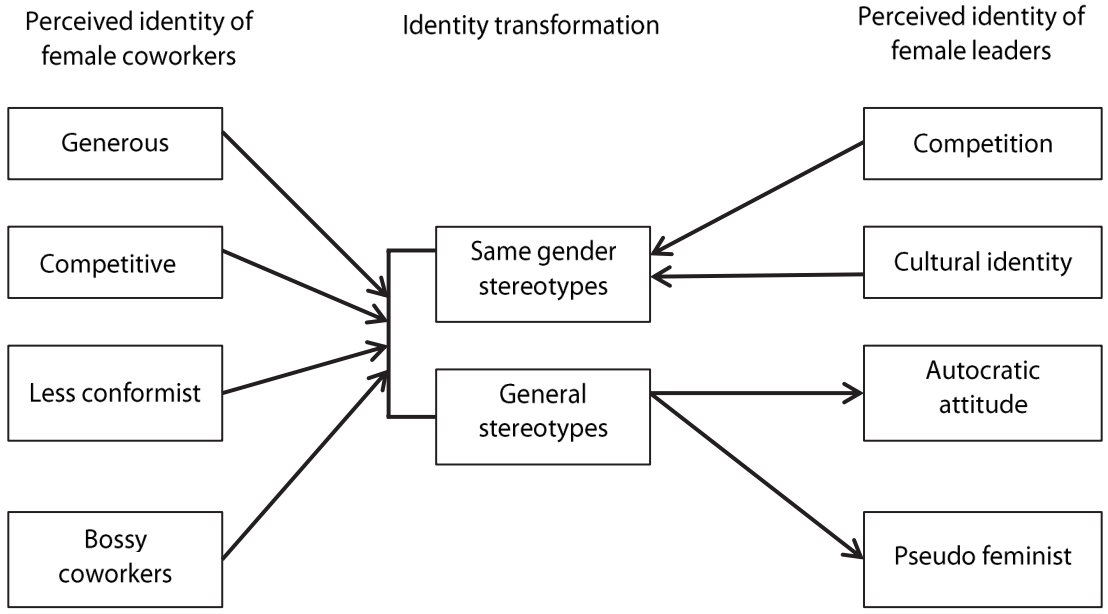
Less Conformist

Women as coworkers are not easily agreed to what they are asked to do; this identity is engulfed with the female coworkers, as they are believed that they do not follow traditional set rules and conducts. One respondent said about a then female colleague that:

> *Females also every time start arguing with their colleagues and not agreeing with other employees, which ends up having difficulties in job work and their relationship with coworkers.*

This particular perception about women colleagues was also being discussed in the studies (Pugh, 2014). However, respondents were observed to be oversimplifying their female coworkers as non-conformists.

Figure 1. The Findings Framework



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Bossy coworkers

Additionally, it is also finding out that women coworkers are perceived not to feel comfortable with everyone in their workplace as they shy in nature. They do not want to listen to others or talk to others; they are a competent and hard worker and are difficult to negotiate in any terms that are negative behavior one could have. One of the participants put this as:

> *When she was my colleague, I felt that she was a bit, bossy person, but that is understandable as female co-workers are like that.*

The bug didn't stop there, as another respondent viewed it like;

> *As a colleague, she was tricky territory to negotiate, but making one your sworn enemy, could hamper your productivity, especially, with the opposite sex and have worked together closely for some time.*

These four identity parts reflected how the current female leaders were perceived when they were just equal coworkers. It is revealed that participants have positive and negative aspects of the perceived identity of female coworkers. Then we tried to dig out if there was any transformation in the identities and whether this positivity and negativity traveled on equal footings when they started to perceive the same coworkers as their leaders. It was interesting to know that the participants develop stereotypes about those female leaders who were once their coworkers, and therefore, their positive perception of female identity start to be eclipsed or maybe vanished. When those females are their leaders, they respond in oversimplification about their current status, or instead, their perception crosses stereotypical beliefs. We identified two types of stereotypes that people develop: those primarily related to 'female vs. female' or same-gendered stereotypes. We observed that this stereotyped is developed because of two reasons; competition and cultural identity. The other type is a general stereotype that is nothing to do with the same gender, as it was there in both genders regarding female leaders. These stereotypes were; that female leader is believed to have an autocratic attitude, and they become pseudo-feminist when they get a leadership position.

When Female Coworkers Become Female Leaders

Same-gender stereotype

We found that competition is one of the significant factors behind this paradox. This whole scenario is being discussed in Queen Bee syndrome too. Queen Bee Syndrome (Seo et al., 2017) is an adverse connection between women leaders and their subordinates. Women in senior leadership roles tend to reject other women's participation to stop other females from advancing their careers (Derks et al., 2011; Seo et al., 2017).

Different studies used this syndrome to define women leaders' adverse assessments for their woman followers that arise tensions between them. It is more likely that women followers with woman leaders report distress and indicate negative health than women

followers with man leaders who support this area of our study. Additionally, cultural identity is also being identified as one factor for developing this identity regarding those women who get promoted to the leadership position.

General Stereotypes

When becoming leaders, women are perceived to be autocratic, and the literature supports it (Holtz & Harold, 2008). However, this is not always the case in previous research. This identities perception transformation in employees' minds regards those females who were once their coworkers and now their leaders. One of the participants said:

> *It is very different now, she used to be supportive, but now since she is my boss so she never asks to do anything but gives orders; perhaps this happens with that chair she has or maybe it happens when a female is on that chair.*

In countries like Pakistan, where the struggle of feminism or its philosophy is already controversial, people start attaching every 'female-support' gesture with feminist ideology. We another transformation in the perception of females' identity, as people employees tend to believe that when females are coworkers, they are fine with many things, but when they become leaders, they start challenging everything based on 'man vs. women' type of notions. Therefore, they are labeled as pseudo feminists. One of the participants said:

> *I think women are darlings when they are coworkers, but when the climb the ladder of leadership, their complexes are revealed, they think everything with the perspective of patriarchal society or male chauvinism, they become pseudo feminists.*

Conclusion

Although the literature on women's Leadership and their perceived identity is quite extensive, this study deepens such understanding by exploring women employees' perceived identity before and after promotion. Such a study has never been taken into account. The study finds out that due to gender stereotypes, people transform their positive perception of a female coworker to a negative perception of that same female coworker when she becomes their boss.

This study deepens the understanding that how the transformation in women's perceived identity occurs from colleagues to the leader. Second, these study conducts in Pakistan, where women and their perceived identity are differ from western countries. In practice, this study provides significant implications for women, as they would know what causes people to perceive their identity in both stages, when they are colleagues and when they are promoted, and should take measures to avoid negative consequences if the perceived identity is valid. Pakistan is one of those countries that is lagging in gender equality, having females as almost half of its population, its indispensable for the economy that females of this country participate equally in everything. This study was conducted with a qualitative approach to explore females'

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perceived identity as coworkers and the transformation in that perception when those females become leaders. It finds out that the same employees who perceive female coworkers fairly well start thinking stereotypically when they become their leaders. This condition hampers employees and female leaders; this study will help the policymakers in organizations initiate grooming sessions of the employees before making females their leaders.

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Is Deception an Antecedent for Employees' Cognitive Appraisal Processes and Unethical Behavior?

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Abstract

The purpose of this study is to examine whether deception influences unethical behavior, employee perceptions of threat, and their coping appraisal processes. It also examines the role of deception in influencing employees' threat appraisal and coping appraisal processing. Using the structural equation model (PLS-SEM), this study reveals a strong relationship between deception, unethical behavior, employees' perceived threat appraisal process, and the coping appraisal process. The empirical findings suggest that deception is a common practice in organizations and significantly influences unethical behavior. This study also finds that deception plays a crucial role in reducing employees' perceptions of threat regarding negative outcomes for engaging in unethical behavior while significantly influencing employees' perceived coping appraisal process, which suggests that deceptive behavior can protect them from the threat of detection their unethical behavior. The findings provide new insights into the relationship among deception, employees' perceived threat appraisal process, coping appraisal process, and unethical behavior and paves the way for further research in this area.

Keywords:
coping appraisal process, deception, employee, threat appraisal process, unethical behavior

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Introduction

Societies and organizations have struggled with unethical behavior for a very long time. Unethical behavior is found throughout society and mingled into our daily lives so that; individuals' sensitivity to such behavior has been reduced (Alempaki et al., 2019; Cooper et al., 2013). As a result, regulators and others often fail to discern that ethical issues are at stake (Al-Aidaros et al., 2014; Cooper et al., 2013). According to the Global Economic Crime and Fraud Survey Report (2020), fraud and its economic costs have increased alarmingly in the last 24 months. The report was the result of surveys of 5,000 organizations in 99 territories, and it found that, among the surveyed organizations, around 47% of them were in some way a victim of fraud, costing US$ 42 billion. The most worrying aspect of this report is that most (60%) of these fraudulent activities conduct by internal employees of the organizations directly or in conjunction with other external perpetrators. However, the Association of Certified Fraud Examiners' Report (2018) argued that the cost for global occupational fraud is far greater than anticipated. The organization examined 2,690 occupational fraud cases in 125 countries over sixteen months, and it found that these were only a fraction of the occupational fraud cases and that they incurred USD 7.1 billion direct costs for the victim organizations (ACFE, 2018). They further argued that if we consider the indirect costs that emerge from these occupational fraud cases, the total cost would be much greater than that amount (ACFE, 2018).

Besides, Luippold et al. (2015) have shed light on Dyck et al. (2014) archive-based argument that "at least one financial reporting fraud is on-going at any time in at least 11.2-13.2% of public companies with more than $750 million in assets, and that managers successfully conceal a large majority of these frauds for some time from the auditor, SEC enforcement, and other government mechanisms." By pointing to the increasing means for internal perpetrators to conduct unethical behavior, several researchers have expressed their concern that despite establishing regulatory requirements for these organizations (Weber, 2015), perpetrators can still hide their fraudulent activities from auditors and legislators for a long period (Halbouni, 2015). Ahmed et al. (2020) argued that by looking at how unethical behavior has diffused itself and has generated costs to society and different stakeholders and, understanding the root causes of unethical behavior, we could better see how it can reduce. It is crucial to determine how people attempt to make their lies believable to others, hide their corruption, or try to cover up their unethical activities to reduce unethical behavior (Shulman, 2011).

Several researchers have postulated that deception might provide perpetrators with the ability to conceal their unethical practices from auditors and other legislators by misleading them (Fleming & Zyglidopoulos, 2008; Folmer & De Cremer, 2012; Halbouni, 2015; O'Reilly-Allen & Zikmund, 2009). The case study concerning Parmalat Dairy and Food Corporation corruption in Italy (Gabbioneta et al., 2013) and that of the $50 million embezzlement case for the Canadian federal government's sponsorship program (Neu et al., 2013) shed light on how systemic and creatively planned accounting misrepresentations helped these organizations to conceal their illegal activities for a

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long time. Although earlier researchers found that the perpetrators used deception while engaging in unethical behavior (ACFE, 2018; Fleming & Zyglidopoulos, 2008; Gabbioneta et al., 2013; Gino & Wiltermuth, 2014; Neu et al., 2013), none of these earlier studies examined the role of deception in influencing unethical behavior in an organizational context. The empirical research that has examined the role of deception in influencing unethical behavior in an organizational context is still scant. It is crucial to understand the subtle use of deceptive behavior since it provides important support for unethical behavior in the workplace (Fleming & Zyglidopoulos, 2008).

Deception refers to perpetrators' intentional activities to manage unethical activities in the workplace so that other people are convinced of or possess a false belief about the accuracy or rightness of their deceptive behavior (Shulman, 2011). It refers to the techniques by which perpetrators avoid the detection of their unethical behavior by concealing it or misleading others to believe in the wrong information (Hodson, 2001). We should note that to conduct unethical behavior successfully, perpetrators do not need to execute unethical behavior effectively. Instead, they need merely to conceal unethical behavior from legislators, regulators, and any organizational monitoring system (Türker & Altuntas, 2014). Deceptive behavior provides the perpetrators with the ability to hide their unethical behavior by misleading others.

Extant studies have mostly discussed how individual emotions (Methasani et al., 2017), trust and culture (Zhang et al., 2015), individual characteristics (Tasa & Bell, 2017), creativity (Kapoor & Khan, 2017), and other factors influence deceptive behavior to mislead the victims in the context of contract negotiations. A group of researchers has also emphasized how leaders' deceptive behavior influences employee perceptions (Kelley, 2015) and how linguistic cues can help successfully detect perpetrators' deceptive behavior (Fuller et al., 2015; Purda & Skillicorn, 2015). Moreover, researchers have also examined the role of deceptive behavior in the context of academia (Griffin et al., 2015), romantic relationships (Cole, 2001), clinical practice (Vangeest et al., 2002), salespeople (Tosun, 2020), and many others. However, there is a clear need to understand better how deceptive behavior operates within organizations, and this has been under-investigated by previous scholars (Kelley, 2015).

Besides, the extant case studies on fraudulent behavior have found that perpetrators use several deception techniques to override the threat of detecting their unethical behavior (Gabbioneta et al., 2013; Neu et al., 2013). On the other hand, organizations have also introduced different mechanisms to heighten employees' perceptions of the threat of detection for their unethical behavior to reduce their unethical behavior (Waheeduzzaman & Myers, 2010). However, the role of the threat appraisal process and the coping appraisal process as a connector between the several organizational control mechanisms and unethical behavior have been examined (Hofeditz et al., 2015; Kouchaki & Desai, 2015; Waheeduzzaman & Myers, 2010). So far, there has been no empirical study that has examined the relationship between deception and employees' perceived threat appraisal and their coping appraisal processes. Empirical studies regarding the relationship between deception and employees' cognitive appraisal processes are important because there are

still inconsistencies and ambiguities regarding the effect of these cognitive mechanisms on individual unethical behavior (Johnson & Buckley, 2015).

Several researchers have argued that understanding the role of deception as a secondary form of unethical behavior that instigates the primary form of unethical behavior in organizations is crucial (Fleming & Zyglidopoulos, 2008; Folmer & De Cremer, 2012). Therefore, this study examines the direct relationship between deception, unethical behavior, and employees' cognitive appraisal processes (i.e., their threat appraisal and coping appraisal processes). This study postulates that this study's findings could enrich our understanding regarding the way perpetrators conduct unethical behavior and give us insight into how to cope with these situations. Consequently, it could provide a clear guide regarding the issues that organizations should consider while designing their ethics programs that seek to reduce employees' unethical behavior. Moreover, by increasing the knowledge of auditors and other monitoring authorities regarding the techniques used for deception, this study expects to reduce the scope of unethical behavior used in organizations.

Methods

This study focuses on public servants in Bangladesh who are currently serving in non-profit autonomous government organizations there. A total of four non-profit autonomous government organizations with 83 branches participated in this study. Scholars have called for researchers to focus on deceptive behavior in non-profit organizations since non-profit organizations share almost the same characteristics as for-profit organizations (Shulman, 2011). Thus this study considers the public servants of non-profit organizations in Bangladesh for this research.

The samples choose frontline officers' levels to mid-level managers within these autonomous government organizations who worked in accounting, audit, and other functional areas. A self-administered, online-based data survey method is using in this study to collect the data, following the recommendation of previous scholars (Hofeditz et al., 2015; Siponen et al., 2014). The participants' anonymity was ensured, and it was explicitly mentioned that participation in this study was completely voluntary. Since all of the information was sensitive and the current study requires honest responses for the data from employees to examine the relationship between the variables, a purposive sampling method was used for this study. Ruiz et al. (2014) have also applied a convenient sampling method to conduct their research regarding employees' ethical intentions in the financial service industry.

The demographic information of the respondents was collected to ensure the representativeness of the sample. Multi-item constructs were used in this research to measure the research model (Appendix -1). All of the items in the measurement scales adapt from previous studies, while slight changes were made to the questionnaire to accommodate the sample from this research context. A five-point Likert scale ranging from "strongly disagree" to "strongly agree" was used to measure the constructs. A preliminary

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study also conducts to see whether or not the online questionnaire was easily readable and understandable by those sampled.

A total of 432 employees were asked to participate in this study. Among them, 225 respondents submitted their responses successfully. Nevertheless, three responses were excluded because they had suspicious answers. Therefore, the ultimate number of responses was 222, which is 51.39% of the total sample. This response rate is consistent with other organizational behavior research in the Bangladesh context (Talukder & Vickers, 2014). This study used PLS-SEM to analyze the research model. Since this study's objective is to examine the relationship between deception, an employee's perceptions of threat, their coping appraisal processes, and unethical behavior, PLS-SEM was decided to analyze the data. Figure 1 shows the proposed direct relationship among the variables of deception, unethical behavior, the threat appraisal process, and the coping appraisal process.

Figure 1. The Framework of the Study

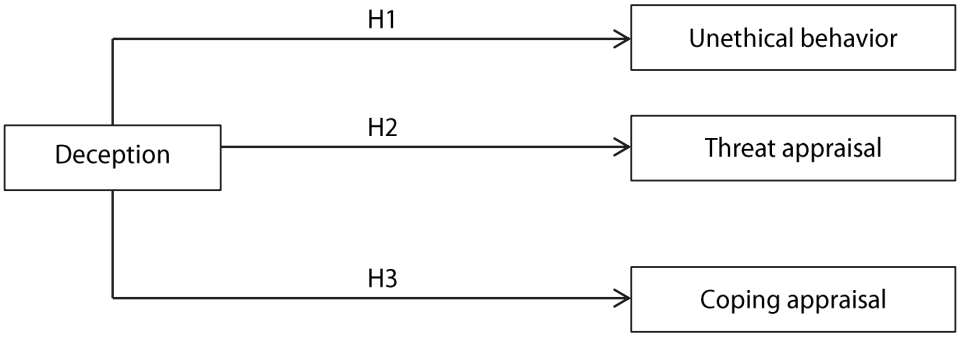

Table 1. Respondents' Demographic Information

Demographic Information	Frequency (n=222)	Percentage	Demographic Information	Frequency (n=222	Percentage
Age			Current Position		
25-35 Years	83	37.4%	Financial/Mgmt. Accountant	64	28.8%
36-45 Years	84	37.8%	Auditor	16	7.2%
46—55 Years	35	15.8%	Engineer	60	27%
Over 55 Years	20	9%	Other	82	36.9%
Academic Qualification			Work Experience		
Diploma Degree	19	8.6%	1-5 Years	71	32%
Bachelor Degree	71	32%	6-10 Years	51	23%
Master Degree/Ph.D	132	59.5%	More than 10-years	100	45%

Results and Discussion

The analysis of the demographic variables in Table 1 shows that 37.8% of respondents were 35 to 45 years old among the study participants, 37.4% of respondents are 25 to 35 years old. The majority of the respondents (59.5%) who participated in this study were postgraduates. The second-highest academic qualification of the respondents was a bachelor's degree (32%). Moreover, 28.8% of the employees were from financial/ management accounting, and the majority of the respondents (45%) had job experience of more than ten years.

Table 2. Result of the Descriptive Analysis and Measurement Model

Latent variables	Mean	Item Loading	Cronbach's Alpha	Composite Reliability	AVE
Deception			0.885	0.913	0.638
	D 1	2.96	0.709		
	D 2	2.85	0.859		
	D 3	2.91	0.855		
	D 4	3.06	0.785		
	D 5	3.19	0.774		
	D 6	2.83	0.800		
Threat Appraisal			0.896	0.928	0.763
	TA 1	3.33	0.850		
	TA 2	3.61	0.848		
	TA 3	3.62	0.907		
	TA 4	3.34	0.887		
Coping Appraisal			0.919	0.943	0.805
	CA 1	3.73	0.887		
	CA 2	4.01	0.893		
	CA 3	4.05	0.897		
	CA 4	3.88	0.912		
Unethical Behavior			0.945	0.951	0.584
	UB 1	2.64	0.779		
	UB 2	2.26	0.815		
	UB 3	2.17	0.787		
	UB 4	2.40	0.752		
	UB 5	2.64	0.761		
	UB 6	2.59	0.829		
	UB 7	2.55	0.770		
	UB 8	2.68	0.819		
	UB 9	2.34	0.717		
	UB 10	2.45	0.753		
	UB 11	2.09	0.725		
	UB 12	2.11	0.717		
	UB 13	2.40	0.743		
	UB 15	2.28	0.714		

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Table 2 shows the descriptive study of the variables, which reveals that "falsifying a time and expense report" (UB1), "conflicts of interest" (UB5), "wasting organizations resources" (UB6), "violating supplier selection rules" (UB7), and "accepting inappropriate gifts" (UB8) are the most common form of unethical behavior found in the surveyed public organizations in Bangladesh. The mean value for these items ranges from 2.55 to 2.68, which is higher than the average value of 2.50. This shows that deception is a common practice within the surveyed organizations given that the mean value for all the items' ranges from 2.83 to 3.19.

This study examined the reliability and validity of the measurement scale of the model. Table 2 shows that the item loadings of all of indicators range from 0.709 to 0.912, except for one item loading for the variable for unethical behavior (UB14-0.689). Thus, this item was removed from the study to avoid any reliability issues and to follow previous scholars' recommendations (Hair Jr et al., 2016). Moreover, the AVE values for all of the constructs range from 0.584 to 0.805, which exceeds the recommended threshold value of 0.5. This study also finds that the Cronbach's alpha for all of the constructs range from 0.885 to 0.945, and the composite reliability value ranges from 0.913 to 0.951. The findings thus ensure the reliability and convergent validity of the scale.

Finally, the constructs' discriminant validity was assessed using the Fornell-Larcker criterion analysis and heterotrait-monotrait ratio (HTMT) approach recommended by Hair Jr et al. (2016). The results for the Fornell-Larcker criterion approach shows that each constructs square roots for the AVE value (the diagonal values) exceed the construct's highest correlation with any of the other constructs in the model (See Table 3).

Table 3. Discriminant validity Assessment by Fornell-Larcker Criterion

Latent Variables	Coping Appraisal (CA)	Deception (D)	Threat Appraisal (TA)	Unethical Behavior (UB)
Coping Appraisal (CA)	**0.897**			
Deception (D)	0.714	**0.799**		
Threat Appraisal (TA)	-0.545	-0.589	**0.874**	
Unethical Behavior (UB)	0.424	0.695	-0.326	**0.764**

Moreover, the results for the heterotrait-monotrait ratio (HTMT) approach in Table 4 reveal that the HTMT value for all of the constructs is less than the conservative threshold value of 0.850 (Hair Jr et al., 2016). These findings thus ensure the discriminant validity of the constructs. Overall, the validity and reliability of the scales are established for further research.

Table 4. Discriminant validity Assessment by Heterotrait-monotrait Approach

Latent Variables	Coping Appraisal (CA)	Deception (D)	Threat Appraisal (TA)	Unethical Behavior (UB)
Coping Appraisal (CA)				
Deception (D)	0.792			
Threat Appraisal (TA)	0.598	0.660		
Unethical Behavior (UB)	0.446	0.746	0.350	

This study also applied the construct level correction (CLC) approach in Table 5 as a statistical remedy to address the issues of common method bias (Podsakoff et al., 2003; Tehseen et al., 2017). The variable "social desirability" was introduced as a marker variable in order to examine the common method variance. Table 5 shows the results for the CLC approach, which show that there are no significant changes between the path coefficients for the original PLS model constructs and the CLC estimations. Therefore, this study considered reporting the original PLS estimation in the rest of the analysis in order to present a reliable, valid, and safe report without the effects of the CMV.

Table 5. Common Method Bias Test by CLC approach

Relationships	CLC Estimation (Path Coefficient)	Original PLS Estimates (Path Coefficient)	CLC Estimation (*t*-value)	Original PLS Estimates (*t*-value)
Deception -> Unethical Behavior	0.648	0.695	9.005	16.414
Deception -> Threat Appraisal	-0.468	-0.591	6.667	15.098
Deception -> Coping Appraisal	0.663	0.714	12.319	19.964

The results show that the R^2 value for unethical behavior is 0.483, for threat appraisal is 0.347, and for coping appraisal is 0.509. This implies that deception can explain 48.3% of the variance in unethical behavior, 34.7% of the variance in the threat appraisal process, and 50.9% of the variance in the coping appraisal process. Table 6 shows the direct relationships between the variables. The results reveal that deception is an important antecedent for unethical behavior in the workplace. This suggests that employees in the surveyed organizations may be practicing different kinds of deceptive techniques while engaging in unethical behavior. The results also find that deception possesses a significant negative relationship with employees' threat appraisal process have a positive relationship with employees' coping appraisal process. The findings indicate that deceptive behavior such as lying, misleading; falsifying reports, and other techniques can significantly reduce employees' perceptions of the threat of negative outcomes while they engage in unethical behavior in the workplace. More specifically, it reduces employees'

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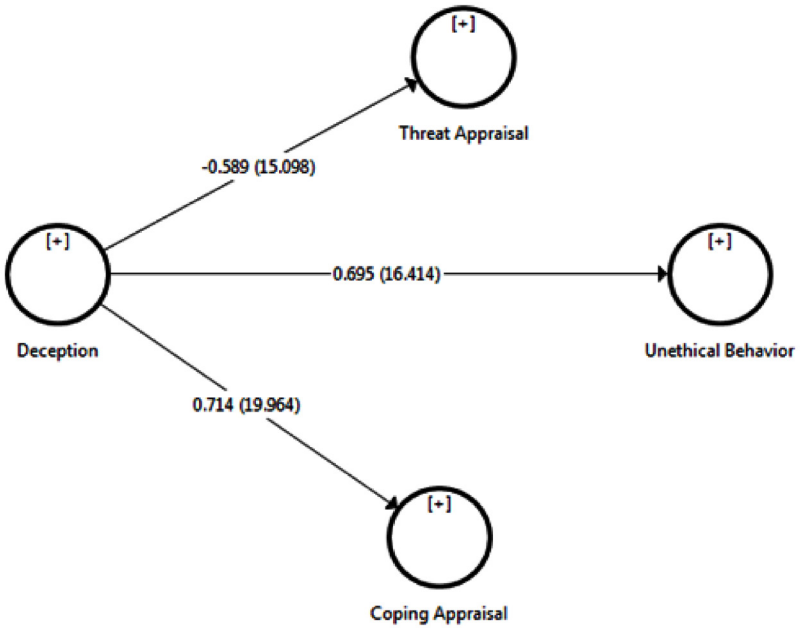
perceptions of the severity and vulnerability to having their unethical behavior be detected or having to punished by the organization for unethical practices.

Table 6. Results of the Structural Model Analysis

Relationships	Correlation	SDT	T Values	P Values	F Square	Confidence Interval 95%	Hypotheses Supporting
H1: D-> UB	0.695	0.042	16.414	0.000	0.633	[0.615 , 0.758]	Supported
H2: D-> TA	-0.589	0.039	15.098	0.000	0.531	[-0.648,-0.517]	Supported
H3: D-> CA	0.714	0.036	19.964	0.000	0.438	[0.648, 0.766]	Supported

Furthermore, the revealed positive relationship between deception and employees' coping appraisal process indicates that employees might possess a positive evaluation of the efficacy of deceptive behavior (lying, document alteration, withholding information, and misleading) to protect them from any negative consequences while engaging in unethical behavior. In other words, deception has a positive effect on employees' perception that the successful implementation of deceptive behavior can overcome the threat of monitoring and auditing control that organizations have implemented to combat the unethical behavior of employees. The larger effect size of deception on the threat appraisal process (0.531), on the coping appraisal process (0.438), and on unethical behavior (0.633) further sheds light on the strong relationship between deception, unethical behavior, employees' perceived threat appraisal process, and their coping appraisal process.

Figure 2. Results of the structural model



Overall, the findings confirm that there is a very strong relationship among deception, unethical behavior, employees' perceived threat appraisal process, and their

coping appraisal process (See Figure 2). The results reveal that when employees intend to engage in unethical behavior, they usually deploy different forms of deception such as lying, falsifying bills, misleading, evasion, concealment, overstatement, and collusion based on their situation, so that their unethical behavior can be conducted successfully. Since individuals are likely to anticipate the threat from an out-group (Stephan et al., 2009), when employees decide to engage in any unethical behavior, they intend to take precautionary actions to protect themselves from the threat that arises from the organizational control mechanisms. In these circumstances, their prior experience (Rogers, 1983), intelligence, and creativity (Kapoor & Khan, 2017) help them to decide the best possible deceptive techniques to be implemented to override the threat of their detection performing self-interested behavior. This finding supports previous studies that suggested that by using their intelligence and creativity, perpetrators might apply different deceptive techniques in different situations to hide their unlawful activities (Petrucelli, 2013).

Moreover, the revealed strong relationship between deception and unethical behavior supports previous studies that showed that deception is a secondary form of unethical behavior that underlies the primary form of unethical behavior found in organizations (Fleming & Zyglidopoulos, 2008; Folmer & De Cremer, 2012). We argue that although deception falls under the broader term of unethical behavior, in terms of its purpose and application, there are some differences between deception and unethical behavior. More specifically, while perpetrators engage in unethical behavior to fulfill their self-interest (Lewicki, 1983), they engage in deceptive behavior to cover or hide their self-interested unethical behavior from regulatory bodies (Halbouni, 2015; Petrucelli, 2013). We support those previous studies that suggest that when perpetrators decide to engage in unethical behavior, they know that they are risking their careers, reputation, and freedom by involving themselves in unethical behavior. Therefore, they focus on concealing their fraud schemes in order to avoid the risk of getting caught by engaging in deceptive behavior (ACFE, 2016). As noted by previous scholars, in order to conduct unethical behavior successfully, perpetrators do not need to execute their unethical behavior effectively. Rather, they need only to conceal their unethical behavior from legislators, regulators, and organizational monitoring systems (Türker & Altuntas, 2014). This study argues that deception provides the means by which perpetrators can cover up or hide their primary forms of unethical behavior from the authorities.

Extant studies have argued that a perception of a threat is an important antecedent to unethical behavior in that it can reduce it (Kouchaki & Desai, 2015; Waheeduzzaman & Myers, 2010). Therefore, organizations very often introduce severe control mechanisms to increase employees' perceptions of threat and to increase the likelihood of the detection of any unethical behavior (Békir et al. 2016; Elango et al., 2010). This study suggests that deceptive behavior can effectively reduce employees' perceptions of threat by decreasing the likelihood of the detection of unethical practices in organizations. The findings indicate that while organizations implement different control mechanisms to increase employees' perceptions of the threat of negative outcomes for being unethical, deception reduces the employees' perceptions of threat by providing them with the ability to sidestep

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organizational control mechanisms. The findings support previous studies, which argued that deception reduces employees' perceptions of threat (Fleming & Zyglidopoulos, 2008). This finding further sheds light on why previous scholars have found a contradictory effect of the cognitive appraisal processes on unethical behavior (Johnson & Buckley, 2015). This study argues that deceptive behavior indeed removes the regulatory bodies' doubts' about the perpetrators' activities and intentions by providing them with the required falsifiede documents and reasons justify their behavior. As a result, very often regulatory bodies fail to identify or detect the unethical practices in organizations.

This study also explains why instead of engaging in unethical behavior directly, employees use deception to conduct the primary forms of unethical behavior (Gabbioneta et al., 2013; Neu et al., 2013). It argues that deception can positively affect an employee's perception that his or her deceptive behavior can overcome the threat of monitoring and auditing system of organizations. The findings suggest that employees possess a positive evaluation of the efficiency of deceptive behavior (lying, document alteration, withholding information, and misleading) that would protect them from the threat of any negative consequences while engaging in unethical behavior. This finding supports previous studies that proposed that deception has a significant influence on employees' coping appraisal process (Fleming & Zyglidopoulos, 2008).

In summary this study suggests that deception might be a common practice in organizations and that it further plays a crucial role in increasing the unethical behavior of employees (ACFE, 2018; Barry & Rehel, 2013; Methasani et al., 2017). By providing empirical evidence regarding the relationship between deception and unethical behavior, this study answers the call of previous research that repeatedly insisted that deception should be considered supportive of more general forms of corruption in organizations (Fleming & Zyglidopoulos, 2008). Fleming and Zyglidopoulos (2008) argued that if an initial lie brings about positive results and remains undetected, it could be a powerful incentive for repeating unethical behavior in the future. The findings of our study suggest that practitioners and researchers should emphasize trying to limit the scope of deceptive behavior; otherwise, they will not be able to reduce the unethical behavior of employees. Instead of relying on the documents supplied by employees, auditors and monitors should work to verify the authenticity of the supplied documents. This study also suggests that whether or not employees' cognitive appraisal processes affect unethical behavior positively or negatively, depends on the factors (deception vs. organizational control elements) that influence their cognitive appraisal processes. The revealed relationship between deception and employees' perception of threat and their coping appraisal processes enrich the deception communication literature by providing new insights while opening the scope for further research in this area.

Conclusion

Overall, our study concludes that deception is a common practice in the investigated organizations in Bangladesh. The purpose of our study is to fill in the gap of a lack of empirical research concerning the link between deception and unethical behavior. It also

aims to determine if deception can influence employees' perceived cognitive appraisal processes. The findings suggest that deception is an important antecedent to unethical behavior. It helps to hide perpetrators' primary unethical practices and significantly influences employees' perceived threat appraisal and their coping appraisal process while playing a crucial role in influencing employees' ultimate behavior. We find that deception reduces the employees' perceptions of threat by reducing the likelihood that their behavior will be detected or exposed and increasing the employees' belief regarding the deceptive behaviors' efficacy and ability to protect them from the potential threats involved in unethical behavior. By revealing the negative and positive influence of deception on employees' perceptions of threat and coping appraisal processes, this study sheds light on why, despite implementing different rules and regulations, organizations often fail to reduce unethical behavior in their workplaces.

Indeed, by examining the relationship among deceptions, the threat appraisal process, the coping appraisal process, and unethical behavior, this study addresses the gap from a lack of empirical research in this area and expands the literature on deception in an organizational context. The revealed relationship between the variables also paves the way for further research in this area. Using the results of this study, future researchers should examine if organizational control mechanisms can effectively reduce deceptive behavior or any moderating effects for deception between the organizational control mechanisms and unethical behavior in the workplace. Future studies should examine if there is any mediating effect of employees' perceptions of threat and their coping appraisal process between deception and unethical behavior. However, we argue this study needs to be replicated in different cultures and countries to increase its findings' generalizability.

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Appendix: Measurement Scale

Measurements and Source
Deception (VanGeest et al., 2002; Kapoor & Khan, 2017)
D 1- Sometimes I exaggerate expense reports to help others.
D 2-Sometimes I change official bills (false bills) to charge more from org.
D 3-Sometimes I sign reports or bills that are not accurate to help others or for my own interest.
D 4-Sometimes I lie to get myself out of trouble.
D 5-There are certain issues in my job that I try to conceal from others.
D 6-There are certain things in my work that I sometimes try to mislead others about.
Threat Appraisal (Warrick, 2016; Witte, 1996)
TA 1-In my org. the punishment strategy is severe.
TA 2-If I do not comply with the rules of the org., I may face serious problems.
TA 3- The probability of detection of my unethical practice poses a threat to me.
TA 4- It is likely that my unethical behavior will get detected in our org.
Coping Appraisal (Workman et al., 2008)
CA 1- My effort to keep myself safe from punishment threats are effective
CA 2- The deception techniques can effectively protect me from detection of unethical behavior.
CA 3- I have the necessary skills to deceive others.
CA 4- My deception skills to protect myself and avoid the detection of unethical behavior is adequate.
Unethical Behavior (Kaptein, 2008)
UB 1-Falsifying time & expense report.
UB 2-Stealing or Misappropriating assets.
UB 3-Abusing or misusing confidential information of organization.
UB 4-Violation document retention rule.
UB 5-Engaging in activities that pose a conflict of interest (such as working hours for private purposes).
UB 6-Wasting, mismanaging or abusing org. resources.
UB 7-Violating or circumventing supplier selection rules.
UB 8-Accepting inappropriate gifts, favors, entertainment, or kickbacks from suppliers.
UB 9-Paying suppliers without inaccurate invoices or records.
UB 10-Entering into supplier contracts that lack proper terms, conditions or approvals.
UB 11-Violating the confidential information of suppliers.
UB 12-Violating contract or payment terms with suppliers.
UB 13- Doing business with disreputable suppliers.
UB 15-Falsifying or manipulating financial reporting information.

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The Determinants of the Technical Efficiency of Secondary Schools in Malaysia: Panel Evidence

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Abstract

This study aims to identify the level of technical efficiency of secondary schools and its determinants using the data of 626 Malaysian secondary schools over 2010-2014. Two estimation techniques have been used; the first step is to estimate the school's efficiency score by employing a Data Envelopment Analysis approach. In the second step, we examine the factors affecting the schools' efficiency using a static panel data analysis. The main findings revealed that secondary education is technically inefficient, and on average, the schools can increase their output by 33% using the same resources. Secondary schools in rural areas and less-developed states indicate a better technical efficiency level than schools in urban areas and developed states. Factors that affect technical efficiency are school size, per capita income, and average wage. The findings suggest that the school may perform better by increasing the schools' size by having more classes. The opportunities to increase residents' and households' income may help the areas perform better than others.

Keywords:

technical efficiency, efficiency determinants, secondary school, data envelopment analysis, static panel data

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Introduction

The economic downturn and globalization have forced the government to spend most of its national income to enhance academic excellence and educational development to ensure human capital quality for the country's economic development. Education efficiency has become an important issue in public sector delivery, given the pressing government budget deficit in many countries. With government expenditure constraints, the assessment of efficiency in using these resources becomes very important and critical. Apart from that, efficient resource allocation is also essential to achieve academic excellence, economic growth, and supply of quality human resources (Psacharopoulos, 2004; 2018). From 2014 to 2018, investment in the education sector was RM 56,627 million (2014) and increased to RM 61,641 million (2018), in which the highest allocation of government service expenditure. Where secondary school expenses cover almost 30 percent of the total education expenses. The existing expenditure level will be maintained provided that efficiency and effectiveness studies are conducted (Malaysian Education Development Plan, 2013-2025).

The large number of secondary schools spending from public funds and the relatively low academic performance warrant further evaluation of the secondary school's efficiency. Malaysian secondary school is found technically inefficient in utilizing its educational resources to achieve better results than other countries (Arshad, 2013). Therefore, this study aims to estimate the level and determinants of the selected secondary schools' technical efficiency in four states in Malaysia, namely Selangor, Melaka, Kedah, and Terengganu. The data from 2010-2014 for every 626 schools have been used to achieve the objectives by employing two-stage analysis. We estimate the school's efficiency score by employing a Data Envelopment Analysis approach in the first stage. Then the static panel data analysis is used in estimating the determinants of schools technical efficiency.

The findings suggest that the secondary education is technically inefficient and the schools could have increased output by 33 percent given the same resources. Secondary schools in rural areas and less-developed state indicate a better level of technical efficiency than schools in urban areas and developed states. Factors that significantly affect technical efficiency are school size, per capita income and wage. The findings suggest that the school may perform better with the increase in the size of the schools by having more classes. Efficiency is the effectiveness of using inputs to produce outputs. The optimum efficiency can be generated and influenced by efficient input factors such as the quality or workers. Where, technical efficiency illustrates the ability of firms to produce maximum output when given a set of inputs (Farrell 1957). An efficiency score of one value indicates technical efficiency, and a score of less than one indicates technical inefficiency (Porcelli 2009).

Studies on technical efficiency have been carried out at various fields or organizations of study based on objective, context, and input and output selection. Most researchers use different techniques to estimate production boundaries, productivity, and technical efficiency. Two approaches, namely, Data Envelopment Analysis (DEA) and Stochastic

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Frontier Analysis (SFA), have dominated education efficiency. Data Envelopment Analysis (DEA) are widely applied at all levels of the education sector (Podinovski et al., 2014; Johnson & Ruggiero, 2014; Huguenin, 2015; Atici & Podinovski, 2015; Haelermans & Ruggiero, 2017; Goncharuk, 2018). The second method is the Stochastic Frontier Analysis (SFA) (Scippacercola & Ambra, 2014; Muvawala, & Hisali, 2012). Both approaches are often used to assess technical efficiency levels by either using cross-section data or panel data. Based on previous studies, many studies measure technical efficiency, especially in education that is closely related to primary school, secondary school, and tertiary education.

Extensive research on the technical efficiency of the education sector has been conducted worldwide. Calero et al. (2020) found that the evolution of age cohorts' efficiency levels shows that higher education is more efficient for younger cohorts, while lower and upper secondary education presents a stable trend. Meanwhile, Johnes & Virmani (2020) evaluate the efficiency of education systems in four low and middle-income countries. The findings revealed that no country does the educational system perform uniformly badly or well. Other than that, Buerger & Bifulco (2019) found that charter schools increase the cost of providing education and that these cost increases are larger than short-run efficiency gains but are offset by efficiency gains in the long term. Agasisti et al. (2014) find that almost 96.5% of schools are inefficient, and on average, Tunisian schools could have increased their results by 27% using the same resources. Nahar & Arshad (2014) found that almost all of the 16 selected OIC members are technically inefficient in utilizing their educational resources to achieve better Trends in International Mathematics and Science Study (TIMSS) results compared to the non-OIC countries. Even after controlling for environmental factors, secondary education in the OIC countries remains technically inefficient. Studies on secondary school efficiency use various variables as output, such as numbers of the pupil, numbers of graduates, passing rates, and average test scores. Often the choices are driven by data availability. However, none of these are ideal. The number of pupils may capture the quantity of scholarly output but does not capture the quality. The output that is always used is the test score (Podinovski et al., 2014; Agasisti et al., 2014; Liang, 2014).

The contribution of the paper is in two folds. First, the paper employs secondary schools' national examination results as the output of education performance. This reflects the actual achievement of a secondary school student in Malaysia. Unlike in previous studies that employ international examination results such as a study by Nahar & Arshad (2014) and Arshad (2013) that uses Trends in International Mathematics and Science Study (TIMSS). In contrast, Agasisti et al. (2014) use Programme for International Student Assessment (PISA) as an ouput. The use of Sijil Pelajaran Malaysia result arguably is more reflective of the secondary school academic achievement in Malaysia. Previous studies by Nahar & Arshad (2014) and Arshad (2013) only discussed about the school efficiency. This study is different because this study examines the determinants of technical efficiency as well as the level of technical efficiency of secondary schools in Malaysia.

The inputs are most often used in the study of technical efficiency, namely government spending and the student-teacher ratio. Akbar (2018) found that the greatest impact inputs have on the cost per teacher and cost per student. Drebee & Razak (2018) conclude that colleges that have not achieved the required efficiency examine the factors that have contributed to this outcome to acquire knowledge of weaknesses and imbalances in their inputs and outputs could exploit the available resources efficiently by comparing their inputs and outputs with those of peer colleges. Meanwhile, the China government has increased its spending on the education sector and other learning inputs. However, if schools are operating at low efficiency, educational resources will not be fully utilized, and the success of primary education in China will not be determined (Danu & Zuhdi 2013). Badri et al. (2014) find that per capita spending on the health and education sector was efficient in some countries for the 2006-2010-study year. A study in Indonesia used the ratio of teachers and students. The average expenditure as input and output used was the average student achievement score in 33 regions in Indonesia, with an average technical efficiency of 86% (Agasisti & Zoido 2015). Besides the student-teacher ratio, the average socioeconomic status of students in the school, number of computers per student, the average score in mathematics, and test scores in reading also used (Hussain et al., 2015). The public schools in Pakistan are technically inefficient under CRS and VRS while efficient on technical efficiency, pure efficiency, and scale efficiency.

Based on previous research on school efficiency determinants, the factors that often influence the efficiency are socio-economic factors such as parental income, parental education, schoolmates, and schoolmates' family background. Hussain et al. (2015) and Agasisti & Sibiano (2014) find that students' socio-economic status and parental education significantly affect school efficiency, especially in rural areas. Besides socio-economic factors, school size factors are also often used. Agasisti (2014) found that per capita GDP has a negative relationship with efficiency. School size factors have different effects on efficiency. Some researchers support the large size of schools increased school efficiency (Yahia & Essid, 2019; Nauzeer et al., 2018), while others support the small size of schools (Burney et al., 2013). Previous studies suggest that the determinants of the efficiency of the secondary schools are parental income, parental education, schoolmates and family background of schoolmates.

Methods

A two-stage analysis involves data envelopment analysis (DEA) and static panel data approach is an appropriate approach to analyze this study. The first stage consists of the measurement of secondary school technical efficiency scores. In the second stage, static panel data analysis was performed with efficiency scores obtained from the first stage as dependent variables, while determinant factors are considered as independent variables. The study involved 626 secondary schools from four selected states (Selangor, Malacca, Kedah, and Terengganu). The data are studied by urban and rural schools and

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developed and less developed states. There were 398 (63.6%) urban schools and 228 (36.4%) rural schools. Of the state economy categories, there were 324 (51.8%) schools in the developed states and 302 (48.2%) schools in the less developed states. The study involved several secondary schools such as boarding schools, national secondary schools, religious, national secondary schools, and technical and vocational schools made up of 17-year-old students. Malaysia has multi-ethnic students consists of Malay, Chinese and Indian.

Studies using Data Envelopment Analysis (DEA) involve one output (average student grade) and two inputs (student-teacher ratio and operating expenses per student). Meanwhile, static panel data used one dependent variable and three independent variables. The dependent variable in this study was the school efficiency score. Meanwhile, the independent variable acts as the explanatory variable to examine its relationship to the dependent variable (school efficiency), namely school size, average wage, and per capita income.

Data Envelopment Analysis (DEA)

At the first stage, Data Envelopment Analysis (DEA) is employed to estimate each school's efficiency score. DEA, established by Farrell (1957), is a non-parametric linear programming technique that evaluates a set of comparable entities' relative efficiency by some specific mathematical programming models. These entities are often called decision-making units (DMUs). The selection of a set of weights that combines multiple outputs and multiple inputs is at the forefront of DEA analysis. DEAs can be performed by linear programming techniques where each DMU attempts to maximize the efficiency ratio (output to input) by selecting the best set of weights. DEA linear programming quality means that the maximum value of the objective function in the form of multiplier can also be expressed as the minimum value of the objective function.

The convex shape, according to Coelli et al. (2005), that the data distance in the envelope was much narrower than that of the concave CRS and that the technical efficiency score was greater or equal to that obtained in the CRS model. The gradient constraints also ensure each DMU is simply benchmarked or compared to a DMU of the same scale. If the DMUj is technically efficient (θj is equal to one), the "λj" weight is one while the λ weight for the other DMU is empty. In cases where DMUj is inefficient, the λ weighting of any (or part) of the other DMUs must be positive-DMUs with high λ show a high position as an example of DMUj.

Input and output targets can be used by DMUj to improve efficiency. With the knowledge of how to calculate CRS and VRS techniques' efficiency, the calculation of scale efficiency can be described. The range of technical efficiency (TE) is 0 to 1. TE = 1 implies that the firm is producing on its production frontier and is said to be technically efficient.

Model Specification

In the second stage, we used a panel data estimation to examine the relationship between efficiency score and independent variables. The benefits of using static panel data include a much larger data set with more variability and less colinearity among the variables than is typical of cross-sectional or time-series data. Panel data sets can also identify and estimate the effects that are simply not detectable in cross-sections or pure time-series data. In this study, the selected independent variables used in analyzing factors influencing secondary school efficiency were school size, per capita income, and average wage. School size is the number of students in a school, per capita income is individual income in a year, and the average wage is average monthly wages in a year. The efficiency value represents the dependent variable. The static panel data for the empirical model of this study is as below:

$$Effi_{it} = \alpha_0 + \alpha_1 lnSize_{it} + \alpha_2 lnwage_{it} + \alpha_3 lnpercap_{it} + u_{it}$$

Where, $u_{i,t} = \lambda_i + e_{it}$

Equation above can be written in the form of a fixed-effects model as follows:

$$Effi_{it} = (\lambda_i + \alpha_0) + \alpha_1 lnSize_{it} + \alpha_2 lnwage_{it} + \alpha_3 lnpercap_{it} + e_{i,t}$$

It can also be written in the form of a random-effects model as follows:

$$Effi_{it} = \alpha_0 + \alpha_1 lnSize_{it} + \alpha_2 lnwage_{it} + \alpha_3 lnpercap_{it} + \lambda_i + e_{i,t}$$

Where $Effi_{it}$ represents the school's efficiency measure and α_0 is intercept. Size is the log for the school size. Wage is the log for an average wage. Percap is the log for per capita income representing community background, "λ_i" is the school-specific effect, e_{it} is the remaining error term where e_i $(0, \sigma_{ei})$, i represents the number of schools i (i = 1,…, N), and t represents the time period (t = 1,…, T). The λ_i variable represents all the unobservable variables that are constant over time but vary by school. The α_i variable will be indicated by the coefficient of the shortcut variable for each school. The α_i variable is assumed to be correlated with one or more of the independent variables found in the model. U_{it} is called idiosyncratic error or random that changes over time. This is because it represents unobservable variables that change over time and affect dependent variables.

Outliers Statistic

DFITS statistical measurements have been used to detect data outliers. The DFITS measurement is a different scale between 'within the sample' and 'beyond the sample' to the observation's expected value. DFITS evaluates appropriate decisions for the model of 'including' and 'excluding' observations. DFITS statistics are calculated as follows:

$DFITS_j = r_j \sqrt{h_j / 1\text{-}h_j}$, where r_j is a studentized (standardized) residual, $r_j \frac{ej}{s(j)\sqrt{1-hj}}$, with s_j referring to root mean squared error of the regression equation with the j_j observation removed. Working through the algebra shows that either a large value of leverage (h_j) or a large absolute residual (e_j) will generate a large |DFITSj|. The DFITS value measure is a scaled difference between the in-sample and put-of-sample predicted values for jth

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observation. DFITS evaluates the result of fitting the regression model, including and excluding that observation. Initially, 626 schools were listed from four states, which consisted of two categories: the developed and the less developed states. However, after considering incomplete school data and information, outliers' tracking test, the number of schools used for estimating is only 609.

Hausman Test

This test has been used in static panel data models in choosing the appropriate model, either fixed effect or random effects (Hausman 1978). Thus, the model of secondary school efficiency estimated using fixed and random effects. The differences between the two models are the fixed effect assumes that the school-specific effect is correlated with independent variables. Meanwhile, random effects assume that school-specific effects do not correlate with independent variables and allow time-invariant variables to play a role as explanatory variables in the model. According to Baltagi (2008), the derivative of the error for the estimator of the fixed effects model is $u_{it} = \lambda_i + e_{it}$, where λ_i represent unobserved individual-specific effect, $e_{it} = 0$ represents the assumed individual effect. Instead, in the random-effects model, it is stochastic and distributed, and the individual effect is not correlated with the error terms but is correlated with the regressors. The panel data model is a one-way error components model that allows for heteroskedasticity in individual specifications and designations using unbalanced panels. Based on the one-way model, the special effect assumes that e_{it} is constant in the fixed-effects model. In contrast, in random-effects models, e_{it} is independent of the probability distribution.

All the independent variables are expected to have different effects on secondary school efficiency. The relationship between school sizes is negative ($\beta 1 < 0$), which means increasing school size will reduce school efficiency. The relationship between average annual wage and per capita income is expected to be positive ($\beta 2 > 0$), where increasing annual average wages and per capita income help improve school efficiency. Specifically, in a one-way model, the Hausman test hypothesis can be written as follows:

H_0: $E\ (v_{it} / x_{it}) = 0$

H_1: $E\ (v_{it} / x_{it}) \neq 0$

The null hypothesis above indicates that if the individual effects are not correlated with the independent variables, then the random-effects model is chosen because it is efficient. On the other hand, if there is a correlation, then the fixed effect is consistent with the estimated coefficient. The random-effects model is not consistently used in the test results. Based on the estimates, the Hausman test value is 0.000, which is less than 0.05; then, the fixed effects model is better used for analysis purposes.

Result and Discussion

In the first stage analysis, this study aims to measure the school's technical efficiency regarding the average student score using non-parametric of the DEA method. There are two inputs have been used, namely, student-teacher ratio and per-pupil

expense (in term of Ringgit Malaysia). At the same time, the output is the average student score, which reflects school educational attainment. The second stage of analysis identifies factors that might significantly affect school efficiency. This study applies static panel data analysis. In this analysis, the dependent variable is the school efficiency, while the independent variables are school size, average wage, and per capita income (Ringgit Malaysia).

Table 1. Descriptive Statistics of The Variable

	Obs	Mean	Std. Deviation	Min	Max
Output					
Efficiency	2950	0.729	0.143	0.168	1
Input					
Per capita income	2950	10.18	0.354	9.55	10.61
School size	2950	6.937	0.5713	4.836	8.39
Average wages	2950	7.571	0.1923	7.275	7.87

Table 1 shows a descriptive analysis of the quantitative determinant variables used in this study. The table shows that the overall average output is 0.729 with a minimum output value of 0.168; the maximum output value is 1. There are three inputs used; the first input was per capita income that average value of 10.18, a minimum value of 9.55, and a maximum value of 10.61. The second inputs used were the school size with an average of 6.937, a minimum value of 4.836, and a maximum value of 8.39. Finally, the third inputs used were average monthly wages with an average of 7.571, a minimum value of 7.275, and a maximum value of 7.87.

Table 2. Secondary School Efficiency Level

Level	2010	2011	2012	2013	2014
1	4	8	6	7	12
	(0.64%)	(1.28%)	(0.96%)	(1.12%)	(1.92%)
0.8-0.99	49	22	161	180	222
	(7.82%)	(3.51%)	(25.72%)	(28.75%)	(35.5%)
0.5-0.79	374	465	379	357	319
	(59.74%)	(74.28%)	(60.5%)	(57.03%)	(50.96%)
≤ 0.49	199	131	80	82	73
	(31.79%)	(20.93%)	(12.78%)	(13.10%)	(11.66%)
Total	626	626	626	626	626

Note: Low ≤ 0.49, medium (0.5-0.79), high (0.8-0.99) and efficient (1.00)

Table 2 displays the technical efficiency scores of four selected states in Malaysia for the period 2010 to 2014. The findings reveal that the efficiency value is rearranged based on the efficient, high, medium, and low level. The efficiency of the low level was on a scale of ≤ 0.49, medium (0.5–0.79), high (0.8–0.99), and efficient (1.00). This five-year study shows that only four schools in 2010 were efficient and increased

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to 8 schools in 2011, declining to 6 secondary schools in 2012 and 12 secondary schools in 2014. The high-efficiency level was showing an increase from year to year except in 2011. The moderate level shows a decline in the number of schools except for 2011. The lower efficiency category shows a decline over the years as these secondary schools show improved levels of efficiency as of 2014; only 73 schools were in the lower level. As of 2014, 98% of secondary schools in Malaysia are inefficient. These findings align with the results by Nahar & Arshad (2014) and Podinovski et al. (2014).

Table 3. Urban and Rural Secondary School Efficiency Level

Year/ efficiency	2010		2011		2012		2013		2014	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1	2	2	1	7	1	5	0	7	6	6
0.8-0.99	20	29	10	12	78	83	83	97	105	117
0.5-0.79	295	176	281	184	260	119	252	105	234	85
≤ 0.49	81	21	106	25	59	21	63	19	53	20
Maximum	1	1	1	1	1	1	0.962	1	1	1
Minimum	0.14	0.21	0.12	0.20	0.14	0.20	0.16	0.20	0.21	0.23
Average	0.61	0.69	0.57	0.65	0.67	0.74	0.67	0.75	0.69	0.77
Sub total	398	228	398	228	398	228	398	228	398	228
Total	626		626		626		626		626	

Table 3 shows there are 398 schools in the urban area and 228 schools in a rural area. The high-efficiency levels show there were 20 schools (2010), up to 105 schools (2014) in the urban areas. Similarly, rural schools increased from 29 schools (2010) to 117 schools (2014). These findings show that academic achievement is improving. Low-level efficiency (≤ 0.49) showed a declining number in both locations, with only 53 urban secondary schools and 20 rural high schools in 2014. School performance improved when the percentage of schools in the lower ranks decreasing. In terms of minimum efficiency, it was found that urban schools had a lower efficiency than rural schools, especially for 2011, at 11.8 percent compared to 19.5 percent for rural schools in 2013. This finding indicates that although both locations are inefficient, rural schools are more efficient than urban schools. This result is in line with the study by Johnes & Virmani (2020), who found that rural schools often showed higher efficiency levels. Muvawala and Hisali (2012) also found urban schools to be technically inefficient than government-aided and rural schools. Conversely, Kantabutra (2009) find urban schools were also more efficient. Rural schools generally benefited from their closer ties with the local community. Denaux (2007) also find that urban schools are more efficient.

Table 4. Secondary Schools Technical Efficiency of Advanced and Less Advanced States in Malaysia

Year	2010		2011		2012		2013		2014	
	DS	LDS	DS	LDS	DS	LDS	DS	LDS	DS	LDS
1	0	4	4	4	3	3	4	3	5	7
0.8-0.99	16	33	6	16	64	97	73	107	93	129
0.5-0.79	250	221	233	232	217	162	208	149	191	128
≤ 0.49	58	44	81	50	40	40	39	43	35	38
Maximum	0.91	1	1	1	1	1	0.962	1	1	1
Minimum	0.141	0.221	0.118	0.198	0.140	0.203	0.164	0.158	0.205	0.225
Average	0.620	0.667	0.572	0.619	0.676	0.669	0.687	0.716	0.705	0.737
Sub total	324	302	324	302	324	302	324	302	324	302
Total	626		626		626		626		626	

*Note: D= Developed States, LD = Less Developed States

Table 4 shows the technical efficiency of secondary schools according to the developed and the less developed states' economic status. There are 324 schools in the developed states and 302 schools in the less developed states. Although located in less developed states, secondary school achievement in these states is relatively good. For example, in 2010, there is no efficient school in developed states than four schools in less developed states. In 2014, the less developed states showed better performance with seven schools than the five in developed states. Average efficiency by economic status indicates that schools in developed states have lower average efficiency than less developed states' efficiency. For example, in 2014, at 70.5% in developed states compared to 73.7% in less developed states. The overall result shows that 289 schools in developed and 264 schools in less developed states achieved an efficiency level of more than 0.50.

Table 5. Estimation Results of Static Panel Data for School Efficiency Determinants

	Fixed effect	Random effect
LnSize	-0.0762	-0.025
	(-2.80)***	(-2.98)***
LnWage	-0.191	0.0578
	(-0.59)	(2.12)
LnPercap	0.1317	-0.0455
	(3.91)***	(-2.35)**
No. of observation	2950	2950
No. of groups	609	609
R-square	0.0072	0.0187
Prob>F / Prob>chi2	0.0000	0.000

Note: The figure in parentheses is t value. *** Significant at level 1%; ** Significant at level 5%, * Significant at level 10%.

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Table 5 illustrates the results of static panel data estimation. Based on the estimation, the Hausman test value is 0.000, so the fixed effects model is more suitable for analysis purposes. Therefore, the discussion of the study results focused on the fixed effects model only while the random effects model estimates were reported for reference. The result of the analysis shows that only two independent variables are statistically significant at a 1% significant level in influencing the secondary school efficiency. School size variables were negatively affects the school efficiency, in which an increase of 1% in school size leads to reduce the school efficiency by 0.076 units. These findings align with Tsakiridou & Stergiou (2013), who found a negative relationship between school size and efficiency in Greece's study. However, the results are inconsistent with some previous studies; for example, research by Yahia & Essid (2019), and Huguenin (2015), who found that large school size would improve school efficiency. In contrast, Agasisti (2014) found that there is no relationship between school size and efficiency.

Per capita income variables were positive affects efficiency. When there was an increase in 1% in per capita income, the school efficiency increased by 0.1317 units. Afonso & Aubyn (2006) also found that GDP per head and parents' educational attainment are highly and significantly correlated to efficiency. In other words, a higher proportion of disadvantaged students reduce school efficiency. This finding is consistent across studies and appears almost unchallenged (Alexander & Jaforullah, 2010; Bradley & Taylor, 2010; Rassouli-currier, 2007). The study's findings also found that the average wage factor is not significant in influencing the technical efficiency of secondary school.

Table 6. Estimation Results of Static Panel Data for School Efficiency Determinants for The Developed and Less Developed States in Malaysia

	Developed states		Less developed states	
	Fixed effect	**Random effect**	**Fixed effect**	**Random effect**
LnSize	-0.0419	-0.0419	-0.1093	-0.0605
	(-1.87)***	(-3.55)***	(-4.68)***	(-4.50)***
LnWage	0.3935	0.3406	0.1083	0.2471
	(15.40)***	(13.72)***	(3.43)***	(8.81)***
LnPercap	0.2285	0.2539	0.2634	0.0609
	(10.13)***	(11.20)***	(6.64)***	(1.98)**
No.of observation	1536	1536	1414	1414
No. of groups				
R-square	316	316	293	293
Nilai Prob >F	0.4778	0.4776	0.2610	0.2392
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Note: The figure in parentheses is t value. *** Significant at level 1%; ** Significant at level 5%.

Table 6 summarizes the results of estimating secondary school efficiency determinants for the developed and the less developed states in Malaysia. There are 316 secondary schools in the developed states and 293 secondary schools in the less developed states. School size variables were negatively influence efficiency in both developed and less developed states. When there was an increase of 1% in school size, the total efficiency

decreased by 0.0419 units in developed states and 0.109 units in less developed states. Increasing school size will reduce school efficiency. Average wages and per capita income have a positive impact on school efficiency for both the developed and the less developed states. The increase of 1% average wages resulted in increased school efficiency by 0.3935 units in developed states and a 0.1083 unit in less developed states. The increased 1% in per capita income increased school efficiency by 0.228 units in developed states, and 0.263 unit in less developed states. The student socio-economic status and parental education significantly influence the schools' efficiency, especially in rural areas (Hussain et al. 2015). These findings are inconsistent with Borge & Naper (2006), indicates that a high level of municipal revenue, a high degree of party fragmentation, and a high share of socialists in the local council are associated with low educational efficiency. The developed states fixed effects model shows a relatively high R^2 of 0.4778, which means a 48% change in the dependent variables explained by the explanatory variables. Compared to less developed states with a lower R^2 of 0.2610, only a 26% change in the dependent variable is explained by the explanatory variables.

Table 7. Estimated Results of Fixed Effects and Random Effects of static panel data on the determinants of urban and rural schools in Malaysia

	Urban		Rural	
	Fixed effect	**Random effect**	**Fixed effect**	**Random effect**
LnSize	-0.0208	-0.0618	-0.1186	-0.0671
	(-1.06)	(-5.32)***	(-4.17)***	(-4.80)***
LnWage	0.2727	0.3187	0.1734	0.3352
	(11.80)***	(13.65)***	(4.74)***	(10.48)***
LnPercap	0.2622	0.0817	0.2621	0.2459
	(11.48)***	(4.07)***	(6.44)***	(6.15)
No.of observation	1855	1855	1095	1095
No. of groups				
R-square	384	384	225	225
Nilai Prob > F	0.4006	0.3781	0.3046	0.2615
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Note: The figure in parentheses is t value. *** Significant at level 1%; ** Significant at level 5%.

Table 7 summarizes the results of estimating secondary school efficiency for urban and rural schools. There are 384 secondary schools in urban areas and 225 secondary schools in rural areas. School size factors for urban areas were not significant in influencing school efficiency. These findings contradict the findings by Kantabutra and Tang (2006), who found that school size has a significant effect and positive relationship with school efficiency in urban areas. However, rural areas show that school size factors negatively and significant at a 1% significant level in influencing efficiency. The one percent increases in school size followed by a 0.1186 unit decline in school efficiency. However, the monthly average wage and per capita income positively and significant at a 1% significant level in influencing efficiency in both locations. A 1% increase in average monthly wages increased school efficiency by 0.2727 units in an urban school and 0.1734 units in a

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rural school. In comparison, the per capita income factors show that a 1% increase in per capita income increased the rate of 0.262 unit school efficiency in urban and rural schools. Hussain et al. (2015) found that parents' socioeconomic factors influence the efficiency of rural schools. The fixed-effect model in urban school shows R^2 of 0.4006. This means that the explanatory variable explains a 40.1% change in the dependent variable. In rural areas, R^2 is 0.3046, this means that only 30.5% of the changes in the dependent variable.

Conclusion

The study's focal point is to examine the level and determinants of technical efficiency of selected secondary schools in Malaysia. The efficiency score for each school has constructed using a DEA method, whereas the static panel data technique has been used to model the determinants of school technical efficiency. The main findings revealed that secondary school's technical efficiency is still moderate, although 88% of the operating secondary school's technical efficiency was above 0.50 by the year 2014. Each category's technical efficiency is as follows, urban schools 86.7%, rural schools 91.2%, developed states 89.2%, and 87.4% in less developed states. The regression result reveals that school size is significant and negatively affects school efficiency in rural areas.

Meanwhile, per capita income and average wages have a positive relationship since the result shows it increases the school's efficiency in urban and rural areas. Schools in the developed and less developed states show that the school size factor negatively affects, whereas the monthly average wage and per capita income are positively related to efficiency. The school size factor was not significant for urban schools, while school size harms rural schools' efficiency. Average wages and per capita income have a positive effect both on urban and rural schools' efficiency.

Results reveal some important implications for policymakers and secondary school management in Malaysia. First, the study's significant results have shown a meaningful and negative relationship between school size and school efficiency. This result explains that an increase in the school's size will lower the school's efficiency. Therefore, determining the number of pupils in a class is crucial to ensure increased efficiency. The new schools and the upgrading of existing schools are necessary to ensure that all facilities are fully utilized and thus improve the school's efficiency. The significant and positive relationship between average wages and per capita income and school efficiency suggests that school efficiency can be improved if the government considers increasing average wages and existing per capita income. This effort can help parents get better opportunities to help schools improve learning facilities both at school and home. Besides, the Federal and State governments should allocate their funding differently to narrow the socioeconomic differences between low-income families and high-income families. So, the importance of family economic background to students' educational success would decline, making academic achievement depend on ability and effort. The school administration and management should also consider the best way to develop school excellence with more authority given by the Ministry of Education.

The study, however, has a limitation. It is difficult to have access to secondary school data. Most of the data are confidential, primarily Sijil Pelajaran Malaysia result. This condition has caused difficulties in obtaining extensive school data, which is valuable for this study. Based on the limitation that has been encountered in this study, the following are some recommendations for further research. First, increasing the number of existing schools to obtain the results of more comprehensive technical efficiency. Second, further research to identify and compare the results of using two different approaches in modeling the DEA and SFA (Stochastic Frontier Analysis). The comparisons of the results can indicate whether there are differences or similarities in the obtained results.

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Board of Commissioners' Structure, Ownership Retention, and IPO Underpricing: Evidence from Indonesia

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Abstract
This research examines how the board of commissioners' structure and ownership retention affect IPO underpricing in Indonesia. In this study, we have examined the following three aspects: the number of board of commissioners, percentage of independent commissioners, and percentage of female commissioners. In total, 186 Indonesian companies that have conducted IPO from 2001 to 2016 were included in this study. This study uses multiple regressions to test the hypothesis. Our findings show that ownership retention has a negative implication on underpricing. Furthermore, the number of board of commissioners and independent commissioners has also been determined to reduce the level of underpricing. However, female commissioners were found to have no significant effect on IPO underpricing; furthermore, it demonstrated no significant effect in reducing the level of underpricing. These results show that higher ownership retention, a smaller number of board members, and a higher percentage of independent commissioners can reduce IPO underpricing.

Keywords:
board of commissioners, ownership retention, underpricing, female commissioner, initial public offering

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Introduction

Initial public offering has been considered as an important event for any company, where they can change their status from private to being a public company by selling their shares or stocks to the general public. Usually, on the first day of trading, the offer price of the share and its market value do not match. If the market value is higher than the offer price, it is referred to as underpricing. On the contrary, if the market value is lower than the offer price, it is called overpricing. Most Initial Public Offering (IPO) events result in underpricing of shares. This phenomenon has already happened in most countries around the world (Banerjee et al., 2011; Hopp & Dreher, 2013; Rathnayake et al., 2019). IPO underpricing can often range from 6.12% (in New Zealand) to 96% (in India) (Hopp & Dreher, 2013). India has been identified as the country with the highest IPO underpricing, followed by Malaysia with 87.12%. A study by Banerjee et al. (2011) shows that on average, IPO underpricing using cross-country study is approximately at 29.11%. In another study, Mehmood et al. (2020) showed that developing markets have higher IPO underpricing rates compared to developed ones.

Allen & Faulhaber (1989) and Grinblatt & Hwang (1989) have both developed signaling theory in order to explain IPO underpricing. Signaling theory argues that every company knows their value. Therefore, most companies use IPO underpricing to signal their worth. Most investors believe that companies that are able to handle the cost of IPO underpricing are good prospects. Conversely, if the company might not have good prospect they will suffer to bear underpricing cost from the IPO event. Thus, most companies use IPO underpricing in convincing investors of their potential.

The study on underpricing can be divided into the antecedents and the consequences of IPO underpricing. Some antecedents of IPO underpricing are as follows: financial condition of the firms (Darmadi & Gunawan, 2013; Kotlar et al., 2018; Kurniawan, 2014; Pahlevi, 2014) and corporate governance practice (Boulton et al., 2011; Hopp & Dreher, 2013) such as ownership structure (Bertoni et al., 2014; Handa & Singh, 2017), board structure (Bertoni et al., 2014; Darmadi & Gunawan, 2013), and gender diversity (McGuinness, 2018; McGuinness et al., 2017). Meanwhile, the other aspect of this study is the consequences of IPO underpricing to market's future performance, for example, taking into consideration the performance of the market in the short (Manjunath et al., 2020; Sahoo & Rajib, 2010; Tutuncu, 2020) and long run (Sahoo & Rajib, 2010; Thomadakis et al., 2012; Wang et al., 2015).

Previous studies on IPO underpricing in Indonesia mostly conduct by Darmadi & Gunawan (2013), Gumanti & Alkaf (2011), Gumanti et al. (2017), and Pahlevi (2014). Previous studies provide evidence that there is a significant IPO underpricing in Indonesia, with a reported average of 22.35 % (Gumanti & Alkaf, 2011) and 23.7 % (Bandi et al., 2020). Darmadi & Gunawan (2013) have also found that on average, underpricing in Indonesia is at 22.2 %, with the structure of the board serving as a significant factor affecting the level of underpricing. On the other hand, ownership

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structure was determined to have no significant effect on IPO underpricing. Furthermore, Widarjo et al. (2017) and Widarjo & Bandi (2018) have highlighted the importance of intellectual capital disclosure in reducing information asymmetry and underpricing.

On the other hand, Darmadi & Gunawan (2013) demonstrated that having independent commissioners has a positive effect on IPO underpricing. Instead, of reducing IPO's underpricing level, the percentage of independent commissioners can increase the level of underpricing. This result shows that in this case, independent commissioners might have failed to effectively minimize the information asymmetry between companies and investors. This result is in line with the findings of Prabowo & Simpson (2011) who found that having independent commissioners has no significant effect on firm performance in Indonesia. This result was confirmed Handa & Singh (2017) and Arora & Singh (2020a) who determined that independent directors in India have no significant effect on underpricing. On the other hand, Bertoni et al. (2014) and Kubicek et al. (2017) support the hypothesis that independent directors have minimized the level of underpricing. Setiawan et al. (2019) showed that independent commissioners in Indonesia have mitigated earnings management. Thus, independent commissioners have positive effect on earnings quality in Indonesia.

Another aspect to examine is the size of the board of commissioners. There are two theories that need to be considered on this matter: (1) the smaller size is better as it could result in quick management responses and less communication problems (Bliss, 2011). (2) Having more commissioners on board is better for more varied expertise. On a study by Bertoni et al. (2014), it was determined that having more members in the board of commissioners can negatively affect underpricing. This result shows that the smaller the number of commissioners, the better. This result shows that the size of committee can reduce the level of underpricing. However, Handa and Singh (2017) have found that the board size has a positive effect on IPO underpricing in India. Using a specific context of SME IPOs in India, Arora & Singh (2020a) also find that board size have positive effect. On the other hand, Darmadi & Gunawan (2013), Kubicek et al. (2017), and Xu et al. (2017) have determined that this factor has no effect on IPO underpricing in China.

This current study also focuses on how having female commissioners affects IPO underpricing. A study by Dieleman & Aishwarya (2012) has showed that the number of female directors and commissioners in Indonesia is approximately at 11.6 %. This number is lower compared to other developed countries such as Europe (17 %) and Australia (13.8 %); however, Indonesia has much better percentage of women in the board compared to other emerging countries that only have 7.2 %. It is expected that this gender diversity will have a positive effect on the performance of the firm and thus a negative effect on the level of underpricing. However, previous studies have shown that female directors have no significant effect on IPO underpricing (Handa & Singh, 2015; Kaur & Singh, 2015; McGuinness, 2018). In this specific context, female directors were determined to have no significant effect on the SMEs' IPO in India (Arora & Singh, 2020b). Singh et al. (2019) have examined the impact of female directors on

the performance of firms in the long run in India. Their findings showed that this has no significant effect in terms of improving the performance of a certain firm. This was in contrary to the findings of Kubicek et al. (2017), who claimed that female directors have a positive effect on IPO underpricing. Meanwhile, a study Badru et al. (2019) has highlighted the importance of the presence of female directors on IPO events. Female directors mitigate the information asymmetry during IPO events; thus, the presence of female directors indicates the quality of the IPO.

This study also examines the effect of ownership retention on IPO underpricing. Albada et al. (2018) have looked into the indicators of IPO events in Malaysia and determined that ownership retention is one of the important aspects most investors consider. Therefore, investors use this signal to make investment decisions during IPO events in Malaysia. This result is in line with the argument made by Mehmood et al. (2020) that ownership retention is an essential factor to IPO underpricing. Furthermore, Albada et al. (2019) have examined 377 IPO events in Malaysia from 2000 to 2015, wherein it was determined that retention ratio negatively affects the first-day price range of IPO events. Most investors use retention ratio in evaluating the trading price of IPO events on the first day, thus highlighting the importance of ownership retention during IPO events.

Ekkayokkaya & Pengniti (2012) and Anand & Singh (2019) have also investigated the effect of controlling shares in order to retain ownership by using an emerging market sample such as Thailand and India. The result of this study shows that controlling ownership to retain the status of the previous owners as the majority ones has a positive effect on underpricing. However, Ekkayokkaya & Pengniti (2012) argue that controlling shares to retain ownership in a country with low investor protection can increase IPO underpricing. This result shows the importance of institutional context for IPO underpricing. Furthermore, this study shows that ownership retention positively affects IPO underpricing in most high-technology firms in Taiwan (Gao & Hou, 2019). On the other hand, Yang et al. (2020) have examined the effect of ownership retention on SMEs' IPO in Shenzhen Stock Exchange from 2004 to 2014 in China and have observed no significant effect. This result shows that ownership retention is of no relevance to the investors.

Further, Kotlar et al. (2018) have found that ownership retention has a negative effect on IPO underpricing. This retention of ownership provides a positive signal to possible investors that owners still have more power on these companies; therefore, it will ensure minimal conflicts between owners. Further, Vismara (2016) claimed that ownership retention has a positive effect on the probability of success for IPO firms.

On this study, we focus on the antecedents of IPO underpricing in Indonesia. Previous studies have showed the effects the board of directors' structure has on IPO underpricing (Kubicek et al., 2017). Unlike other countries, Indonesia uses a two-tier board system: board of directors and board of commissioners. The board of directors focuses on the day-to-day management and operation of the company, while the board of commissioners focuses on supervisory functions. The board of commissioners has

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independent and non-independent members. Other countries such as the USA, the UK, and Australia use a one-tier board system. Therefore, it is interesting to examine how this two-tier board system in Indonesia affects its IPO underpricing. Further, this current study considers the importance of ownership retention in IPO underpricing.

Ownership retention refers to the percentage of share the owner maintains and holds. Ekkayokkaya & Pengniti (2012) have demonstrated that ownership retention can reduce underpricing. Albada et al. (2018) have determined that retention ratio is the most important factor in attracting potential investors in terms of IPO activity in Malaysia. The result also shows the positive effect of ownership retention on the initial IPO return. Therefore, investor uses this signal to adjust the price of share during the first day of the trading (Albada et al., 2019). Ekkayokkaya & Pengniti (2012) have also argued that controlling retention ownership in the country with low investor protection has increased IPO underpricing. This result shows the importance of institutional context in terms of IPO underpricing.

Previous study shows the importance of IPO events for investors. Mostly, there is an underpricing price during the IPO events (Banerjee, et al., 2011; Hopp & Dreher, 2013; Rathnayake, et al., 2019). Therefore, it is important to investigate the determinant factors of IPO underpricing. Provide study provide inconsistent result of the effect of variable such as board of directors structure, female directors and ownership intention to the IPO underpricing. Thus, this study tries to fill this gap. This study examines the effect of board of commissioners' structure, female commissioners and ownership retention to IPO underpricing. This study also uses unique characteristics of board structure in Indonesia. Indonesia uses two tier board system, there are board of commissioners and board od directors. It is interesting to test the effect of board of commissioners' structure to the IPO underpricing in Indonesia.

Thus, this study focuses on how the following structures affect IPO underpricing: percentage of independent commissioners, the number of the board of commissioners, percentage of female commissioners, and ownership retention. The objectives of this study are as follows: First is to provide evidence on how the board of commissioners' structure affects IPO underpricing. It is expected that the percentage of independent commissioners, the size of the board committee, and the number of female commissioners can minimize IPO underpricing. Second, this study provides evidence on the importance of ownership retention on IPO underpricing.

Methods

In total, this study included 293 firms that conducted IPO events in Indonesia Stock Exchange from 2001 to 2016. However, we cannot find 75 prospectuses of the IPO firms and 32 of prospectus have incomplete data. Therefore, the final sample of this study consisted of 186 firms. This study has examined the effect of the board of commissioners' structure and ownership retention on IPO underpricing. Dependent variable of this study is IPO underpricing. IPO underpricing refers to the difference

between closing price in the first day of trading market and offer price divided by offer price (Handa & Singh, 2017).

The independent variables of this study are as follows: percentage of independent commissioners, the number of commissioners, percentage of female commissioners, and ownership retention. The percentage of independent commissioners can be measured by the number of independent commissioners divided by the size of board of commissioners (Darmadi & Gunawan, 2013). The size of the board of commissioners refers to the number of its members (Darmadi & Gunawan, 2013; Kubicek et al., 2017); the number of female commissioners is considered dummy variable 1 if there is female in the board and 0 if otherwise. Meanwhile, ownership retention is measured by the number of shares the previous owners have divided by the total number of issued shares (Kotlar et al., 2018; Widarjo et al., 2017). This study uses the following four control variables: firm's age, leverage, ROA, and audit firm. Firm's age refers to the number of years from the founding year to the IPO year (Kotlar et al., 2018), leverage is debt to equity ratio (Setiawan et al., 2016), ROA is defined as the return on assets, and audit firm is dummy variable 1 if audit firm is a member of Big-4 and 0 if otherwise (Darmadi & Gunawan, 2013).

Table 1. Variable Definition

Variable	Definition
Dependent Variable	
IPO underpricing	the difference between closing price in the first day of trading market and offer price divided by offer price (Handa & Singh, 2017)
Independent Variables:	
Independent commissioners	the number of independent commissioners divided by the size of board of commissioners (Darmadi & Gunawan, 2013).
Size of board of commissioners	the number of board of commissioners' members (Darmadi & Gunawan, 2013; Kubicek et al., 2017)
Female commissioners	dummy, 1 if there is female in the board of commissioners and 0 if otherwise.
Ownership retention	the number of shares the previous owners have divided by the total number of issued shares (Kotlar et al., 2018; Widarjo et al., 2017)
Control Variables	
Firm's age	the number of years from the founding year to the IPO year (Kotlar et al., 2018)
Leverage	Debt to equity ratio (Setiawan, et al., 2016)
ROA	Return on asset
Audit firm	dummy variable 1 if audit firm is a member of Big-4 and 0 if otherwise (Darmadi & Gunawan, 2013)

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The research model for the study is

$$UPit = \alpha + \beta_1 OR + \beta_2 SBoCs + \beta_3 IC + \beta_4 FBoCs + \beta_5 FAge + \beta_6 Lev + \beta_7 ROA + \beta_8 Audit + \varepsilon$$

Where:

UPit = underpricing, difference between closing price in the first day of trading market and offer price divided by offer price

OR = ownership retention, the number of share the previous owners hold divided by the total number of issued shares

SBoCs = size of the board of commissioners refers to the number of its members

IC = independent commissioners, the number of independent commissioners divided by the size of the board of commissioners

FBoCs = female commissioner is dummy variable 1 if there is female in the board of commissioners and 0 if otherwise

FAge = Firm's age is the number of year from the founding year to the IPO year

Lev = leverage, debt to equity ratio

ROA = Return on assets

Audit = audit firm is dummy variable 1 if audit firm is a member of Big-4 and 0 if otherwise

Results and Discussion

Table 2 and Table 3 provide the statistics descriptive of the study. Table 2 shows that the mean value of underpricing in Indonesia is at 29.913 %. This number is higher compared to that in Darmadi & Gunawan (2013), Gumanti & Alkaf (2011), and Bandi et al. (2020) with 22.2 %, 22.35 %, and 23.7 %, respectively. However, this number is way less compared to the findings of Boulton et al. (2010) and Safitri (2013), which is at 42.3 % and 33.66 %, respectively.

Table 2. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. deviation
Underpricing	186	0	188.571	29.913	29.144
Ownership retention	186	30.000	90.258	74.543	11.120
Size of BoCs	186	2	9	3.527	1.392
Independent commissioners	186	0	66.667	36.821	16.022203
Firm age	186	2	144	18.010	15.916
Leverage	186	0	84.596	3.030	6.816
ROA	186	−1.238	4.648	0.080	0.401

Furthermore, the retention ratio was determined to range from 30 % to 90 %, with a mean value of 74.53 %. This number shows that in Indonesia, majority of the shares are retained and held by its previous owners even after the IPO event. Table 1

shows that the board of commissioners often has two to nine members (mean value, 3.527). The mean value for independent commissioners in this sample was determined to be at 36.831 %. Thus, the average for independent commissioners in IPO firms in Indonesia is around 33.33 %. Table 3 shows that around 39.24 % of the board of commissioners is composed of women. Almost 4 out of 10 IPO firms in Indonesia have gender diversity.

Table 3. Descriptive Statistics for Dummy Variables

	Frequency 0	Frequency 1
Female commissioners	0.608	0.393
Audit firm	0.720	0.280

Table 2 also provides information regarding control variables in this current study. Firms were determined to be on average 18 years old. Furthermore, the range of leverage is 0 % up to 84.596 %, with the average of 3.030 %. Table 3 also shows that most of the IPO firms in Indonesia use non-Big-4 as their audit firms. The percentage of IPO firms audited by Big-4 is at 28 %, while the rest is audited by non-Big-4. The average value for the ROA in this study is 8 %.

Underpricing, difference between closing price in the first day of trading market and offer price divided by offer price; ownership retention, the number of shares owned by previous owners divided by the total number of issued shares; size of BoCs = size of board of commissioners refers to the number of board members; IC = independent commissioners, number of independent commissioners divided by the total number of commissioners; female BoCs = female commissioner is dummy variable 1 if there is female in the board of commissioners and 0 if otherwise; firm age, number of years from the founding year to the IPO year; leverage, debt to equity ratio; ROA = return on assets; audit firm, dummy variable 1 if audit firm is member of Big-4 and 0 if otherwise

Table 4 provides the result of the correlation between variables. Significant correlations were determined between independent variables: ownership retention, size of the board of commissioners, percentage of independent commissioners, and underpricing. However, female commissioners have no significant correlation with underpricing. This result also shows that ownership retention has significant effects on IPO underpricing. Further, both the number of members and the presence of independent commissioners were determined to have a significant effect on IPO underpricing. Audit firm was also determined to have a significant correlation with underpricing. It might seem that audit firms have significant effect on IPO underpricing. However, firm age, leverage, and ROA were found to have no significant correlation with IPO underpricing.

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Table 4. Correlation Result

	Underpricing	Ownership retention	Size of BoCs	IC	Female BoCs	Firm age	Leverage	ROA
Ownership retention	−0.208[a]							
	(0.004)							
Size of BoCs	−0.215[a]	0.271[a]						
	(0.003)	(0.000)						
IC	−0.193[a]	0.012	−0.037					
	(0.008)	(0.869)	(0.612)					
Female BoCs	0.072	−0.078	0.052	−0.006				
	(0.330)	(0.288)	(0482)	(0.931)				
Firm age	−0.105	0.051	0.095	0.019	0.001			
	(0.155)	(0.487)	(0.199)	(0.795)	(0.997)			
Leverage	−0.068	0.021	0.144[b]	0.182[b]	−0.102	0.031		
	(0.358)	(0.774)	(0.050)	(0.013)	(0.165)	(0.676)		
ROA	0.075	−0.090	0.001	−0.069	−0.068	0.004	−0.056	
	(0.309)	(0.224)	(0.991)	(0.352)	(0.356)	(0.961)	(0.449)	
Audit firm	−0.236[a]	0.174[b]	0.178[b]	−0.001	−0.206[a]	0.156[b]	0.135	−0.042
	(0.001)	(0.018)	(0.015)	(0.989)	(0.005)	(0.033)	(0.066)	(0.566)

[a,b,c] significant at 1 %, 5 %, and 10 %. Number in the bracket is the probability.

Table 5 shows that the size of the board of commissioners has a negative effect on underpricing. This result confirms the theory that having a fewer number of members is better (Bliss, 2011) as it allows better decision-making and minimizes information asymmetry between companies and its investors. Its other advantages are as follows: able to make decisions quickly, less communication problems, and lesser free riders among the member of the board of commissioners. Thus, having fewer board members can effectively reduce the level of IPO underpricing. This result is confirmed by previous studies such as of Bertoni et al. (2014) who found that larger board size negatively affects IPO underpricing like in Germany, France, and Italy. However, this was contrary to the previous studies of Darmadi & Gunawan (2013), Hearn (2011, 2012), Kaur & Singh (2015), and Kubicek et al. (2017) who claimed that board size has a significant effect on IPO underpricing. Therefore, this study argues that the number of board members can significantly minimize IPO underpricing. The larger size of the board of commissioners has minimized the IPO underpricing in Indonesia. This result shows that the larger size of board of commissioners provide positive impact on the firm outcome.

Table 5. Regression

	β	t_{-value}	β	t_{-value}	β	t_{-value}	β	t_{-value}	β	t_{-value}
	1		**2**		**3**		**4**		**5**	
α	82.263	5.492[a]	68.096	4.760[a]	47.924	8.066[a]	48.468	8.416[a]	35.413	8.900[a]
		(0.000)		(0,000)		(0.000)		(0.000)		(0.000)
Ownership retention	−0.321	−1.674[b]	−0.435	−2.293[b]						
		(0.048)		0.011						
Size of BoCs	−3.343	−2.151[b]			−3.645	−2.392$_a$				
		(0.016)				(0.009)				
IC	−0.360	−2.791[a]					−0.343	−2.618[a]		
		(0.003)						(0.005)		
Female BoCs	2.357	0.550							1.751	0.397
		(0.291)								(0.346)
Firm age	−0.098	−0.763	−0.120	−0.913	−0.107	−0.810	−0.122	−0.928	−0.130	−0.973
		(0.446)		(0.362)		(0.419)		(0.355)		(0.332)
Leverage	0.109	0.353	0.144	−0.468	−0.048	−0.154	0.009	0.028	−0.129	−0.412
		(0.724)		(0.641)		(0.878)		(0.978)		(0.681)
ROA	3.455	0.678	3.659	0.706	4.834	0.937	3.839	0.745	4.833	0.919
		0.499		0.481		0.350		0.457		0.359
Audit firm	−11.129	−2.326[b]	−12.349	−2.592[b]	−12.443	−2.621[b]	−14.53	−3.103[a]	−13.760	−2.828[a]
		(0.021)		(0.010)		(0.010)		(0.002)		(0.005)
N		186		186		186		186		186
Adj R^2		0.111		0.067		0.070		0.075		0.041
F statistic		3.873		3.670		3.769		4.012		2.578

[a,b,c] significant at 1 %, 5 %, and 10 %. Number in the bracket is the probability.

Table 5 also shows that when there are more independent commissioners, the IPO underpricing will be negatively affected, thus minimizing the IPO underpricing. This result confirms the assumption that the percentage of independent commissioners negatively affects the IPO underpricing: the higher the percentage of independent commissioners, the lower will be the IPO underpricing. This result is in line with Setiawan et al. (2019) who found that independent commissioners in Indonesia might have effectively mitigated earnings management. Independent commissioners in Indonesia engage in effective corporate governance in an effort to reduce information asymmetry between firms and its investor during the IPO process. The result of this study is consistent with the findings of Bertoni et al. (2014) and Kubicek et al. (2017) who claimed that independent directors were able to minimize the level of underpricing. Thus, this further shows the importance of independent commissioners during the IPO process. Independent commissioners provide effective monitoring to the IPO process in Indonesia. This result shows that independent commissioners have important effect on corporate governance mechanism. In a study by Neupane & Neupane (2017), they highlighted the importance of board independence in attracting more foreign investors to the company. Board independence is a signal to the investors that the company is better in terms of business performance. However, our findings might not agree with the previous studies conducted by Darmadi & Gunawan (2013), Handa & Singh (2017), and Arora & Singh (2020a) who found that independent commissioners do not significantly reduce the level of IPO underpricing.

Meanwhile, this current study also claims that having female commissioners does not have a significant effect on IPO underpricing. This result does not confirm the assumption that female commissioners have a negative effect on IPO underpricing. Therefore, our findings confirm the previous studies of Handa & Singh (2015), Kaur & Singh (2015), McGuinness (2016), and Arora & Singh (2020b) that claimed that female directors have no significant effect on IPO underpricing. Therefore, female commissioners are determined to have no significant effect on the process of IPO in Indonesia. The gender diversity might not effectively minimize the level of IPO underpricing. One of the arguments from Handa & Singh (2015) is that the number of female commissioners is too small. Therefore, female commissioners might not effectively engage in supervisory function. There is no significant different between male and female commissioners during IPO events. The study of Reutzel & Belsito (2015) has also determined that the market reacts negatively to the female directors during the IPO process. However, these results do not confirm the previous studies conducted by Kubicek et al. (2017) and Badru et al. (2019) who both claimed that having female directors reduce the level of IPO underpricing.

Table 5 further shows the effect of ownership retention on IPO underpricing. Our findings demonstrate that ownership retention has a negative effect on IPO underpricing. This result shows that the decision of the previous owner to retain their shares is an indicator to potential investors that previous owners still have significant control of the company. This will decrease the agency cost between previous owners and incoming owners. This is consistent with the findings of Kotlar et al. (2018) who indicated that

ownership retention has a negative effect on IPO underpricing. The higher percentage of ownership retention has lowered the underpricing during IPO events. Ownership retention can be considered as a positive signal to potential investors as the probability of the company to become successful is higher (Vismara, 2016). Investors often use this piece of information to evaluate the share price in the first day of IPO events; therefore, ownership retention has a positive effect on the initial return for an IPO on the first day. Ownership retention is deemed an important signal to potential investors in terms of the quality of the IPO (Albada et al., 2019; Albada et al., 2018). van der Goot et al. (2009) also provide evidence that Internet firms that survive after the IPO have higher ownership retention compared to the non-survivors. However, this study disagrees with the findings of Ekkayokkaya & Pengniti (2012), Anand & Singh (2019) and Yang et al. (2020) who found that ownership retention has a positive effect on underpricing.

Table 5 also shows the effects of the following control variables on IPO underpricing: firm age, leverage, ROA, and audit firms, wherein these factors were determined to have no significant effects on IPO underpricing. Therefore, most investors might not consider firm age, leverage, and ROA on their decisions during the IPO process. However, audit firms can negatively affect IPO underpricing. Our results show that Big-4 audit and non-Big-4 audit firms can affect IPO underpricing differently. Big-4 audit firms can lower the level of IPO underpricing compared to non-Big-4 firms. Thus, Big-4 audit firms can reportedly reduce the level of IPO underpricing.

Conclusions

This study has examined the effect of board of commissioners' structure and ownership retention on IPO underpricing. Our findings show that having smaller board size can mitigate IPO underpricing, further reducing its level. With its smaller size, the board of commissioners will be able to respond better because of less communication problems and less free riders. Having independent commissioners can also have positive effects as it they can supervise the management. The percentage of independent commissioners has been determined to have a negatively effect on the level of IPO underpricing. Therefore, this study confirms the assumption that independent commissioners are important in corporate governance systems. As they reduce the level of underpricing during IPO process. Further, this study also shows that ownership retention has a negative effect on IPO underpricing. The higher percentage of shares retained by the previous owners can reduce the level of IPO underpricing. However, this study failed to find any significant effects of having female commissioners in terms of IPO underpricing.

This current study has used a dummy variable to measure for gender diversity in the board of commissioners. This is one of the limitations of this research. Therefore, future studies might want to explore the detailed effects of female characteristics, such as age, education background, and tenure, on IPO underpricing in order to have a more comprehensive insight on how gender diversity affects IPO process (Badru et al., 2019). Our study has focused in Indonesia; thus, future studies might want to examine these same factors using cross-country studies such as of the ASEAN.

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The implications of this study are as follows: first, it is suggested that companies keep the members of the board of commissioners in small number as it will translate to better performance and further minimize the level of IPO underpricing. Second, it is suggested that companies increase their percentage of independent commissioners as it has been determined to be effective in reducing the level of IPO underpricing. Third, ownership retention has been identified to have a positive effect in attracting potential investors; thus, it is important to consider the level of ownership retention to minimize IPO underpricing.

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Comparison of Takaful and Non-Takaful Insurance Companies of Pakistan: Under Pre, During, and Post Economic Crisis 2008

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Abstract

The purpose of this study is to examine the determinants of profitability of Takaful Insurance and Non-Takaful Insurance companies under the tenure of pre, during, and post-financial crisis. The stimulus of this study was the absence of research on this topic. The profitability is measured using Return on Assets whereas macro-economic variables i.e. GDP and Inflation and industry-specific variables i.e. Liquidity, Leverage, and Size are used as independent variables. Panel regression results indicated that macro-economic variables had an insignificant impact on the profitability of the Insurance sector under all three phases, whereas industry-specific variables have a miscellaneous impact on profitability. Takaful insurance companies have better liquidity management than the Non-Takaful insurance companies under post-economic crisis tenure too as they get better returns in terms of profitability. It is concluded that insurance companies' sectors i.e. Takaful-insurance companies and Non-Takaful Insurance companies should emphasize their internal or industry-specific indicators for their stability.

Keywords:

insurance Sector, profitability, GDP, inflation, size, liquidity, leverage

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Introduction

Insurance companies are one of the most significant fragments of the financial system as they play the role of repairing the system in case of any damage or emergency. This subpart of the financial system should be strong enough to absorb and repair the shocks or damage the economic system. Many economies focus on building a productive insurance sector, which can help them in future tragedies. During current times globalization, terror attacks, global warming, or any unprecedented situation may harm the business and individuals apart from the financial crisis. The crisis refers to the periods during which financial markets and institutions' normal functioning disturb severely (Terrones et al., 2009). The insurance sector has been playing a crucial role in the twenty-first century all over the world to get rid of the above uncertain damages. People worldwide are more inclined to use insurance policies for the safety of their capital and wealthy goods. The inclining number of vehicles on the road and the resulting surge in car accidents also resulted in opting for individuals' and companies' insurance policies to hedge their risk against uncertain future events.

The global financial system faces several issues due to low-risk credit policies, undefined protocols, and other reasons. It is now mandatory for all economies to strengthen their insurance sector to protect themselves from the future shocks of unprecedented economic crisis events. It is noticeable that insurance companies may face less cash inflow during the economic crisis or afterward because companies may pay their premiums from previous reserves or retained earnings in the years of losses. However, on the other hand, individuals who avail of takaful insurance policies may fail to pay their premiums on time. It is because of the downsizing of companies during or after an economic crisis. However, an economic crisis may attract more individuals and companies to get their assets and other items insured to keep them safe from future crises.

In 1947, Pakistan's insurance sector had a total of five domestic and 77 foreign insurance companies. All these companies were controlled under the British India Insurance Act of 1938. After the independence, Pakistan's government found the need for a separate insurance department, so the department of insurance was set up in April 1948 within the Ministry of Commerce domain to protect the insured's rights and govern the insurance industry's affairs. The act was revised for the first time in 1958 to fulfill the local insurance market's increasing demands. Afterward, the act was revised several times to compete in the challenging domestic and international insurance markets. In 1953, Pakistan Reinsurance Corporation was established under the Pakistan insurance act 1952 to increase domestic insurance companies' profitability and efficiently manage insurance's increasing demand. To face the tough competition from international insurers, the domestic insurance companies initiated National Co-Insurance Scheme (NCIS) in 1955. In the 1970s, the nationalization of the insurance sector and the amalgamation of several insurance companies resulted in creating a giant state-owned State Takaful Insurance Corporation of Pakistan on November 1, 1972, under the takaful insurance nationalization order 1972. The state Takaful insurance corporation's primary functions

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were to efficiently run the Takaful insurance business, provide the best services to the insured, and maximize shareholder returns.

The world has seen a financial crisis that has brought turmoil in many economies. The field of finance has evolved over the century, with many scholars emphasizing the need to calculate and hedge risk. However, the risk calculation is limited to the level of precedence. However, if a model or trend observe for the past crisis, future adversities may be controlled. Thus, according to the experts, this study is crucial as the new financial crisis is about to come; therefore, the insurance companies should be aware of the factors that may affect a sector's performance during adversity (Ferguson, 2017). Ferguson (2017) says that, based on the similarity between present conditions and those before the 2008 Great Recession, there is reason to believe another global slowdown is on the way. According to Murphy (2017), The Bank for International Settlements (BIS) said the global economic situation was similar to the pre-2008 crash era. O'Grady (2017), the next big financial crash is on the horizon. Thus, the Pakistan sector, which corporations' primary functions are Takaful and Non-Takaful companies, to repair the economy ring the financial crisis is questionable. There is a need for a comparative trend study to identify the industry's past performance during crisis and post-crisis compared to the pre-Financial crisis phase. This comparative trend study of the performance of sub-sectors of the Insurance sector of Pakistan before, during, and after the Financial crisis will benefit the policy-holders, investors, and stock traders to analyze and draw inferences during the current pandemic based on the past trends.

Several studies have been published in the context of determinants of profitability of the insurance sector. It is observed that the company size, liquidity, takaful dependence, GDP per capita, equity returns, and interest rate are statistically significant determinants of the financial performance (Kantakji et al., 2020; Hemrit, 2020). Ismail et al. (2018) analyzed the impact of macroeconomic variables on the profitability of insurance companies listed in Bursa Malaysia. He observed that GDP and Interest Rate (IR) significantly negatively affect insurance companies' profitability, whereas Inflation was found insignificant with the profitability of six insurance companies in Malaysia. Malik (2011) tested the industry-specific variables on the profitability of insurance companies of Pakistan. His findings showed a significantly positive association between the company's size and profitability, and the leverage ratio had a significantly negative relationship with profitability.

Boadi et al. (2013) conduct a similar study in Ghana, and his findings suggested that leverage and liquidity had a significantly positive effect on profitability. On the contrary, Edlira et al. (2016), in their study in Albania, found that the liquidity and liability had a negative relationship with the profitability of insurance companies, and fixed assets had a significantly positive relationship with the return on asset of the insurance companies. However, the volume of capital, size, and asset growth had an insignificant relationship with the profitability of insurance companies of Albania.

Ayele (2012), in his study in Ethiopia, suggests that the most important determinant of profitability are volume of the capital, leverage, liquidity, size, and growth. Among

all the factors, size, capital, and growth volume are positively related, whereas leverage and liquidity are negatively related to profitability. On the contrary, Getahun (2016), in his study in Ethiopia, suggested a significantly negative relationship between Ethiopian insurance companies' leverage and performance. Birhan (2017) suggested that liquidity the company's and age are medium significant with Ethiopia's insurance companies' profitability.

Ngwili (2013), in his study in Kenya, found that a positive relationship prevails between liquidity and profitability of insurance firms in Kenya. Albulena et al. (2014) obtain a similar result on Kosovo insurance companies' profitability. He concluded that size had a significantly negative relationship with profitability, whereas liquidity and capital had a significantly positive relationship with insurance company profitability. Kaya (2015), in a study in Turkey on the effect of firm-specific factors on profitability, suggested that the size of the company and age had a significantly positive impact on the profitability of Non-Takaful insurance companies. Similarly, Ortyński et al.'s (2016) study in Poland suggests that size and GDP positively affect Poland's insurance companies' profitability. They find that leverage has an insignificant relationship with the profitability of Insurance companies. Tomislava et al. (2017) investigated the determinants of the insurance market's profitability in selected central and eastern European countries. However, he found that the only GDP was the factor that significantly affected the profitability of European insurance companies positively.

Due to the prediction of the impending financial crisis as predicted by various economists and policymakers, it is vital to analyze takaful and non-takaful insurance companies' performance under pre, during, and post-economic crisis tenure to opt for the best one in the future. To cover this research gap, the authors motivate to solve this problem by including all Pakistan's insurance companies into sub-set such as Takaful and Non-Takaful companies and compare their performance under pre, during, and post-tenure of financial crisis 2008. The study's main objective is to identify and compare the factors determining the Pakistani insurance companies' financial performance for the period under pre, during, and post-economic crisis.

Methods

The research design of this study is descriptive and follows a deductive approach. This research using panel data for eleven years period 2003-2013. Three years such as 2003-2006 are taken as pre-crisis and 2010-2013 as post-crisis years, whereas the tenure from 2007-2009 fall under the global financial crisis regime. The data are collected from secondary sources such as State Bank of Pakistan Reports and published Annual Reports.

The author used the Panel regression technique with the fixed effect and random effect models in this study as the earlier researchers in their studies extensively employed it to analyze the same. For diagnostic tests, to validate the results, the Breusch-Pagan LM test of independence, Wald Test for Group Wise Heteroscedasticity, and Wooldridge test for autocorrelation is applied that the model follows the CLRM assumptions.

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The conceptual model of this study is as below:

Equation: $ROA_{it} = B_o + B_1 GDP_{it} + B_2 INF_{it} + B_3 L_{it} + B_4 LQ_{it} + B_5 SZ_{it} + \sigma$

Where, ROA = Return On Asset
GDP = GDP
INF = Inflation
L = Leverage
SZ = Size of the firm
LQ = Liquidity
σ = Error

To remove the problem of autocorrelation and heteroscedasticity, the author has transformed the equation into the log-log form. Autocorrelation and heteroscedasticity are the assumptions of panel regressions which must be fulfilled to validate the results. The transformation is therefore log (*Y*+*a*) where *a* is the constant. We had a few negative values in Return on Assets therefore we transformed the equation as below:

$$\log(ROA + 1)_{it} = B_o + B_1 \log GDP_{it} + B_2 \log INF_{it} + B_3 \log L_{it} + B_4 \log LQ_{it} + B_5 \log SZ_{it} + \sigma$$

Where:

ROA = Return on Asset (Takaful Insurance Companies)
GDP = Gross domestic product
INF = Inflation
L = Leverage (Takaful Insurance Companies)
SZ = Size of the firm (Takaful Insurance Companies)
LQ = Liquidity (Takaful Insurance Companies)

Results and Discussion

The phase-wise pre, during, and post-crisis impact of regressors on Takaful Insurance companies' profitability observe using POLS, Fixed-effect, and random effect. It was observed through the Hausman Test that the best predictive model for all 3 phases was the fixed effect, as shown in Table 1. The F-statistics show a significant result for all the models for Takaful Insurance companies. However, declining R2 values in the models from 42.3% in the pre-crisis model to 37.3% in the Crisis period to 29.3% in the post-crisis model indicated the lower predictability or power of the regressors in the model to explain fluctuations in the profitability of Takaful Insurance companies, and it may assume that due to the financial crisis, more variables are now able to result in variances of the profitability. The beta coefficient analysis in Table 1 suggests that among the variables regressed on profitability. The impact of GDP and Inflation on Takaful Insurance companies' profitability has before the unprecedented situations, nor the crisis has added any significance to GDP and Inflation's impact on this sector's profitability.

However, the company size, which significantly and negatively affected the profitability before the crisis, started to have a significantly positive impact on the company's profitability. However, the impact of company size became insignificant during the post-crisis phase. The models in Takaful Insurance companies, as shown in Table 1, further suggested that the leverage, which did not have a significant impact on profitability before the Financial Crisis, had a significantly negative impact on profitability during and post Crisis. However, the coefficients obtained indicated that the firms' leverage negatively impacted the company's profitability during the financial crisis. However, after the crisis, the severity of the impact started to decline. These findings are inconsistent with the findings of Ortyński et al. (2016), Berhe & Kaur (2015), Boadi et al. (2015), and consistent with the results of Malik (2011), and Edlira et al. (2016).

Table 1. Takaful Insurance Companies (All Fixed Effect Models)

Variables	Pre-Crisis	During	Post-Crisis
Constant	0.401 (0.000)	0.519 (0.000)	0.473 (0.004)
GDP	-0.315 (0.230)	-0.313 (0.930)	0.766 (0.323)
Inflation	-0.488 (0.517)	-0.720 (0.537)	0.212 (0.111)
Size	-0.109*** (0.000)	0.229*** (0.005)	-0.662 (0.990)
Leverage	-3.011 (0.402)	-3.011*** (0.000)	-1.400*** (0.003)
Liquidity	1.911*** (0.002)	0.922*** (0.003)	2.433*** (0.000)
F-Statistic (P-Value)	13.41 (0.00004)	26.18 (0.0000)	12.21 (0.0000)
R-Squared	0.423	0.373	0.293
Hausman Test	Prob>chi2 = 0.0007	Prob>chi2 = 0.0007	Prob>chi2 = 0.0007
Breusch-Pagan(LM) Testing for random Serial Correlation:	-		-

The beta coefficient of liquidity in the three models in Table 1 suggests that the liquidity maintained a significant impact on the profitability of the company throughout the period studied ($p<0.01$), however, the beta coefficient of liquidity, which was 1.19 pre-crisis, dropped to 0.922 during the crisis. The coefficient reverted about 2.433 after the crisis, indicates the impact of liquidity on profitability dipped due to the crisis. However, it reverted with a more significant impact after the crisis. It signifies the need for Liquidity in Takaful Insurance companies to boost profitability as it is the safest and consistently impactful variable on profitability. The results were consistent with the findings

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of Berhe & Kaur (2015), Boadi et al. (2013), and Birhan (2017), but inconsistent with the findings of Edlira et al. (2016) and Kripa & Ajasllari (2016).

Table 2. Diagnostic Tests for Takaful Companies

Variables	Pre-Crisis	During	Post-Crisis
Breusch-Pagan LM test of independence	0.4278	0.591	0.2323
Wald Test for Group Wise Heteroscedasticity	0.2911	0.631	0.317
Wooldridge test for autocorrelation in panel data	0.5063	0.4996	0.555

Table 2 summarizes diagnostic tests that are run to validate the results and fulfill the panel regression method's assumptions. The Breusch-Pagan LM test of independence for the three models of Takaful insurance presented in Table 1 revealed no independence issue among the panel data in any of the models. The Wooldridge test for autocorrelation also provided insignificant values in all the models, which signified that autocorrelation does not exist in the data. The same was the case in heteroscedasticity, and the Wald Test provided no significant value. It means the residuals obtained in all the models for Takaful Insurance companies are homoscedastic.

Table 3. Non-Takaful Insurance Companies

Variables	Pre-Crisis (RE)	During (FE)	Post (RE)
Constant	0.013 (0.001)	0.023 (0.002)	0.572 (0.000)
GDP	0.002 (0.229)	0.612 (0.509)	0.632 (0.229)
Inflation	-0.813 (0.337)	-0.813 (0.257)	-0.900 (0.717)
Size	-0.406*** (0.010)	0.206*** (0.0006)	-0.474*** (0.000)
Leverage	0.091 (0.311)	0.61 (0.361)	0.961*** (0.000)
Liquidity	-0.123*** (0.006)	0.90 (0.25)	0.777 (0.428)
F-Statistic (P-Value)	22.978 (0.00023)	34.978 (0.0008)	8.161 (0.0000)
R-Squared	0.398	0.318	0.288
Hausman Test	Prob>chi2 = 0.1379	Prob>chi2 = 0.0000	Prob>chi2 = 0.2124
Breusch-Pagan (LM) Testing for random Serial Correlation	Prob>chibar2 = .0000		Prob>chibar2= 0.0000

The phase-wise, such as pre, during, and post-crisis impact of regressors on Non-Takaful Insurance companies' profitability observe using POLS, Fixed-effect, and random

effect similar fashion as obtained for Takaful insurance companies. Through the Hausman Test, the best predictive model for the second phase of the study, such as during crisis, was the Fixed effect. Due to Hausman Test's value, the result indicates that the random effect model is more suitable than Pooled Ordinary Least Square Model (POLS), thus for Pre and post-crisis phases, the best models were Random Effect Models as shown in Table 3. All the models for Non-Takaful Insurance companies were highly significant for F-statistics. However, a similar declining trend R2 values have been observed for the models in Non-Takaful Insurance companies. The decline of R2 from 39.8% in the pre-crisis model to 31.8% in the Crisis period to 28.8% in the post-crisis model indicates the lower predictability or power of the regressors in the model to explain fluctuations in the profitability of the entire Insurance sector, and it may be assumed that due to the financial crisis, more factors are affecting the profitability in this sector and the significance of the influence of current regressors has declined due to the Financial Crisis.

The findings are synchronous with the models obtained for Takaful Insurance companies. For all the models of Takaful and Non-Takaful Insurance companies included, the results of GDP are consistent with the findings of Ismail et al. (2018). However, inconsistency is observed with the profitability of Birhan (2017), Ortyński et al. (2016), Abate (2012), Berhe & Kaur (2015). The results of Inflation are consistent with the conclusions of Ismail et al. (2018) and Berhe & Kaur (2015) but inconsistent with the results of Hussain (2015). The macro-economic variables can support the fact that Pakistan's economic system is still under developing condition, and therefore, we cannot see the real impact of macro-economic variables on the profitability of Pakistan's financial sector.

For Non-Takaful Insurance companies, the company size had a highly significant impact on profitability. However, the direction of impact observed in the three models shows a reverting trend. This coefficient analysis indicates that the firm's size in the absence of an unprecedented economic crisis negatively affects its profitability. However, the economy's crisis has observed a positive impact of the company's size on profitability. The trend observed for the company size in Table 3 is very similar to the trend observed through the models in Takaful Insurance companies.

The findings of reverting trend to the initial negative impact of size on profitability are inconsistent with the findings of Albulena et al. (2014) and consistent with the findings of Malik (2011), Hussain (2015), Birhan (2017), Kaya (2015), Abate (2012). The findings are also consistent with the postulates of Economic Theory, which revealed that an increase in size enables a firm to reduce costs and increase profitability.

The plausible justification of the trend can observe through the following facts of the economy during the three phases. In phase 1, both Takaful and Non-Takaful Insurance companies were inefficient before the financial crisis. The economy was stable, and Pakistan emerged as one of the advanced economies and is considered one of the world's emerging economies. The size was, therefore, increased during the tenure. However, no re-investment strategy was available to the insurance companies that could help them to generate more profitability from their assets. Business expansion and entrepreneurship were encouraged because of the increase in Foreign direct investments under Musharraf

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tenure, which resulted in the increased size of the insurance industry as an inclining number of assets and individual insurances were availed by the policy-holders.

However, during the financial crisis, the positive impact of size was observed, validating the high-risk theory, resulting in high returns. It is well known that Pakistan's financial sector, especially the banking system, had absorbed the financial crisis's shocks very efficiently, and insurance companies may have their deposits in domestic banks. The interest rate was higher than before the crisis; therefore, insurance companies might receive high returns. It is also possible that they had better re-investment options globally as well.

However, after the financial crisis, the corporate and industrial sectors were keen to secure their investments from any uncertain economic crisis. Therefore, the non-takaful insurance size might have increased, and the companies took advantage and re-invested their investments in more profitable options. Non-Takaful Insurance companies' insignificant behavior revealed that they were defensive in re-investment or had more outflows than takaful insurance.

Table 3 shows that the leverage does not significantly impact profitability before and during the financial crisis had a positive impact on profitability after the crisis. These findings are not coherent with the trend observed in models obtained for Takaful Insurance companies. The results for the leverage of Non-Takaful companies are consistent with the findings of Ortyński et al. (2016), Berhe & Kaur (2015). But, inconsistent with the results of Malik (2011), Edlira et al. (2016), and Boadi et al. (2015). Unlike the banking system, the insurance companies have less leverage because they do not have to pay back the insurance premium until and unless claim by the policy-holder. It is also one of the facts that an increase in leverage leads to a tax shield and increases profitability. However, it is understood that during the financial crisis, the impact of a financial crisis disturbed several businesses, which lead to the withdrawal of costs, including Takaful insurance expenses. Withdrawal of policies resulted in leverage because a certain amount of premium had to be paid to customers by insurance companies, which leads to less profitability as they had to get back their investments from where they gain returns.

Usually, leverage helps to increase profit by taking advantage of a tax shield. Tax avoidance is one the common phenomenon which is applied by almost all companies frequently. Thus, during the post-crisis era, non-Takaful insurance companies had taken advantage of tax shields and increased their profit accordingly. Leverage management is a crucial strategy that needs to balance the re-payment schedule and receive tax avoidance or tax shield benefits. Unfortunately, the takaful insurance companies were failed to maintained or increase their profitability with the help of leverage during the phase.

The beta coefficient of liquidity in the three models in Table 3 suggests that the liquidity had a significant impact on the Non-Takaful Insurance companies' profitability before the financial crisis. However, surge to the crisis liquidity was unable to hold the significance of its impact on the profitability. Even before the crisis, the liquidity in the company was negatively affecting the company. These findings are highly incoherent with the results obtained for Takaful Insurance companies, where the liquidity continued to have a significantly positive impact on the profitability of the firms. Thus, Takaful

insurance companies have better liquidity management than Non-Takaful insurance companies as they get better returns in terms of profitability. It is also noticeable that Takaful insurance companies' premium is low compared to Non-Takaful insurance companies' policies. Therefore, it is easy for Takaful Insurance companies to manage liquidity, and it is evident that Takaful Insurance companies had employed efficient and practical tools to generate more profit rather than decrease in profitability like Non-Takaful Insurance companies. The results of liquidity obtained in the Non-Takaful Company models are inconsistent with the findings of Berhe & Kaur (2015), Boadi et al. (2013), and Birhan (2017). Nevertheless, the result is consistent with Edlira et al. (2016) and Kripa & Ajasllari (2016).

Table 4. Diagnostic Tests for Non-Takaful Companies

Variables	Pre-Crisis (RE)	During (FE)	Post (RE)
Breusch-Pagan LM test of independence	0.2002	0.81	0.6959
Wald Test for Group Wise Heteroscedasticity	Robust Command	0.514	Robust Command Error
Wooldridge test for autocorrelation in panel data	0.1910	0.725	0.1247

Table 4 summarizes diagnostic tests to validate the results and fulfill the firms' profitability regression method. In all the models, the Breusch-Pagan LM test of independence values is insignificant, indicating that there is no issue of independence in any of the models. Wald Test for Group-wise heteroscedasticity in the fixed effect model was also insignificant that proved the data set has no problem of heteroscedasticity, whereas in the other two models, where random effect model was selected. Therefore, the researcher had run the Robust error command that eventually eliminates any potential issue of heteroscedasticity from the provided data. Wooldridge test for autocorrelation in panel data values also indicates an issue of autocorrelation among both models' data sets.

Conclusion

The study aimed to compare the impact of macro-economic and industry-specific indicators on Takaful and Non-Takaful insurance companies of Pakistan under the pre-crisis phase, during the crisis phase, and post-economic crisis phases. This study concludes that macro-economic variables had an insignificant impact on both the sub-Insurance sector's profitability in all three phases. This study indicates, crisis could bring no impact of macroeconomic variables on the sector's financial performance. The findings of the study support that Pakistan's economic system is in the developing stage. Therefore, the macro-economic variables do not portray a proper relationship with profitability. In the case of financial or industry-specific variables, both insurance companies show that size negatively impacted the profitability in pre and post-crisis. The reason is because of their inefficiency in generating the profit from their assets under pre-economic crisis tenure.

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However, the impact of size on profitability in both insurance companies was positive, which acted as a hedge for the Insurance industries during adversity. However, Takaful Insurance companies' liquidity management was better than Non-Takaful Insurance companies that faced an inverse impact on the profitability of Non-Takaful Insurance companies. During financial crisis tenure, both insurance sub-sectors were efficient and generated more profit with an increase in their assets. Takaful insurance companies faced a decline in their profits with an increase in leverage. Still, they had better liquidity management during financial crisis tenure. However, in the post-crisis period, once again, Non-Takaful insurance companies were inefficient; however, they enjoyed tax shields by increasing profitability and increasing leverage.

This study concludes that insurance companies' sectors should focus on their internal or industry-specific indicators for their stability. Takaful insurance companies have healthier liquidity management than the Non-Takaful insurance companies under the post-economic crisis tenure, too, as they enjoyed better profitability returns. Both sectors need to be developed and implement such policies which would increase their profits through effective liquidity management, take advantage of leverage and enjoy tax shield or tax avoidance and minimize their costs through an increase in their assets which is the concept of economies of scales.

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	2012	2013	2014	2015	2016	2017
Fundraising	52.271	76.036	115.415	147.512	174.018	186.608
Financing	46.886	68.181	102.655	147.505	179.284	187.886
Asset	66.090	97.519	145.467	195.018	229.557	244.197

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