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Full Length Research Paper

Migrant remittances, financial market development, and per capita real growth in sub-Saharan Africa

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The inflow of migrant remittances to developing economies in the recent past has been one of the most topical issues discussed in growth literature due to the increasing volume, stable nature, and capacity to enhance growth. This study examines the effect of migrant remittances and financial market development, on per capita real growth in sub-Saharan Africa (SSA). Data from twenty-seven African countries between the period 2000 and 2020 was employed for this study. The pool mean group (PMG) was deployed in analyzing the data. The study outcome revealed that migrant remittances positively influence and facilitate growth in the SSA region. The study also affirmed that equity market development contributes positively to growth in the SSA region. Furthermore, the study also established that banking sector development seems not to affect growth positively in the SSA. In addition, the study also recommends some policies for the region to implement.

Key words: Migrant remittances, financial market development, pool mean group, sub-Saharan Africa.

INTRODUCTION

The inflow of migrant remittances to developing economies in the recent past has been one of the most topical issues discussed in growth literature due to the increasing volume, stable nature, and capacity to enhance growth. The remarkable increase in the volume of migrants' remittances moving into the developing countries is largely due to the increasing level of immigration between the developed countries and the developing countries together with the modern technological innovations which have boosted the international transfer of payment at a reduced cost (Meyer and Shera, 2017). Migrant remittances refer to funds transferred from migrants working abroad to their families in their country of origin. It is viewed as the second most essential source of external funding that most developing economies rely on after foreign direct investment (FDI) (World Bank, 2018; Yoshino and Otsuka, 2020; Omon, 2021).

Based on the World Bank report the inflow of migrant remittances reached a record high in 2018 ($529 billion), an increase of 9.6% compared to 2017 ($483 billion). The report attributed the growth in migrant remittances to the strong economic activities and employment opportunities in the United States and European economies. Although there was a decline in 2020 due to the impact of the pandemic, the inflow rose by 7.3% ($589 billion) in 2021.

Also, in sub-Saharan Africa (SSA), the inflow of migrant remittances soared 14.1% to $49 billion in 2021 due to strong economic conditions in developed economies (World Bank Report, 2022).

Despite the enormous inflow of migrant remittances to SSA, the region in the past years has been confronted with inadequate resources which have hindered them to embark on developmental projects to improve the welfare of the citizenry. On average, the SSA region has a low GDP when compared with the other regions, and the SSA region is faced with lots of challenges. Although some studies ascribed these challenges to the structural features of most of the economies in the SSA region which include macroeconomic policies, poor savings culture among the populace, level of the financial market, banking sector development, and regulation among others. Hence, to bridge the gap, governments in the SSA region often rely on migrant remittances to enhance and sustain real per capita growth.

According to Sghaier (2021), migrant remittances impact growth positively when there is a well-developed financial market (equity and banking sector development) which can pave the way for recipients of remittances to demand and have access to other banking products, capital market instruments, and services that will in turn drive growth positively. However, in most SSA economies, the financial market is still underdeveloped due to lack of financial infrastructures, weak monetary management, low income of most economic agents and households, government interference, history of financial repression, inadequate prudential, regulatory, and prudential frameworks, judicial enforcement rights, and weak creditors' rights (Mlachila et al., 2013; Bekele and Degu, 2021). To this end, the study aims to proffer answers to the following research questions: to what extent do migrant remittances and financial market development (equity market development and banking sector development) affect real per capita growth?

This study contributes to the literature by considering financial market development (equity market development and banking sector development) to unravel migrant remittances' effect on real per capita growth, unlike previous studies that employ financial development. More so, in terms of measurement of financial market development, the study uses equity market development and banking sector development. The study employs the gross portfolio equity asset to GDP as a measure of equity market development, unlike other studies that use the value of total traded shares expressed as a percentage of total market capitalisation and the value of listed shares in the stock exchange divided by GDP. Using gross portfolio equity asset to GDP serves as a robust measure of equity market development since it measures the financial depth and stability of the equity market.

In addition, the study adopts the ratio of bank credit to bank deposit as a measure of banking sector development. The reason for using this measure is because it captures both the asset side and liability side of the bank statement of financial position, and it also measures financial stability (Rajan and Zingales 2003; Toyin and Toyin, 2016) unlike previous studies that used either private credit as a share of GDP (Naghshpour and Iii, 2018; Camara and Diallo, 2020) or the ratio of deposit to GDP (Rajan and Zingales 2003; Ngongang, 2015; Ahmed and Basir, 2016; Agbo and Nwankwo, 2018; Gashi, 2019; Siriki and Machrafi, 2021) as a measure of banking sector development. The weakness of using private credit as a share of GDP is that it only captures the asset side of a bank statement of financial position but ignores the liability side of the bank statement of financial position. Also, using the ratio of deposit to GDP signifies ignoring the asset sides and focusing on the liability side of the bank statement of financial position. In addition, these two methods only focus on depth and not financial stability.

REVIEW OF THEORIES AND LITERATURE

Theoretical review

Several theories in the literature have provided reasons why migrant remittances flow into developing countries. This study reviewed theories such as the developmental optimistic theory, and the developmental pessimistic theory. The developmental optimistic theory was one of the earliest theories of migrant remittances. During the period of 1950 and 1960s, the theory was popular, and it holds an optimistic view that migrant remittances flow to promote growth in recipient countries. According to the developmental optimistic theory, migrant remittances have the capacity of aiding and enhancing economic growth in a country. This theory emerged from the neoclassical migration hypothesis which provided reasons why labour migration exists. According to the neoclassical migration hypothesis, the differences in wage levels between economies are the major reasons for the bulk of labour migration, and in the absence of wage differentials among economies, labour migration will stop. The neoclassical migration hypothesis thus concluded that labour would move from developing/developed nations to developed/developing nations, while capital in contrast moves in the opposite direction.

The developmental pessimistic theory, on the other hand, came about in the early 1960s. According to this theory, migrant remittances do not lead to sustainable development. The theory argued that the negative effect of brain drain cannot substitute the gain linked with migrant remittances. The theory is of the view that due to the huge cost associated with emigration, the poor face a challenge in migrating, and the inflow of migrant remittances will further create an income gap in

developing economies as the migrant remittances inflows will hugely be spent on consumption instead of productive investment. The pessimistic theory also documented that the flow of migrant remittances would lead to a fall in labour supply in recipient economies when people start substituting work-related income for income coming from migrant remittances as workers start consuming more leisure while depending solely on the flow of migrant remittances (Cham et al. 2008). The theory also noted that the flow of migrant remittances might increase the level of corruption among government officials since migrant remittances reduce the incentive of households to hold the government accountable.

Aside from the theoretical review of migrant remittances, this study also reviews empirical literature between migrant remittances, financial market development, and real per-capita growth. For example, Giuliano and Ruiz-Arranz (2009) using a panel GMM method found that between the period 1975 and 2002, migrant remittances affect growth positively in seventy-five developing economies. The result confirmed that a substitution effect is found when migrant remittances interacted with financial development. Alkhathlan (2013) employing an ARDL and ECM method between the period 1970 and 2010 indicated that migrant remittances have an adverse effect on growth in Saudi Arabia in the short run, while in the long run, migrant remittances have a negative and insignificant effect on Saudi Arabia's growth. Also, Lartey (2013) using GMM concluded that migrant remittances positively influence the growth of thirty-six SSA economies for the periods 1990 to 2008. Shafqat et al. (2014) employing an OLS concluded that migrant remittances drive and enhance growth positively in Pakistan for the period 1991 to 2010. Kratou and Gazdar (2015) employing IV with GMM option, examined the link between migrant remittances and growth in twelve MENA economies for the period 1984 and 2011. The study showed that in the short run, migrant remittances affect growth adversely in MENA economies.

Fasanya and Baruwa (2015) exploring the effect of migrant remittances on growth in the West Africa Monetary Zone (WAMZ) between the period 1970 and 2011 using a panel cointegration concluded that migrant remittances positively influence the growth of six economies in the WAMZ region. The study also found that for migrant remittances to positively affect growth, a sound macroeconomic policy needs to be adopted. Meyer and Shera (2017) using fixed effect regression estimates, confirmed that for the period 1999 and 2013, migrant remittances have a positive influence on the growth of six high migrant remittances-receiving economies (Bulgaria, Moldova, Albania, Macedonia, Romania, and Herzegovina. Using time series analysis, Sarkar et al. (2018) showed that for the period 1995 to 2016, migrant remittances drive Bangladesh's growth. Shah and Majid (2018) using data from 1973 to 2015 and employing OLS and VECM methods concluded that migrant remittances affect Pakistan's growth positively.

Peprah et al. (2019) using an ARDL technique documented that migrant remittances positively affect growth in the short and long run between 1984 and 2015 in Ghana. Anetor (2019) examined the migrant remittances-growth nexus concerning the role of financial sector development in Nigeria between 1981 and 2017. The study outcome revealed that migrant remittances and financial sector development have an adverse effect on growth in the short and long run.

Employing a GMM estimation technique, Izevbigie (2020) concluded that between the period 2005 and 2017, migrant remittances positively influences growth in the ECOWAS region. The author concluded that the government should ensure that migrant remittances are channeled to productive use. Keho (2020) using data from 1980 and 2017 examined whether migrant remittances influence financial development in ECOWAS economies. The author concluded that the inflow of migrant remittances to the region affects financial development adversely. Oteng-Abayie et al. (2020) employing an auto-regressive distributed lag (ARDL) method showed that migrant remittances retard growth in Ghana in the long run between the period 1970 to 2016. Employing fully modified ordinary least square and general least square Islam (2021) confirmed that migrant remittances drive growth in South Asian countries between the period 1986 to 2019. Ur Rehman and Hysa (2021), using a system GMM technique documented that migrant remittances affect growth positively in six Western Balkan economies for the period 2000 to 2017. Qutb (2021) employing a vector error correction model (VECM) approach showed that migrant remittances have an adverse effect on growth in Egypt for the period 1980 to 2017. The findings of Shakya and Gonpu (2021) showed that migrant remittances do not contribute to growth in Nepal for the period 1976 to 1997.

However, despite the mixed findings on the role of migrant remittances on per capita real growth, this paper tests the following hypothesis.

Hypothesis 1: Migrant remittances have no significant effect on per capita real growth in SSA.

Some studies have investigated the effect of banking sector development on growth, one such work is the study done by Uddin et al. (2013) who documented that during the period 1971 to 2011, banking sector development affects growth positively in Kenya using ARDL technique. Adusei (2013) employing fully modified ordinary least square and GMM showed that for the period 1971 to 2010 banking sector development has an adverse effect on Ghana's growth. Using ECM Ayunku and Etale (2014) concluded that between the period 1977 and 2010 banking sector development affect Nigeria's growth positively. Pradhan et al. (2014) using data from twenty-six ASEAN economies between the period 1961 and 2012 and employing VECM and Granger causality test showed that banking sector development has a

long-run link with economic growth and a bi-directional causality exist between the banking sector and economic growth. Using a system GMM, Petkovski and Kjosevski (2014) documented that when credit to the private sector and interest margin (a measure of banking sector development) are used, banking sector development has an adverse effect on growth in sixteen economies in Southeastern and Central Europe between the period 1991 and 2011. Ngongang (2015) employing a system GMM on data obtained from twenty-one Sub-Saharan Africa (SSA) economies concluded that banking sector development has an adverse effect on growth in the region between the period 2000 and 2014. Abugamea (2016) using ordinary least squares (OLS) concluded that for the period 1995 to 2014 in Palestine banking sector development has an adverse effect on growth.

Employing panel dynamic ordinary least square, Tongurai and Vithessonthi (2018) concluded that banking sector development has a positive effect on industrial development between the period 1960 to 2016. Ibrahim and Alagidede (2018) using a system GMM showed that banking sector development supported growth in 29 SSA economies for the period 1980 to 2014. Employing panel fully modified ordinary least square and dynamic ordinary least square, Bist (2018) showed that banking sector development affects growth positively in sixteen low-income economies (15 low-income African economies and 1 non-Africa economy). Employing an ARDL approach Paudel and Acharya (2020) concluded that for the period 1965 to 2018 banking sector development affects growth positively in Nepal. Adopting an ARDL approach, Almahadin et al. (2021) showed that for the period 1980 to 2018 banking sector development drives growth positively in Bangladesh. Siriki and Machrafi (2021) using the VAR technique concluded that for the period 1990 to 2019 that banking sector development affects growth positively in Cote D'Ivoire.

Furthermore, some studies have also investigated the effect of equity market development on growth. One such study includes Nzomoi and Ikikii (2013) who documented that for the period 2000 to 2011 and using a linear regression model, stock market development influenced growth positively in Kenya. Employing a panel data analysis approach, Ngare et al. (2014) indicated that between the period 1980 and 2010 stock market development positively affect growth in thirty-six African countries. Aigbovo and Izekor (2015) employing an ECM technique concluded that in Nigeria between the period 1980 and 2011 stock market development contribute positively to Nigeria's growth. Employing an ECM method, Ologunwa and Sadjbo (2016) indicated that capital market development is a key driver of growth in Nigeria. Using an ARDL technique, Nyasha and Odhiambo (2017) documented that for the period 1980 to 2012 stock market development positively influence growth in Kenya.

Ananwude and Osakwe (2017) using an ARDL

revealed that between the period 1981 and 2015 stock market development has a positive but insignificant effect on Nigeria's growth both in the long and short run. Ogbeide and Akanji (2018) using a panel generalized method concluded that for the period 1994 to 2014 stock market development positively contribute to growth in BRICS (Brazil, Russia, India, China, and South Africa) nations. Employing system GMM, Twerefou et al. (2019) showed that between the period 1993 and 2013 stock market development positively affects growth in SSA. Cave et al. (2020) employing data from 101 economies and using panel data techniques concluded that for the period 1990 to 2014 stock market development contribute to growth positively. Bhattarai et al. (2021) employing an ARDL method documented that for the period 1994 to 2019, Nepal stock market development affects growth positively.

Besides, several other studies in the literature have also shown that the stock market does not affect growth. Employing a vector auto-regressive approach, Wang and Ajit (2013) showed that for the period 1996 to 2011 stock market development has an adverse effect on growth in China. Adusei (2014) documented that the period 2006Q1 to 2013Q2 using an ARDL approach showed that stock market development does not contribute to growth in Ghana. Nyasha and Odhiambo (2015) employing an ARDL technique showed that between the period 1980 to 2012, there is an absence of any link between stock market development and growth in South Africa. Employing a VECM approach Magweva and Mashamba (2016) between the period 1989 and 2014 concluded that stock market development has an adverse effect on growth in Zimbabwe in the long run. Pan and Mishra (2018) employing an ARDL method concluded that in China for the period 1991 to 2015 stock market development has an adverse effect on growth in the long run. Employing a system GMM, Kagochi and Durmz (2020) concluded that stock market development does not contribute to growth in SSA economies. Ezeibekwe (2021) employing VECM concluded that from 1981-2017 stock market development does not contribute to growth in Nigeria.

Despite the mixed empirical evidence on the role of financial market development on per capita real growth, this paper tests the following hypothesis:

Hypothesis 2: Financial market development (equity market development and banking sector development) has no significant effect on per capita real growth in SSA.

This study contributes to the literature by considering financial market development (equity market development and banking sector development) to unravel migrant remittances' effect on real per capita growth, unlike previous studies that employ financial development by using either private credit as a share of GDP in measuring financial development (banking sector development). The

Table 1. Variables' description, measurement, and source.

Variable	Notation	Measurement	Expectation	Source
GDP per capita growth rate	GDPPCGR	Calculated by dividing GDP at constant prices by the population of a country or area.	-	WDI, 2023
Migrant Remittances	REM	Ratio of migrant remittances to GDP.	Positive	WDI, 2023
Equity Market Development	EMD	Ratio of gross portfolio equity assets to GDP	Positive	FRED. ST. LOUSIFED, 2023
Banking Sector Development	BSD	Ratio of bank credit to bank deposit.	Positive	FRED.ST LOUISFED, 2023
Domestic Investment	DI	Gross capital formation (i.e. ratio of gross capital formation divided by GDP	Positive	WDI, 2023
Human Capital	HC	Secondary school enrollment (% gross)	Positive	WDI, 2023
Trade Openness	TOP	Ratio of the sum of exports plus imports of goods to total output	Positive	WDI, 2023
Inflation	INF	Consumer price index (annual % change in the cost to the average consumer of acquiring a basket of goods and services	Positive/Negative	WDI, 2023

Source: Author (2023).

weakness of using private credit as a share of GDP is that it only captures the asset side of a bank statement of financial position but ignores the liability side of the bank statement of financial position. Also, using the ratio of deposit to GDP signifies ignoring the asset sides and focusing on the liability side of the bank statement of financial position. In addition, these two methods only focus on depth and not financial stability.

This study in resolving this shortcoming adopts the ratio of bank credit to bank deposit as a measure of banking sector development. The reason for using this measure is because it captures both the asset side and liability side of the bank statement of financial position, and it also measures financial stability.

Furthermore, the study employs the gross portfolio equity asset to GDP as a measure of equity market development, unlike other studies that use the value of total traded shares expressed as a percentage of total market capitalisation and the value of listed shares in the stock exchange divided by GDP. Using gross portfolio equity asset to GDP serves as a robust measure of equity market development since it measures the financial depth and stability of the equity market.

METHODOLOGY

Sources of data

Data from twenty-seven countries in sub-Saharan Africa (SSA) economies from 2000 to 2020 will be used for this study. The SSA is used because the region is one of the major recipients of migrant remittances (World Bank Report, 2022). Data will be sourced from the World Bank Development Indicator (WDI), a publication of the World Bank, and FRED ST. LOUISFED. The following variables such as economic growth (GDPPCGR) remittances (REM), equity market development (EMD), banking sector development (BSD), domestic investment (DI), human capital (HC), trade openness (TOP), inflation rate (INF) was employed in the study as depicted in Table 1 (Appendix).

Model specification

The empirical model of the study is built on the augmented Solow growth model advanced by Mankiw et al. (1992) which is an extension of the Solow growth model.

Using the traditional Cobb-Douglas production, the augmented Solow growth is stated as:

$$Y_t = f(A_t K_t H_t) \qquad (1)$$

where Y_t is the output of the economy and represents the real per capita GDP growth rate at time t, A_t is technology at time t, K_t is capital stock at time t, and H_t is human capital at time t.

The endogenous growth model noted that through capital inflows (migrant remittances) developing economies can obtain the required technology (A_t) to stimulate, enhance, and promote economic growth (Romer, 1990; Mankiw et al., 1992).

Equation 1 becomes Equation 2 as migrant remittances could be welfare-enhancing or investment-enhancing via the equity market and banking sector.

$$Y = f(REM_t BSD_t EMD_t K_t HC_t) \qquad (2)$$

Expressing Equation 2 in econometric form:

$$GDPPCGR_{it} = \alpha_0 + \alpha_1 REM_{it} + \alpha_2 BSD_{it} + \alpha_3 EMD_{it} + \alpha_4 DI_{it} + \alpha_5 HC_{it} \qquad (3)$$

where α_0 is constant, α_1 to α_5 are parameters to be estimated.

In Equation 3, GDPPCGR (real per capita growth rate) is used to replace Y_t, DI_t is used to replace K_t. Subsequently, the control variable trade openness (TOP), and inflation (INF) is added to the model to capture trade liberalization and the effect of inflation.

Following the review of theories, empirical literature, theoretical framework, and study objective, the study functional model becomes:

Table 2. Descriptive statistic.

Variable	Mean	Min.	Max.	Std.
GDPPCGR	3.222	0.00082	15.711	2.42995
REM	2.477	0.00019	16.64626	3.1648
EMD	9.397	0	150.7288	17.9356
BSD	68.883	8.17773	131.1308	21.4126
DI	24.297	6.69904	60.0583	8.96427
HC	42.249	6.1974	311.8663	24.39775
TOP	61.075	0.78463	152.5471	25.0659
INF	11.039	0.03668	513.9065	32.39356

Number of observations 546.
Source: Author's Computation from Stata (2023).

$$GDPPCGR_{it} = f(GDPPCGR_{it}, REM_{it}, EMD_{it}, BSD_{it}, DI_{it}, HC_{it}, TOP_{it}, INF_{it}) \tag{4}$$

Expressing Equation 4 in econometric form:

$$GDPPCGR_{it} = \alpha_0 + \alpha_1 REM_{it} + + \alpha_2 EMD_{it} + \alpha_3 BSD_{it} + \alpha_4 DI_{it} + \alpha_5 HC_{it} + \alpha_6 TOP_{it} + \alpha_7 INF_{it} + \mu_{it} \tag{5}$$

where GDPPCGR is real per capita growth rate, REM is migrant remittances, EMD is equity market development, BSD is banking sector development, DI is domestic investment, HC is human capital, TOP is trade openness, INF is inflation, i and t refers to cross-country at time t, α_0 is constant, α_1 to α_7 are parameters to be estimated, and μ_{it} is the error term.

Expressing Equation 5 in pool mean group form

$$\Delta GDPPCGR_{it} = $$
$$A + \emptyset GDPPCGR_{it-1} + $$
$$\alpha_1 \sum_{i=1}^{p} \Delta GDPPCGR_{it-i} + \alpha_2 \sum_{i=1}^{p} \Delta REM_{it-i} + \alpha_3 \sum_{i=1}^{p} \Delta EMD_{it-i} + \alpha_4 \sum_{i=1}^{p} \Delta BSD_{it-i} + \alpha_5 \sum_{i=1}^{p} \Delta DI_{it-i} + \alpha_6 \sum_{i=1}^{p} \Delta HC_{it-i} + $$
$$\alpha_7 \sum_{i=1}^{p} \Delta TOP_{it-i} + \alpha_8 \sum_{i=1}^{p} \Delta INF_{it-1} + \beta_1 GDPPCGR_{it-1} + \beta_2 REM_{it-1} + \beta_3 EMD_{it} + \beta_4 BSD_{it-1} + \beta_5 DI_{it-1} + \beta_6 HC_{it-1} + $$
$$\beta_7 TOP_{it-1} + \beta_8 INF_{it-1} + \mu_{it} \tag{6}$$

where A is constant, Ø is the coefficient of the past lagged value of the dependent variable, α_1 to α_s are the short-run coefficients while β_1 to β_s indicates the long-run coefficients.

A priori expectation:

$$\alpha_0 > 0, \alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 > 0, \alpha_5 > 0, \alpha_6 > 0, \alpha_7 < 0$$

The model examines the effect of remittance and financial market development (equity market development and banking sector development) on real per capita growth.

Method of data analysis

The study employed the use of a pool mean group (PMG) and the mean group (MG) techniques in analyzing the study model. However, before using the PMG technique, the study first carried out a panel first-generation and second-generation unit root test. The study also carried out a cross-sectional dependence test to determine whether to report the first-generation panel unit root test or the second-generation panel unit root test. The first-generation panel unit root test is reported provided there is an absence of cross-sectional dependence among the panel series. Also, the study carried out panel cointegration test with or without cross-sectional dependence. Finally, the study also carried out the PMG and MG test and used the Hausman test to determine the test to report. If the p-value is not significant, the PMG result is reported vice-versa.

RESULTS

Descriptive statistic

Table 2 shows the descriptive statistics of the variables used in the study. As shown in the table, the average GDP per capita growth in SSA is 3.22% while the maximum is 15.71%. On average, the ratio of migrant remittances to GDP (REM) is 2.45, while the average gross portfolio equity assets to GDP (EMD) and the ratio of bank credit to bank deposit (BSD) are 9.39 and 68.88, respectively. More so, on average gross fixed capital formation is 24.29% while human capital is 42.25% an indication that human capital is less fully developed in SSA. In addition, the descriptive statistic also revealed that on average trade openness is 61.08% an indication that SSA economies are liberalizing their economies to trade while the average inflation rate (INF) is 11.04%.

Table 3. Correlation matrix.

Correlation	GDPPCGR	REM	EMD	BSD	DI	HC	TOP	INF
GDPPCGR	1.000	-0.013	-0.067	-0.132	0.178	-0.028	0.068	0.089
REM		1.000	-0.199	0.045	0.1666	0.168	0.109	-0.109
EMD			1.000	0.052	-0.139	0.186	0.088	-0.068
BSD				1.000	-0.118	0.218	-0.088	-0.273
DI					1.000	0.079	0.357	-0.046
HC						1.000	0.275	-0.087
TOP							1.000	-0.014
INF								1.000
RIR								
UNR								
GG								
EMM								

Source: Author's Computation from Stata (2023).

Table 4. Multi-collinearity result.

Variable	Variance inflation factor (VIF)
REM	1.12
EMD	1.14
BSD	1.17
DI	1.22
HC	1.22
TOP	1.27
INF	1.1

Source: Author's Computation from Stata (2023).

Table 5. Cross-section dependence test.

Cross-section dependence test	Statistic	p-value
Pesaran's test of cross-sectional independence	0.768	0.442

Source: Author's Computation from Stata (2023).

Correlation analysis

Table 3 reveals the outcome of the correlation analysis. The outcome of the correlation analysis revealed that the variables are weakly correlated an indication that the study is not suffering from multicollinearity. In addition, Table 3 reveals that REM, EMD, BSD, and HC are negatively correlated with GDPPCGR while gross DI, INF, and TO are positively correlated with GDPPCGR in SSA between the period 2000 and 2020.

Multi-collinearity test

The multi-collinearity test was carried out using the variance inflation factor (VIF). Based on the results shown in Table 4, there is an absence of multi-collinearity among the variables since the VIF for each variable is below 10.

Cross-sectional dependence test

This study employs the Pearson Cross-Sectional Dependence test to test for the presence of cross-sectional dependence among the panel series. The result in Table 5 reveals that the null hypothesis of an absence of cross-sectional dependency is accepted, and the alternative hypothesis of cross-sectional dependence is rejected. Hence, there is no cross-sectional dependence

Table 6. First generation panel unit root test.

Series	First-generation panel unit root test[a]										Second-generation panel unit root test[b]		
	Common unit root process test				Individual unit root process test						Pesaran's CADF test		
	LLC		Breitung		Im et al		ADF		PP				
	1(0)	1(1)	1(0)	1(1)	1(0)	1(1)	1(0)	1(1)	1(0)	1(1)	Series	1(0)	1(1)
GDPPCGR	(3.45)***		(7.478)***		(5.454)***		(15.33)***		(15.32)***		GDPPCGR	(2.224)***	
REM	(2.912)***			(8.354)***	(9.359)***		(1.935)***		(1.935)**		REM		(2.460)***
EMD	(2.613)***		(4.289)***			(6.059)***	(3.563)***		(3.563)***		EMD		(2.679)***
BSD	(4.728)***			(10.702)***	(3.175)***			(1.462)*	(1.462)**		BSD		(2.085)**
DI	-	(1.114)***	(11.718)***		(9.753)***			(27.819)***	(19.808)***		DI		(3.297)***
HC	(96.128)***		(5.894)***			(9.243)***	(11.266)***			(27.819)***	HC		(2.434)***
TOP	(2.962)***			(10.85)***		(9.109)***		(21.291)***	(11.266)***		TOP		(2.34)***
INF	(39.057)***		(3.036)***		(14.629)***		(18.142)***		(18.142)***		INF		(2.584)***

***, **, *, represent 1, 5 and 10%, respectively.
Source: Author's Computation from Stata (2023).

among the panel series and the study adopts the first-generation unit root test.

Panel data unit root test

Table 6 shows the first-generation and the second-generation panel unit root test. Based on the cross-sectional dependence test result in Table 5 which shows an absence of cross-sectional dependency among the panel series, the study reports the first generation panel unit root test (Table 6). The first generation unit root test carried out were categorized into common unit root process tests (Levin, Lin & Chin test and Brietung test) and individual unit root process tests (Im, Perseran & Shim W-test, ADF- Fisher and ADF- Choi Z-test). From the outcome in Table 6, the majority of the test confirmed that the following series GDPPCRG, REM, EMD, BSD, and INF are stationary at level {1(0)} while DI, HC, and TOP are stationary at first difference {1(1)}.

Panel cointegration test

Table 7 shows the panel cointegration results with and without cross-sectional dependence. Since there is an absence of cross-sectional dependence among the series, this study reports the panel cointegration test without cross-sectional dependence using the Kao and Pedroni tests (Table 7). Based on the outcome in Table 7, the null hypothesis that all panels are cointegrated is accepted, and the alternative that all panels are not cointegrated is rejected. Hence, the study concludes that the variables are cointegrated (have a long-run relationship).

Panel regression estimates

Table 8 shows the panel pool mean group estimates and the panel mean group estimates. However, based on the Hausman test result, it can be seen that the pool mean group is the preferred estimation technique since both the p-values exceed 0.05. Hence, the pool mean group estimation is reported. From the pool mean group estimates the coefficient of migrant remittances (0.113) is positive and statistically significant at 5%. This implies that migrant remittances have contributed to the economic growth in the SSA region. The result is in tandem with previous studies (Kumar et al., 2018; Peprah et al., 2019; Izevbigie, 2020; Islam, 2021; Sghaier, 2021) who affirmed that migrant remittances affect growth positively.

Consequently, the outcome in Table 8 indicates

Table 7. Panel cointegration without and with cross-sectional dependence.

Estimate	Statistic
Without cross-sectional dependence[a]	
Kao test	
Panel ADF-statistic	(5.522)***
Pedroni test	
Panel PP-statistic	(17.029)***
Panel ADF-statistic	(12.163)***
With cross-sectional dependence[b]	
Variance ratio	1.4002**

***, **, represents 1 and 5%.
Source: Author's Computation from Stata (2023).

Table 8. Panel regression estimates (Model 1).

Variable	Pool Mean Group Estimates			Mean Group Estimates		
	Dependent variable: GDPPCGR			Dependent variable: GDPPCGR		
	Coefficient	Standard error	t-Statistic	Coefficient	Standard error	t-Statistic
Long-run						
REM	0.113	0.068	1.66**	8.241	3.950	2.09**
EMD	0.117	0.012	9.98***	(0.700)	4.739	(0.15)
BSD	(0.007)	0.006	(1.1)	(0.086)	0.037	(2.34)***
DI	(0.539)	0.0169	(3.18)***	0.109	0.234	0.46
HC	(0.037)	0.013	(2.93)***	0.119	0.148	0.81
TOP	0.02	0.006	3.32***	0.009	0.033	0.27
INF	(0.0632)	0.0163	(3.89)***	(0.110)	0.098	(1.13)
Short-run						
EC	(0.781)	0.962	(8.11)***	(1.201)	0.096	(12.55)***
D.REM	4.014	2.941	0.172	(2.214)	2.254	(0.98)
D.EMD	(10.198)	15.766	0.518	(8.321)	5.810	(1.43)
D.BSD	0.042	0.018	0.023	0.026	0.038	0.69
D.DI	(0.183)	0.243	0.451	(0.657)	0.5272	(1.25)
D.HC	(0.166)	0.180	0.358	(0.301)	0.289	(1.04)
D.INF	(0.007)	0.039	0.852	0.049	0.056	0.88
Constant	3.869	0.529	7.33***	(9.256)	13.642	(0.68)
Hausman test						
PMG vs MG	19.92[0.1]					
Number of observations	520					

***,**,* represent 1, 5, and 10%, respectively.
Source: Author's Computation from Stata (2023).

that the coefficient of equity market development (0.117) is positive and statistically significant at 1 percent. This connotes that equity market development has influenced economic growth in the SSA region. The result is similar to the following existing studies (Aigbovo and Izekor, 2015; Chen and Komal, 2016; Ayadi, 2018; Hossin and Islam, 2019; Hamzah et al., 2020; Yemelyanova, 2021) that affirmed that equity market development affects economic growth positively.

In addition, the regression estimates further indicate that the coefficient of banking sector development is negative (-0.007) and statistically insignificant. This

Table 9. Variables' description, expectation, and outcome.

Variable	Notation	Expectation	Outcome
GDP per capita growth rate	GDPPCGR	-	-
Migrant remittances	REM	Positive	Positive
Equity market development	EMD	Positive	Positive
Banking sector development	BSD	Positive	Negative
Domestic investment	DI	Positive	Negative
Human capital	HC	Positive	Negative
Trade openness	TOP	Positive	Positive
Inflation	INF	Positive/Negative	Negative

Source: Author (2023).

connotes that banking sector development has not culminated in economic growth in the SSA region. This outcome lends credence to previous works (Ngongang, 2015; Abugamea, 2016; Nyasha and Odhiambo, 2017; Cave et al., 2020; Yemelyanova, 2021) that assert that banking sector development has not culminated in economic growth.

Furthermore, the coefficient of domestic investment is negative but insignificant, implying that domestic investment is inadequate to cause growth in the region. More so, human capital (HC) has a negative coefficient and significant implication that the level of human capital in SSA does not facilitate growth. The plausible reasons for this are the prevalent brain drain and the high level of adult illiteracy witnessed in the region. Besides trade openness (TOP) coefficient is positive and statistically significant at 1% an indication that trade openness positively influences growth in the region. This implies that the more the SSA region reduces the numerous trade barriers, the higher the growth of the economy. Lastly, inflation is negative and statistically significant at 1%, suggesting that inflation retards economic growth adversely.

DISCUSSION

Having considered the effect of migrant remittances and financial market development on per capita real growth in SSA, the study's outcome in Tables 8 and 9 reveal that migrant remittances positively influence economic growth in SSA. The economic rationale for this is that most of the economies in SSA rely on migrant remittances from abroad to improve their standard of living. More so, it gives the recipients additional sources of income to address the challenges faced when starting a new venture, building a house, accessing good healthcare, and increasing households' purchasing power. This is in line with previous studies (Kumar et al., 2018; Peprah et al., 2019; Izevbigie, 2020; Islam, 2021; Sghaier, 2021) who confirmed that migrant remittances enhance economic growth.

In addition, the study's outcome also indicated that equity market development contributes positively to economic growth in the SSA region. The economic rationale for this result is that the equity market encourages and facilitated the mobilization of domestic savings via the issuance of equity shares and distribution of such funds to the deficit sectors that needs the funds for investment, and this, in turn, enhances and promotes economic growth in the region. The result confirms existing studies (Aigbovo and Izekor, 2015; Chen and Komal, 2016; Ayadi, 2018; Hossin and Islam, 2019; Hamzah et al., 2020; Yemelyanova, 2021) that affirmed that equity market development affects economic growth positively.

Furthermore, considering the impact of banking sector development on economic growth, the study outcome showed that banking sector development seems not to have contributed to economic growth in the region. The plausible rationale for this is that the banking sector in SSA is faced with a lot of challenges such as (highly concentrated in the urban areas, barriers to entry and exit, poor IT infrastructures, cyber security risk, weak corporate governance, political instability, ineffective regulatory framework, and lack of innovative financial product that make use of technology among others) which in turn limit the financial intermediation of banks thus constrains growth in the region. In addition, a huge proportion of domestic savings in the banking sector are mostly channeled to less risky and short-term investments rather than to the productive sector (manufacturing and agricultural sector). The outcome is similar to previous works (Ngongang, 2015; Abugamea, 2016; Nyasha and Odhiambo, 2017; Cave et al., 2020; Yemelyanova, 2021) that affirmed that banking sector development has not contributed to economic growth.

Conclusion

What is the effect of migrant remittances and financial market development on economic growth? To shed some light on these key questions, the study analysed the relationship between migrant remittances, financial market

development, and real per capita growth in SSA. The study uses panel data from twenty-seven countries covering the period 2000-2020. The pool mean group was deployed to analyse the data. The study has established that migrant remittances positively influence and facilitate growth in the SSA region. The study also affirmed that equity market development contributes positively to growth in the SSA region. Furthermore, the study also established that banking sector development seems not to affect growth positively in the SSA.

The outcome of the study provides significant policy direction. Since the finding of the study revealed that migrant remittances drive economic growth, the government should establish strategies and incentives to encourage migrants to freely remit foreign earnings through the financial markets to spur economic growth. More so, since equity market development promotes economic growth, it is suggestive that the regulators of the stock market should formulate policies that would increase equity investment which would improve the equity market and position it further for long-term investment opportunities required for sustained economic growth.

In addition, the study outcome revealed that bank sector development seems not to facilitate growth due to some inherent challenges. To overcome these inherent challenges, the bank boards need to invest heavily in IT infrastructures to drive down the cost of services, strengthen corporate governance within the bank, ensure effective and efficient internal control in place to combat the incidence of fraud, and also ensure that the workforce maintains high professional standards and ethics required by the profession. More so, the monetary authority needs to strengthen its oversight function to ensure that banks comply with existing and new regulations.

Future studies can carry out a comparative study by investigating the relationship between migrant remittances, financial market development, and economic growth in SSA by focusing on their income level (that is, low income level, lower-middle income level, and upper-middle income level).

CONFLICT OF INTERESTS

The author has not declared any conflicts of interests.

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Appendix: List of countries.

S/N	Countries
1	Angola
2	Benin
3	Botswana
4	Cabo Verde
5	Congo Dem. Rep.
6	Cape Verde
7	Côte d'Ivoire
8	Ethiopia
9	Gabo
10	Ghana
11	Guinea
12	Guinea Bissau
13	Kenya
14	Malawi
15	Mali
16	Mozambique
17	Namibia
18	Niger
19	Nigeria
20	Rwanda
21	Senegal
22	Sudan
23	Tanzania
24	Togo
25	Uganda
26	Zambia
27	South Africa

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CPA's perception(s) regarding the Covid-19 crisis: A questionnaire development and validation

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The purpose of this study is to develop a valid and reliable questionnaire concerning the Certified Public Accountants' (CPA) perception(s) regarding the Covid-19 pandemic and to provide insights into this issue. A questionnaire was developed combining the key aspects of professional guidelines, prior literature, and experts' opinions. Our study focuses on the perceptions of Greek CPAs, ensuring the validity and reliability of the instrument used through a robust methodology incorporating techniques from classical test theory and factor analysis. The final questionnaire has 18 questions and 4 main subsections (Work and organizational environment, Audit planning, Field work and Audit report). All subsections of the questionnaire achieved an acceptable internal reliability value. Construct validity was confirmed via factor analysis. Insights from the data analysis illustrate that Work and organizational environment and Audit planning explain the greatest variance during the first wave of the pandemic in Greece. The results have important implications for CPAs, practitioners, audit firms and regulators who wish to enhance the effectiveness of the auditing profession and the quality of financial information. To the best of our knowledge, this is the first study that reflects the Covid-19 crisis for the perspective of CPAs. This instrument can be used, if properly modified, as a measurement tool on CPAs perceptions on future crisis.

Key words: Covid-19, Certified Public Accountants, auditors, questionnaires, crisis, stressful events.

INTRODUCTION

The outbreak of the Covid-19 pandemic has profoundly affected society in all aspects of economic and social life (Brammer et al., 2020). This crisis situation has created numerous constraints and challenges to the accounting and auditing profession as well (Rinaldi, 2022). Against this backdrop, organizational and professional bodies provide guidance to their members regarding the accounting and auditing implications both at an international and at a national level (Albitar et al., 2020). For instance, the Financial Reporting Council (2020) released guidance on issues that auditors should consider while performing their duties. Similarly, the International Auditing and Assurance Standards Board (IAASB, 2020) and the Association of Chartered Certified Accountants (ACCA, 2020), drew the attention of auditors to the fact that, due to the changes brought about by

Covid-19 to their understanding of the audited entity's system of internal control, they must reevaluate their planned reliance on controls, so that they can effectively respond to identified risks of material misstatement. This illustrates that most guidelines focus on the identification and assessment of audit risk, the response to assessed audit risk and, finally, audit reporting.

Based on these arguments, users expect more transparency on the disclosure of the pandemic's material effects on corporate operations (IAASB, 2020). Thus, to avoid the possibility of fraud or error, auditors should have timely and appropriate communication with the entity's management to obtain and report sufficient and appropriate audit evidence (IBR/IRE, 2020; CEAOB, 2020; CNDCEC, 2020). In addition, they should consider the series of guidelines that have been produced these years. The key areas include: i) the financial reporting date beyond which Covid-19 pandemic will be considered an adjusting event, ii) the manner in which entities should assess a going concern and iii) other significant effects on accounting and reporting (such as fair value measurement, impairment of non-financial assets, management estimates, contingent liabilities and expected credit loss assessments). In this context, the actual impact of the pandemic on the audit profession is yet unknown.

The contribution of this paper to the existing literature is that it is one of the first studies that examine the CPAs' perception regarding the Covid-19 crisis consequences. Since accounting and audit research on Covid-19 is at the pre-early stage of development, this study constitutes an early indication of how Covid-19 changed the audit environment. A valid and reliable questionnaire has been designed. The questionnaire can be used to measure the perceptions of CPAs on the pandemic impact to their profession. The developed questionnaire, can also be used if modified accordingly, in the measurement of the perceptions of CPAs of the impact in their profession of any crisis or other context. Therefore, regulators and audit firms can use the questionnaire to measure CPA perceptions and consequently issue directives that will enhance the effectiveness of the auditor's profession and the quality of financial information.

The remainder of the paper proceeds as follows: in section two, we review prior literature. In the third section, we describe the research methodology. The main results are presented in the fourth section, while the fifth section discusses the impact of Covid-19 on CPAs. In the sixth and final section, we conclude the study.

Motivation

This work was directly motivated by a recent call for Covid-19 implications for audits and the auditing profession, which suggests the need for more research on such issues (Agoglia and Krishnan, 2022). Additionally,

a recent study by Albitar et al. (2020) discusses the theoretical impact of the pandemic on audit quality and provides guidance on how to construct a research instrument to measure it. Although the impact of the pandemic has been extensively examined on a theoretical level, little research has been conducted on its practical implications for the audit profession. To the best of the authors' knowledge, this is the first study that develops a reliable and valid questionnaire to illustrate the CPAs perception regarding Covid-19.

Main CPA issues during the pandemic

Within the Covid-19 era, as we have already mentioned, a variety of supervisory and professional bodies have provided guidance to their members regarding implications for accounting and auditing. Additionally, there are some prior empirical studies that try to shed light on some aspects of the impact of Covid-19 on CPA's. For this reason, the authors summarize this literature and discuss the main areas in which the pandemic has affected CPA's work.

The most common issue related to the pandemic impact on CPA in the relevant literature, is the *Work and the organizational environment*. This probably occurs due to the nature of the auditors' job and the changes brought about to their daily routine (Carungu et al., 2021). The shift to remote work for the audit team and the client had a significant impact and changed the procedures of obtaining audit evidence (IFAC, 2020a). In particular, the lack of face-to-face interaction with the client poses a significant challenge in exercising professional skepticism, while the increased complexities of financial reporting and risks challenge the delivery of audit engagements (IFAC, 2020a). As illustrated by Papadopoulou and Papadopoulou (2020) accounting professionals were significantly affected and generally experienced difficulties adapting to the new work demands. For instance, Humphrey and Trotman (2022) show that the pandemic has affected teamwork and the way the members of audit teams interact with each other in terms of knowledge sharing, mentoring and review of the audit work. A study on a sample of auditors in the Midwest of the US indicates that the various forms of remote communication (that is, instant messaging, telephoning and video conferencing) have increased due to the pandemic (Beechem, 2021). Another study documents significant difficulties faced by auditors in obtaining sufficient and appropriate audit evidence as a result of the complex conditions created by the pandemic (Ugurlu and Sarisoy, 2021). However, although the pandemic raised concerns regarding the ability of auditors to work efficiently, a survey on audit committee members shows that the vast majority of them consider that audit quality either increased (32%) or stayed the same (66%) (Tysiac, 2022).

A second issue is guidance for *Audit planning*. This involves the establishment of an overall audit strategy and the development of the audit plan according to which the audit will be conducted. In this context, the scope, timing and direction of the audit is set, and the auditor needs to consider several matters, such as risk assessment procedures, the determination of materiality and the potential involvement of experts (ISA, 300). An efficient audit plan allows the productive assignment of duties among the audit team members, enhances the coordination of the audit procedures, and facilitates the effective supervision of the audit engagement by the engagement partner and the supervising manager. The auditor must apply the appropriate materiality level in planning and performing the audit to help evaluate the effect of misstatements (ISA 320). For instance, in a study conducted in the Jordanian context, Al-Khasawneh (2021) find that the Covid-19 pandemic had a significant effect on audit planning as well as onother audit areas, such as the determination of materiality levels, auditing risks, the collection of audit evidence and the auditor's report.

The Covid-19 environment is also likely to affect analytical audit procedures (Kend and Nguyen, 2021), defined as "*evaluations of financial information through analysis of plausible relationships among both financial and non-financial data*" (ISA 520; p. 4). The use of analytical procedures in risk assessment is described in ISA 315 "Identifying and assessing risks of material misstatement". More specifically, IFAC (2020b) highlighted two major areas regarding ISA 315. First, the impact of new or revised risks due to the Covid-19 pandemic on the planned audit approach and second, the identification of pandemic-related subsequent events and the assessment of whether these have been appropriately addressed. In this light, Crucean and Hategan (2021) showed that subsequent events disclosed by companies in 2019 annual reports are related to the reduction of corporate activities, the disclosure of prevention plans and distance working for employees. In the same direction, Kend and Nguyen (2021) showed that 3% of the analytical audit procedures applied in 2020 aimed to address the Covid-19 audit risks. Finally, Donatella et al. (2022), focusing on municipalities issuing annual reports in regions with higher numbers of Covid-19 cases, found that they were more likely to disclose information relating to the pandemic as a subsequent event.

Another issue to be addressed is the impact of the pandemic on the *Audit report*. Despite the uncertainties derived from the pandemic, auditors remain responsible for high quality audits (IOSCO, 2020). Thus, Covid-19 may lead to a modification to the auditor's opinion expressed in the auditor's report. More specifically, the form and the content of the auditor's report are defined by ISA 700 "*Forming an opinion and reporting on financial statements*". According to it, the auditor expresses an unqualified opinion, when the financial statements are prepared in accordance with the applicable financial reporting framework and modifies the opinion, when they are not free from material misstatement or when sufficient or appropriate evidence cannot be obtained to ensure that the financial statements are free from material misstatement. The auditor expresses an adverse opinion when, although sufficient and appropriate evidence is obtained, the misstatements are material and pervasive to the financial statements (ISA, 705). A disclaimer in the auditor's opinion occurs when the auditor is unable to obtain sufficient evidence and the possible effect of the undetected misstatements could be both material and pervasive or when it is not possible to form an opinion due to the interaction of uncertainties and the potential cumulative effect on the financial statements (ISA, 705). Recently, in a USA study, Morris et al. (2022) revealed a significant increase in late filing of audited annual reports during the pandemic, which was lower for companies audited by a Big4 auditor. Further, they illustrated an increase in new, modified audit opinions, but a decline in the cases where the auditor issued a modified going concern audit opinion and the client did not declare bankruptcy within the one-year period after the opinion.

RESEARCH METHODOLOGY

This part of the study discussed how the questionnaire was developed and validated using a web-based survey.

Development and validation process

An eight-step validation process for the development of the questionnaire was used (Trakman et al., 2017; Dancet et al., 2011). These steps include: i) gathering and studying CPA institutes and accounting bodies'guidelines, ii) identifying International Auditing Standards (IAS) key aspects, iii) compiling a list of factors, iv) receiving a review of the questionnaire by a CPA committee, v) composing a questionnaire test, vi) performing a skewness and kurtosis test, vii) checking the reliability of the questionnaire, and viii) performing a factor analysis. Table 1 provides a summary of this process.

The eight steps of development and validation

First, we combined the key aspects of professional guidelines, prior literature, and expert opinions (experts on IAS) and we formulated a list of 57 questions to determine/assess the impact of the Covid-19 pandemic on the CPA profession on a five-point Likert scale (steps 1 to 3). Through this process, four dimensions emerged. Three were adopted from professional guidelines, namely audit planning, field work and audit report and the fourth was adopted from prior empirical studies, namely the working and organizational environment. Apart from the above mentioned questions, the questionnaire included common and experiential demographic questions. Common demographic questions included categorical age, gender, and education level. Experiential demographic questions included professional experience in years, client base industry, audit firm current employer and client's size.

At the fourth step, three CPAs were used to review the questionnaire and provide comments and recommendations (same as Crocker and Algina, 1986). Our basic (implicit) assumption was that CPAs have the expertise to make important comments. For this purpose, we selected CPAs with different gender, experience, and

Table 1. Flow chart of 8 step methodology used to design and validate the questionnaire.

Step one: Collection and study of CPA institutes and accounting bodies guidelines
Research of issued guidelines by national CPA Institutes and International accounting bodies concerning Financial Reporting and Audit Quality implications due to the coronavirus pandemic
Step two: Identifying International Auditing Standards (IAS)key aspects
Experts on IAS noted key aspects of IAS and prepared corresponding questions for our questionnaire
Step three: Creating a list of factors
Information gathered from steps one and two were used for the creation of 57 questions concerning the impact of the Covid 19 pandemic on the CPA profession.
Step four: Review by CPA committee
Three CPAs reviewed the questionnaire and a group evaluation followed. All comments and recommendations from the above procedure were considered to improve the questionnaire validity, context and comprehension.
Step five: Questionnaire test
Two separate CPA's before distribution tested the questionnaire. Comprehension, accessibility, time needed for completion as well as the website-based platform's reports were tested in this step.
Step six: Skewness and Kurtosis test
Prior to our analysis, we calculated the skewness and kurtosis of our variables (questions). Variables with skewness and kurtosis between [-2, 2] were kept for further analysis. Eleven (11) variables were excluded.
Step seven: Reliability of the questions
We measured the questionnaire's internal consistency by Cronbach's alpha measure and corrected the item-total correlation. All twenty five (25) items with α≤0, 7 were excluded.
Step eight: Factor analysis
Explanatory factor analysis was implemented to unravel any underlying factors and examine the relations between factors and items-variables. Eighteen items were found to influence four (4) factors.

Source: Author.

educational background. Each CPA made a preliminary evaluation of the questionnaire and a group evaluation followed. The review of the Auditing Board guidelines was available to the CPAs. All comments and recommendations from the above procedure were considered with a view to improving the questionnaire validity, context, and comprehension.

This final questionnaire was further tested by two different CPAs, in the fifth step, to assess the comprehension, the accessibility, the time needed for completion and the website-based platform's reports. After the completion of the questionnaire, CPAs were encouraged to report the difficulties they encountered (if any) in the process of completion. Only minor difficulties were reported, which were addressed accordingly.

The sixth step included the calculation of the skewness and kurtosis, which led us to exclude 11 questions that exceeded the limits [-2, 2]. Accordingly, the seventh step included the calculation of the Cronbach's alpha measure, which led us to exclude 25 questions with value ≤ 0.7. Finally, the eighth step included the implementation of the Explanatory Factor Analysis, which led us to a final set of 18 questions classified into four dimensions. The results of these last three steps are presented in detail in section 4 "Results".

RESULTS

Sample

The Hellenic Accounting and Auditing Standards

Oversight Board (HAASOB) is responsible for maintaining a publicly available register of CPAs in Greece. A low rate of answers was anticipated, given that the population of CPA's in Greece is relatively small and numbers 1351 CPAs. In response to this limitation, the link to the online questionnaire was sent via e-mail to all 834 CPAs with available e-mail information, on the public registry from all audit firms in Greece. We collected 104 anonymous questionnaires (12.47 % of the 834 CPAs) and accepted 95 responses (11.39 % of the 834 CPAs) with declared auditing experience of at least five years. The questionnaires were collected during the period from 14th of August to 18th of October of 2020, between the first and second pandemic wave.

Our respondents were drawn mainly from non-Big4 audit firms. This may have been due to the Greek Big4 policy towards external research. Table 2 provides an analysis of the population of CPA per audit firm, the number of answers per audit firm, and associated percentages.

Given the unverified email addresses and heavy workload of CPAs, we consider that the number of responses gathered is a representative sample of Greek CPA's.

In Table 3, the descriptive statistics of our sample was

Table 2. Responses and population per audit firm.

	Responses		Available CPA		
Audit firm	**Frequency**	**%**	**Frequency**	**%**	**% of responses per firm**
Big four	17	17.89	140	16.79	12.14
Sol Crowe	41	43.16	321	38.49	12.77
Grant Thornton	19	20.00	68	8.15	27.94
Other audit firms	18	18.95	305	36.57	5.90
Total	95	100.00	834	100.00	11.39

Source: Author.

Table 3. Descriptive statistics.

Number of variables (n=57)	
Number of variables after exclusion (n=46)[1]	
Variable mean score, range	[1.61, 4.47]
Variable SD, range	[0.503, 1.562]
Variable skewness, range	[-1.418, 1.627]
Variable kurtosis, range	[-1.043, 1.957]
Age group (years)	
<30	n=7
30-39	n=39
40-49	n=27
50-59	n=12
≥60	n=10
Education groups	
BA	n=53
MSc	n=39
PhD	n=1
PostDoc	n=2
Accounting/ auditing certifications	
ACCA, JES, ACA	n=16
IESOEL	n=71
ACCA, JES, ACA and IESOEL	n=8
Economic first degree	
Yes	n=93
No	n=2
Gender groups	
Female	n=26
Male	n=69
Customer base[2]	
≤ 1 industry	n=11
2 – 3 industries	n=64
4 – 5 industries	n=17
> 5 industries	n=3

Table 3. Cont'd

Audit experience	
≤ 1 firm	n=62
2 - 3 firms	n=30
4 - 5 firms	n=1
> 5 years	n=2
Audit firm (current firm)	
Big 4	n=17
Sol Crowe	n=41
Grant Thornton	n=19
Other	n=18
Customer size	
Small	n=13
Medium	n=47
Large	n=35

[1]We included only variables with skewness and kurtosis between [-2. 2]. All others were excluded. [2]We considered the following industries of the customer base: (i) Banking and Finance, (ii) Insurance, (iii) Shipping, (iv) Commercial, (v) Industrial, (vi) Public sector, (vii) Other.
Source: Author.

presented. The variable mean range and standard deviation range are [1.61, 4.47] and [0.503,1.562] respectively. All respondents have at least a bachelor's degree, as it is prerequisite for a CPA qualification in Greece. 74.75% of them, have IESOEL certification, which is issued by the Institute of certified public accountants of Greece, 16.85% have a non-Greek certification (ACCA, ACA etc.), while only 8.40% have both a Greek and a non-Greek certification. Women constitute 27.37% of our sample and men the rest. Finally, the average audit professional experience was nineteen (19) years.

Skewness and Kurtosis test

Prior to reliability tests, in the sixth step, we calculated the skewness and kurtosis of the variables (questions). Variables with skewness and kurtosis between [-2, 2] were kept for further analysis, while all others were excluded (similar with Dancet et al., 2011; Demaray et al., 2016; Kabuye et al., 2017). This implies that normality assumption is not violated.

Therefore, eleven variables (questions) were excluded (A1.5, A2.2, B1.5, B2.6, B10.8, C1.4, C1.6, C1.7, C3.1, C3.2, C3.5).

Reliability

To test the questionnaire's reliability, in the seventh step, Cronbach's alpha was used to measure internal consistency and item-total correlations. Internal consistency was used to measure the reliability of our questionnaire because it can be established in one testing situation, thus it avoids many of the problems associated with repeated testing found in other reliability estimates (Allen and Yen, 1979). Alpha values above 0.7 are generally considered acceptable and satisfactory, above 0.8 are usually considered quite well and above 0.9 are considered to reflect exceptional internal consistency (Cronbach, 1951). In the social sciences, the acceptable range of alpha value isfrom 0.7 to 0.8 (Nunnally and Bernstein, 1994). After discarding questions with low Cronbach's alpha ($α≤0.70$), we resulted in 21 questions with relatively high reliability as presented in Table 4. For the four domains, the coefficient ranged from 0.834 to 0.916 (Table 4). The *Work and organizational environment* domain had a Cronbach's alpha of 0.916, the *Audit planning* section had a Cronbach's alpha of 0.851, *Field work* had a Cronbach's alpha of 0.834 and finally *Audit report* had a Cronbach's alpha 0.872. The above results indicate good internal consistency reliability (Norman and Streiner, 1994). In addition to high internal consistency results, corrected item-total correlation surpassed the level of 0.20 (Nunnally and Bernstein, 1994) ranging from 0.48 to 0.832 (Table 4).

Factor analysis

Preceding factor analysis (step 8), we tested our data's suitability for factor analysis. For this reason, different

Table 4. Cronbach's Alpha results.

B) Work and organizational Environment Cronbach's Alpha = 0.916			D) Audit planning Cronbach's Alpha = 0.851			E) Field work Cronbach's Alpha = 0.834			F) Audit report Cronbach's Alpha = 0.872		
Variable	Corrected item-total correlation	Cronbach's alpha if item deleted	Variable	Corrected item-total correlation	Cronbach's alpha if item deleted	Variable	Corrected item-total correlation	Cronbach's alpha if item deleted	Variable	Corrected item-total correlation	Cronbach's alpha if item deleted
A1.1	0.774	0.900	B1.1	0.616	0.831	C1.2	0.480	0.830	D6.3	0.677	0.855
A1.2	0.797	0.899	B1.2	0.694	0.815	C1.3	0.491	0.828	D6.4	0.710	0.844
A1.3	0.768	0.904	B1.3	0.582	0.836	C1.5	0.622	0.804	D6.5	0.797	0.807
A1.4	0.803	0.896	B2.1	0.651	0.823	C1.8	0.513	0.825	D6.6	0.729	0.836
A1.6	0.832	0.888	B2.2	0.730	0.808	C1.9	0.786	0.764			
			B2.3	0.546	0.842	C1.10	0.766	0.770			

Source: Author.

approaches were proposed for the suitability of factor analysis. Regarding the appropriate sample size, Stoel et al. (2012) illustrate that for each item we should have at least two responses. In this sense, the 97 responses for these 21 items are considered acceptable. Moreover, the Kaiser - Meyer-Olkin (KMO) was employed to measure the Sampling Adequacy and Bartlett's Test of Sphericity. KMO for our sample was equal to 0.728 and Bartlett's Test of Sphericity was significant (p< .001). Both results indicate that our data are adequate and thus, we proceeded with the factor analysis.

According to Hair et al. (2010), factor loadings greater than 0.50, are considered very significant and can be used for further analysis. Consequently, three (3) items with factor loadings lower than 0.50 were excluded from this analysis, and there were no items that cross-loaded onto any other factor. As can been seen in Table 5, where factor analysis results are presented, the impact of the Covid-19 pandemic on the audit profession consists of four factors. Validating our questionnaire design, each factor is affected only by items belonging to a certain stage of the audit process.

As illustrated in Table 5, the eighteen items are classified in four factors, as in our questionnaire design. In particular, the first factor, *Work and organizational environment,* consists of five items. The item loadings vary from 0.814 to 0.878 and explain the 23.62% of the factor variance. The second factoris related to the *Audit planning* and consists of five items with item loadings from 0.609 to 0.823. This factor explains the 16.21% of the factor variance. The third factor is related to *Field work* and consists of four items. The loadings of the items fluctuate between 0.628 and 0.872 and explain the 11.47% of the factor variance. Finally, the fourth factor, namely *Audit report*, contains four items, with loadings ranging from 0.806 to 0.895, and explains the 15.14% of the factor variance (Appendix).

DISCUSSION

In recent years, the impact of Covid-19 on the accounting and audit profession has received considerable attention by professional bodies, practitioners, and scholars. Against this background, these professional accounting bodies have provided guidance to their members regarding the accounting and auditing implications both at international and national level. Therefore, the purpose of this study was to construct a reliable and valid questionnaire and evaluate the relative importance of each factor/dimension based on the perceptions of Greek Certified Public Accountants**.**

This research identifies four factors associated with the impact of Covid-19 on Greek CPAs. Every factor contains variables from a separate section of the questionnaire. Thus, we can infer that factor 1 refers to *Work and organizational environment* as it contains only variables from the relevant section of the questionnaire and for the same reason factor 2 refers to *Audit planning*, factor 3 refers to *Field work* and factor 4 refers to *Audit report*. Of the four, the highest rated factors are *Work and organizational environment* and *Audit planning*, which explain the greatest variance in the factor analysis. It is reasonable to expect *Work and organizational environment* to be the most important factor, since the accounting

Table 5. Exploratory factor analysis results.

Variable	Factor 1	Factor 2	Factor 3	Factor 4
Kaiser-Meyer-Olkin Index = 0.728				
Bartlett's sphericity test = < 0.001				
	Work and organizational environment	Audit planning	Field work	Audit report
Your audit firm, in terms of dealing with the pandemic to what extent (from 1 to 5)				
A1.1 Delivered a comprehensive action plan on time	0.872			
A1.2 The plan was clear	0.876			
A1.3 Provided the necessary protective measures and equipment	0.814			
A1.4 Provided the necessary training	0.863			
A1.6 Adapted to the pandemic satisfactory	0.878			
As a result of the pandemic, which was the change to the following (from 1 to 5)				
B1.1 The required engagement time of each customer		0.777		
B1.2 The amount of audit evidence required		0.798		
B1.3 The quality of the required audit evidence		0.609		
How will the pandemic affect the following in the future (from 1 to 5)				
B2.1 The required engagement time of each customer		0.801		
B2.2 The amount of audit evidence required		0.823		
How was the quality of audit evidence affected by each procedure (from 1 to 5)				
C1.5 Evaluation of accounting estimates (impairments, etc.)			0.872	
C1.8 Confirmations from third parties (customers, suppliers, etc.)			0.628	
C1.9 Assessment of going concern			0.845	
C1.10 Subsequent events			0.871	
How pandemic effects on the financial statements will be dealt with in the post-pandemic era (from 1 to 5)				
D6.3 There will be an increase in matters of emphasis				0.806
D6.4 There will be an increase in matters that raise modification of audit reports				0.815
D6.5 There will be an increase in audit reports with an adverse opinion				0.895
D6.6 There will be an increase in audit reports with a disclaimer of opinion				0.859

Source: Author

and audit profession is considered one of the most affected by the pandemic, due to the nature of the work.

Work and organizational environment

As far as *Work and organizational environment* is concerned, the variables that best describe the impact of the pandemic are related only to the audit firm's response to the pandemic conditions. Thus, the timely delivery of a comprehensive action plan, the comprehensiveness of the above-mentioned plan, the provision of the necessary protective measures, equipment, and training, and the overall adaptation of the firm to the pandemic are the variables that best describe the first factor.

Audit planning

The impact of the pandemic on *Audit planning* can

best be depicted by variables with more general content rather than variables with high expertise content. That is why items with high loadings in Table 5, consist of questions about required engagement time, the amount and quality of audit evidence in present impact and the anticipated future impact of the pandemic (except quality of audit evidence that concerns only the pandemic's present impact). On the other hand, questions with high expertise content, such as materiality benchmark changes, fraud risk assessment, risk of material inaccuracies by account do not seem to explain the impact of the pandemic on audit planning.

Field work

The variables that affect the third factor, *Field Work*, are questions about the impact of the pandemic in the evaluation of accounting estimates (impairments etc.), assessments of going concern, subsequent events and confirmation from third parties. In contrast with what is expected, audit procedures mentioned by many national CPA professional bodies on their issued guidelines and performed on site, like the inventory census and document audit, are not among the variables that affect the third factor. This result is attributed to the period in which the questionnaire responses were collected and depicts the concerns of Greek auditors at the time. Since the inventory census of 31/12/2019 was conducted in a non-covid environment, in the summer of 2020, at the time inventory census was not an issue for CPAs. The same fact largely explains why alternative means of obtaining audit evidence proposed by CPA institutes did not affect the *Field work* factor either. That is because alternative means suggested mainly target audit procedures that were already concluded at the time of the response collection. Document audit had already largely been completed during interval audits, also in a non-covid environment. At the time of the response collection, CPAs were concerned about near reporting procedures, such as going concern, subsequent events and accounting estimates. Due to the above reasons, there is a high probability that our results are highly dependent on the time that responses were collected.

Audit report

The fourth and final factor, *Audit report,* is affected only by questions that refer to how CPAs will deal with the impact of the pandemic in the post pandemic era and, in particular, only by questions concerning contents of the audit report.
    Thus, the variables that affects the fourth factor concern the increase in matters of emphasis, matters that call for the modification of audit reports, audit reports with an adverse opinion and audit reports with a disclaimer of opinion.

Conclusion

Covid-19 has been one of the most significant global crises that further exacerbated preexisting social, economic and governance problems and triggered a variety of institutional, organizational and individual responses (Rinardi, 2022). In this turbulent environment several aspects of socio-economic life were severely affected, extending from public economics to business operations, education and, ultimately, working conditions and environment. The accounting and auditing profession is one of the categories of professionals most affected by the pandemic due to the nature of the work, the need to meet strict deadlines and the requirement to provide high quality information to the users of the financial reports that ensures transparency and facilitates decision making. Acknowledging the complexity created by the pandemic, several regulatory and professional organizations in accounting and auditing issued guidance to their members in order to support their work and help them handle the consequences.
    Motivated by the impact of the pandemic on the accounting and auditing environment and the guidance provided to the accounting and auditing community, we conducted a questionnaire survey on certified public accountants during the first wave of the pandemic in Greece. Our purpose was to depict auditors' views on the impact of the pandemic on their profession and identify the key factors that affected them. Factor analysis was employed to identify significant relationships between the items of our research instrument and evaluate their importance. The findings suggest the existence of four factors with significant influence: *Work and organizational environment*, *Audit planning*, *Field work* and *Audit report*.
    Through an eight step process a valid and reliable questionnaire was designed. This instrument can be used as a benchmark to measure the impact of the Covid-19 pandemic on the CPAs in other, similar contexts. In addition, it can be applied during the different waves of a pandemic to get a clearer picture of the consequences of the phenomenon for the audit profession. On that basis, our study has important implications for CPAs, practitioners, and regulators. Because the 57 questions of the initial questionnaire cover most of the audit process, the developed questionnaire, if it is modified accordingly, can be used as a measurement tool of any crisis, health related or not. Therefore, regulators and audit firms can use the initial questionnaire to measure CPA perceptions on the impact of any crisis to their profession and consequently issue directives that will enhance the effectiveness of the auditor's profession and the quality of financial information.

Limitations

Another limitation is that the sample is only reflective of people living in a certain region, and so cannot be

generalized to apply to the whole population. The survey was restricted to people from a particular region that may not be reflective of the country as a whole. Therefore, predictions about the general population cannot be made using the results of this study. In addition, although the sample of this study is large enough to support the statistical analysis, a larger sample or one extended to more countries could potentially strengthen the robustness of the results.

FUTURE RESEARCH RECOMMENDATION

Future research could reassess the impact of the pandemic after the vaccination program and examine its impact.

Moreover, since vaccination was not mandatory for the accounting and auditing profession, it would be extremely interesting to examine differences in the opinions between professionals who were vaccinated and those who were not.

In addition future research, can measure the perceptions of CPAs as future crisis develop over time by modifying our questionnaire accordingly. Furthermore, the developed questionnaire can be used in different countries as well as in various crisis, health or non-health related. Finally, interviews could supplement and broaden our understanding regarding the impact of the pandemic on the accounting and auditing profession.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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APPENDIX

Study's questionnaire.

Your audit firm, in terms of dealing with the pandemic to what extent (from 1 to 5)

A1.1 Delivered a comprehensive action plan on time

A1.2 The plan was clear

A1.3 Provided the necessary protective measures and equipment

A1.4 Provided the necessary training

A1.5 Provided the necessary equipment for remote work (hardware, software)

A1.6 Adapted to the pandemic satisfactory

Due to the pandemic, which was the change to the following (from 1 to 5)

A2.1 Working hours

A2.2 Income

A2.3 Level of stress

A2.4 Productivity

A2.5 Ability to meet deadlines

A2.6 Communication with your colleagues

A2.7 Communication with your customers

As a result of the pandemic, which was the change to the following (from 1 to 5)

B1.1 The required engagement time of each customer

B1.2 The amount of audit evidence required

B1.3 The quality of the required audit evidence

B1.4 Audit fees

B1.5 The overall quality of the audit

How will the pandemic affect the following in the future (from 1 to 5)

B2.1 The required engagement time of each customer

B2.2 The amount of audit evidence required

B2.3 The quality of the required audit evidence

B2.4 Audit fees

B2.5 The overall quality of the audit

B2.6 The frequency of changing audit firms

How will the risk of material inaccuracy change in the following accounts (from 1 to 5)

B10.1 Fixed assets

B10.2 Inventory

B10.3 Receivables

B10.4 Cash

B10.5 Loans

B10.6 Suppliers

B10.7 Taxes – Insurance organizations

B10.8 Revenue

B10.9 Expenses

B10.10 Going concern assessment

How was the quality of audit evidence affected by each procedure (from 1 to 5)

C1.1 Inventory census

C1.2 Internal control assessment

C1.3 Document audit

C1.4 Reconciliations (e.g., fixed asset register with accounts, etc.)

C1.5 Evaluation of accounting estimates (impairments, etc.)

C1.6 Assessment of the appropriateness of accounting policies

C1.7 Final reconciliations of financial statements

C1.8 Confirmations from third parties (customers, suppliers, etc.)

C1.9 Assessment of going concern

C1.10 Subsequent events

How much the below means contributed to the audit work (from 1 to 5)

C3.1 Drones

C3.2 Remotely operated robotic systems

C3.3 Remote interviews

C3.4 Live video tours from mobile devices

C3.5 Document reviews via scan

C3.6 Received posted documents

C3.7 Remote (virtual) presences in censuses

How pandemic effects on the financial statements will be dealt with in the post-pandemic era (from 1 to 5)

D6.1 Companies will adjust and no matters that raise modification of audit report will occur

D6.2 Management representation letters will include more issues

D6.3 There will be an increase in matters of emphasis

D6.4 There will be an increase in matters that raise modification of audit reports

D6.5 There will be an increase in audit reports with an adverse opinion

D6.6 There will be an increase in audit reports with a disclaimer of opinion

Note: The questionnaire has also demographic questions, of which the main results are presented in section 4.1

List of non-Standard abbreviations

Acronym or Initialism	Full name
ACA	Association of the Institute of Chartered Accountants
ACCA	Association of Chartered Certified Accountants
AJPT	A Journal of Practice and Theory
CEAOB	Committee of European Auditing Oversight Bodies
CNDCEC	National Council of Chartered Accountants and Accounting Experts (Italy)
CPA	Certified Public Accountant
HAASOB	Hellenic Accounting and Auditing Standards Oversight Board
IAASB	International Auditing and Assurance Standards Board
IAS	International Accounting Standards
IBR/IRE	Institute of Company Auditors (Belgium)
IFAC	International Federation of Accountants
IOSCO	International Organization of Securities Commissions
ISA	International Standard of Auditing

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Review

To cancel debt or not to cancel debt: Evaluation of debt cancellation or provide a tax credit

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U.S. students are facing unprecedented student loan debt levels, roughly $1.75 trillion. The Biden Administration is proposing a debt relief program that will cancel student loan debt up to $20,000 for Pell Granted individuals. However, the current plan has faced substantial legal challenges and political pressure, and as suggested, it could increase the current inflation crisis. However, the size of the inflation effect is subject to debate. On the lower end, student debt relief may add only about 0.2% points to annual inflation. Proponents have also circulated linking student loan repayment to income levels. We propose an alternative approach to handle the current student loan debt crisis using a non-refundable tax credit. We provide theoretical support that individuals receive higher utility with a college degree, can pay off student loan debt faster, and that the U.S. government may obtain higher tax revenue from college graduates in the long run. We argue that individuals will seek higher-paying jobs, work longer hours, and accept promotions not only based on the increased salary but also because it would reduce taxes.

Key words: Student loan debt, student debt relief, tax credit.

INTRODUCTION

Student loan debt is growing at an extraordinary rate, with its current level at $1.75 trillion (Siripurapu and Speier, 2021). The amount has doubled in the past two decades, with over forty-three million Americans having student loan debt. On average, students graduate with debt of $34,100 for public and $58,600 for private four-year colleges (Hanson, 2022). Additionally, lower-middle-income students carry a more significant amount of debt than their peers (Danna, 2013); suggesting that the student loan crisis is more detrimental to the lower-middle class than any other US socio-economic class.

As student loan debt is the second largest amount of debt in the United States behind home mortgages, it is getting more difficult for students to develop financial stability.

The government has been involved in student loans since the end of World War II when it developed the Servicemen's Readjustment Act of 1944 (Siripurapu and Speier, 2021). However, the U.S. government did not start taking a stake in education funding until 1957, when it developed the National Defense Education Act, which was signed into law on September 2, 1958 (Siripurapu and Speier, 2021). This was further expanded in 1965

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with the Higher Education Act and is the current model of student loan lending in the U.S. (Siripurapu and Speier, 2021). The government's involvement in student financial aid has had pushback from experts suggesting that government lending protects educational institutions from market forces allowing them to contribute to raising prices (Siripurapu and Speier, 2021).

The cost of education increasing steadily is causing students to take on more and more debt to pay for higher education, causing the current student loan debt crisis.

President Biden announced on August 24, 2022, that the United States Federal Government would forgive between $10,000 and $20,000 of student loan debt for eligible individuals (Fact Sheet, 2022). However, the student loan debt relief plan faced multiple challenges from Republican-led states. This has led to the federal appeals court temporarily blocking the forgiveness plan and the 8th Circuity Court of Appeals issuing a stay in response to the six states' motions. This study discusses the current student loan forgiveness plan and an alternative to handle the student loan debt crisis by providing a tax credit for individuals with student loan debt. The tax credit is presented with an upper bound limit per year with a lower bound equal to the amount of taxes an individual would pay in that current fiscal period. The approach does not only benefit individuals that sought out higher level education without the burden of the repayment placed on all taxpayers. Additionally, we argue that this would motivate individuals to seek higher-paying jobs after graduation, allowing them to take advantage of the tax credit benefit.

President Biden announced a three-part plan to handle the current student loan crisis affecting American families. In a White House Press release, it is stated that currently, 43 million Americans have federal student loan debt with a value of $1.75 trillion (Siripurapu and Speier, 2021). Even more staggering is that one-third of the students did not acquire a degree. Student loan debt has also been shown to affect individual career opportunities, the ability to save, and the ability to acquire fixed assets such as homes (Park and Miller, 2022) and cars (Nova, 2018). Dettling et al. (2022) show that families holding student loan debt later in life have fewer savings than their similarly educated peers without such debt. Similarly, students who pay off their loans are much better off financially than those that did not attend college in later life, which supports our argument.

Therefore, easing the burden of student loan debt affecting the American workforce is considered a prudent economic measure. President Biden announced that the Department of Education would forgive student loan debt of $10,000 or $20,000 for Pell Grant recipients for Americans that make under $125,000 or $250,000 for married filers. However, roughly only 37.5% of Americans have college degrees, and roughly only one out of seven have student loan debt. Therefore, the question is then asked, who should be paying for student loan debt,

and how should this be structured?

Currently, thirty-two U.S. states offer programs to cover college tuition, and eleven of these states offer four-year college tuition programs. Most of the programs are geared toward need-based individuals. However, New York offers the Excelsior Scholarship that pays the tuition of a SUNY or CUNY institution after federal and state aid is applied. To benefit, students must stay in the state for several years after receiving the funding. Thus, New York can benefit from college graduates through intellectual contributions and tax revenue. Nevertheless, students are still subject to an income requirement and must complete thirty semester hours a year to qualify.

Many solutions have been proposed over the years to deal with the student loan debt problem. As far back as 1955, Milton Friedman suggested an income-driven repayment intended to protect student borrowers from financial hardship (Friedman, 1955). Although details have changed significantly over the years, the basic design is straightforward: pay a percentage of your monthly income above some threshold for some years, followed by loan forgiveness. Income-driven plans have been relatively unsuccessful, and as of 2021, only about 3% of student loan borrowers were enrolled. In 2011, the Department of Education created a pay-as-you-earn plan. Monthly payments are generally 10% of discretionary income; remaining balances are forgiven after 20 years. About half of the borrowers make no payments because they reported low incomes. Greig and Sullivan (2021) argues that these plans benefit primarily low income earners. As of 2021, approximately 19% of all borrowers were enrolled in pay-as-you-earn plans. We speculate that up to half of the borrowers enrolled in a pay-as-you-earn plan will have part or the entire loan balances forgiven. Pay-as-you-earn plans are moderately successful, but they penalize borrowers who pay off their loan balances, most likely those with higher earnings. See Wessel and Yu (2022) for additional details and information.

Following a similar stream of reasoning, we propose an alternative approach to handling the student loan crisis affecting American society rather than the proposed student loan forgiveness program. We suggest applying a non-refundable tax credit to an individual with federal student loan debt. We argue that this would provide an incentive to seek higher-paying jobs after graduation and acquire degrees that provide a higher return on investment. Enache (2022) suggests that high marginal tax rates can affect the workforce and individuals accepting higher-paying jobs, raises, and additional hours. The current tax code does provide a deduction for interest paid on a student loan if the individual meets specific qualifications. However, if you are in a higher paying position, you lose the tax deduction benefit, potentially resulting in less incentive to seek higher paying positions. A tax credit would not be phased out based on the level of income earned; instead, it would

have a maximum amount of credit awarded each year. Furthermore, we provide support showing that students who receive a non-refundable tax credit pay less than those receiving the debt relief plan proposed by President Biden in the long run when considering the time value of money.

This study contributes to the current discussion about how to handle the student loan debt crisis facing U.S. citizens. We explore if individuals gain a more significant amount of utility by attending college. Specifically, we investigate if U.S. taxpayers could pay off their student debt faster than traditional repayment plans using a tax credit scheme. However, our arguments are limited to being theoretical and must be empirically tested.

The rest of this paper is organized as follows: In the next section, we provide insight into the current student loan debt crisis affecting American society. This is followed by a simulation/example of our current non-refundable tax credit for handling the federal student loan crisis- The last two sections discuss the implications of our analysis and our conclusion.

BACKGROUND OF STUDENT LOAN CRISIS

The Biden-Harris Administration Student Debt Relief Program was developed to help the middle class. The program is estimated to cost the U.S. taxpayers $400 Billion over the next 30 years (Binkley, 2022). It is set to relieve $10,000 if you did not receive a Pell Grant and $20,000 to individuals who did receive a Pell Grant. Additionally, eligible individuals can only earn $125,000 a year or $250,000 for married couples. Thus, this income-based debt relief is only available for specific individuals. The borrowers, who benefit most, as measured by the ratio of forgiven balances to balances held, are younger, have lower credit scores, and live in lower-income neighborhoods (Goss et al., 2023). Additionally, the COVID–19 pandemic resulted in the government making it easy for individuals to stay home and not enter the labor market (Irwin, 2021). Therefore, if the government provides additional student loan debt relief, it could result in additional issues with the labor market. Furthermore, U.S. taxpayers are unhappy with paying someone else student loan debt even though they did not attend college (Bickerton, 2022). Additionally, 87% of Americans not having student loan debt resulting in most of the U.S. population footing the bill (Bickerton, 2022). Americans also worry that student loan forgiveness could worsen inflation (Epperson and Dhue, 2022). Loan forgiveness has been explored in the past, but it has been shown that such policies disproportionately benefit high-income borrowers (Catherine and Yannelis, 2020). Alternative proposals have been put forth to deal with the increased debt levels. For example, alternative repayment plans have surged in popularity. These plans are collectively referred to as income-driven repayment plans. Essentially, borrowers pay a portion of their discretionary income toward reducing their student loan plans. In some proposals, the payments stop after 20 to 25 years, and the remaining portion is written off. Yannelis and Tracey (2022) show that loan forgiveness programs in their current form benefit low-income earners only. High-earnings individuals benefit the least from income-driven loan forgiveness programs. On average, individuals with bachelor's degrees contribute nearly $381,000 more in taxes than those with just a high school degree. Furthermore, Lundeen (2014) and Autor (2014) suggest that America does not face an income gap but rather an education gap. Individuals with bachelor's degrees make almost twice as much as individuals with high school diplomas. We now turn our attention to a simulated example.

SIMULATION/EXAMPLE

An example was given with two individuals, both classified as risk-averse; one seeks to acquire a baccalaureate degree from a higher education institution, and the other one does not. Using a utility function aims to understand the satisfaction or pleasure an individual will receive from a specific good or action. In this situation, it is the action of earning wealth and the benefits of receiving a tax credit from such action. Furthermore, regarding choices between actions, utility functions are valuable to understanding which choice will lead to the highest expected payoff for an individual. In addition, the utility function provides valuable insight into the preferences of the individual generating wealth. Note also that the results will still hold if the individual is a risk-natural individual or risk-seeking because the equation would drop the square root part of the equation.

Additionally, the authors assume that students are from middle-class families as they are the most likely to take out federal loans at 58.4% (educationdata.org). Collecting data from the U.S. News on college tuition rates, we find that for the 2022-2023 academic years, public rank in-state tuition will cost roughly $10,423. To simplify, we will assume the cost is the same for all four years for the student. This assumption is appropriate because public institutions guarantee students that those costs will not increase over the four years of attendance. Therefore, the four-year cost of tuition is $41,692. Assuming a normal utility function for the risk-averse individual, we will take the square root of the payout. The median salary of a college graduate in 2022 is roughly between $55,260 and $59,600. Only 70% of students starting a baccalaureate degree will finish the degree. Students who do not elect to attend college have a median income of approximately $36,600 a year. Furthermore, if you have some college or an associate degree, your expected medium income will be roughly $39,900 and $44,100, respectively.

Setting up the expected value of the utility of attending

Table 1. Maximum amount of tax credit each year that an individual can take each year.

Year	Taxpayers					
	College			Non-College		
	Income	Taxes	Student loan	Income	Taxes	Student loan
Year 0			41.692			
Year 1	$50.652	4.322	37.370	36.600	2.633	-2.633
Year 2	53.286	4.653	32.717	36.600	2.633	-5.266
Year 3	56.056	5.100	27.617	36.600	2.633	-7.899
Year 4	58.971	5.742	21.875	36.600	2.633	-10.532
Year 5	62.038	6.416	15.459	36.600	2.633	-13.165
Year 6	65.264	7.126	8.333	36.600	2.633	-15.798
Year 7	68.658	7.873	460	36.600	2.633	-18.431
Year 8	72.228	8.658	-8.198	36.600	2.633	-21.064
Year 9	75.984	9.484	-17.682	36.600	2.633	-23.697
Year 10	79.935	10.354	-28.036	36.600	2.633	-26.330

Source: Based on the tuition rates from U.S. News & World Report.

college or not attending college will result in the following expected value equation, assuming both individuals are the same age: utility of attending College = E(Utility)= $\sqrt{Payoff} = \sqrt{income} =$

$P(S) * \sqrt{income} + P(DO)\sqrt{income}$

Applying the above information to our model, the utility received from an individual that attends college is equal to the:

$$.7 * \sqrt{55,260} + .3 * \sqrt{39,900} = 434.8243$$

Utility of not attending college = Equity) = $\sqrt{Payoff} = \sqrt{income}$

Applying the above information to our model, the utility received from an individual that did not attend college is equal to the:

$$\sqrt{36,600} = 191.3113$$

Therefore, using expected utility theory, the individual would elect to go to college. However, this example does not take into consideration the cost of college. Assuming the cost of a four-year public college of $41,692 but depends on the benefit of increased salary. Furthermore, our first example does not consider the lost opportunity cost of the college student being in school as the non-college student works for the additional four years. Therefore, students that attend college have an opportunity cost of $188,092. However, college graduates experience, on average, 84% higher earnings than high school students. We then look at the return on investment with the expected utility between college graduates and high school diplomas; we have the following results:
Utility for College student $= .7 * \sqrt{2,671,000} + .3 * \sqrt{1,547,000} = 1,517.159$

Utility for non-college student = $\sqrt{1,304,000}$ = 1,141.928
Therefore, the solution is similar in that risk-averse individuals benefit from attending college, supporting an increase in college-educated Americans. As of 2022, roughly 37.5% of Americans hold a college degree compared to 25.6% 20 years ago. However, during the same time, the cost of education increased, resulting in the $1.7 trillion-dollar federal loan issue. President Biden's solution to the federal student loan debt crisis is to forgive between $10,000 and $20,000 of student loan debt. This has a direct cost to all US taxpayers. Even if you did not attend college and experience this increase in expected utility, you have to incur the cost of individuals that did experience the expected utility under President Biden's plan. Therefore, we propose the following solution to handle student loan debt that holds the individual accountable for the cost of the debt they incurred instead of having United States taxpayers at-large responsible.

Recalling the example, a single wage earner earning $55,000 yearly typically pays around $7,000 in taxes yearly. However, we will use our probabilities of completing the degree and the appropriate payout. Therefore, we will use an income of $50,652, resulting in an individual paying roughly $4,322 in federal taxes. On the other hand, the non-college student earns $36,600 and pays roughly $2,633 in federal taxes. We propose that the federal tax paid by the college student is applied to their tax requirement up to the amount of taxes paid. Therefore, the tax credit received from the student loan debt is only treated as a non-refundable tax credit. Furthermore, we set a maximum amount of tax credit each year that an individual can take each year (Table 1). Therefore, after ten years, the college student will pay more taxes than the non-college student and will have the student loan debt paid in full. As noted previously, this

alternative does not pass along the student debt to all American taxpayers.

Based on assumptions and simulation, the authors argued that providing a non-refundable tax credit will incentivize individuals to seek college degrees as it would reduce future taxable income that would wash out the cost of school.

The non-refundable tax credit is only available to eligible borrowers. To be eligible, individuals must graduate from college. Additionally, as a non-refundable tax credit, only individuals that graduated and have taxes due are eligible to take the tax credit. Otherwise, they are responsible for the student loan debt repayment. Therefore, it minimizes the incentive for individuals not to graduate and not working because they will still have to pay back the student loan. Non-refundable, in our example, means that the tax credit would be lost if the borrower does not have sufficient income to make use of the tax credit. In such a case, the borrower would have to make the loan payment. This would also incentivize individuals to seek higher-paying jobs or work additional hours to maximize the taxable credit as it is non-refundable. The tax credit would also remove the tax wedge because it would be a dollar-to-dollar tax credit up to a specific limit for a specific year. If student debt remains after the first year, a tax credit would be applied to next year's income, and so on, until the debt is paid off. However, if the individual does not have taxable income, they would incur interest expenses and still must make the minimum loan payment. This would further incentives individuals to contribute to the labor market, which in turn will address the education gap Autor (2014) and (Lundeen, 2014). Students who have paid off their student loans were significantly more likely to land higher-paying jobs in new industries. These changes amounted to a $4,000 boost to their income (Di Maggio, 2019 and Di Maggio et al., 2019). Note that the tax credit is only valid for individuals that complete and finish their degree. Therefore, only "college graduates" can receive the non-refundable tax credit. If an individual elects to seek further degrees, the additional degrees must be completed before the tax credit can be received. If individuals fail to complete the degree, they will not be eligible to receive the non-refundable tax credit. Additionally, making the tax credit non-refundable does not pull from other taxpayers because only taxes that an individual pays would be eligible for the tax credit.

CONCLUSION

The U.S. is facing a student loan debt crisis, and if not handled properly, it can cause economic turmoil. The current administration proposes canceling debt for eligible individuals up to $20,000 for Pell Grant students. However, the Biden-Harris debt cancelation plan has encountered legal resistance and has paused accepting applications for the plan. The plan has further received

criticism suggesting it could worsen the current inflation, cost the U.S. taxpayers $400 billion, and would have someone else footing the bill. Therefore, we provide an alternative solution to deal with the current student loan debt crisis. The non-refundable tax credit only applies to individuals that attend higher education and graduate. Furthermore, it incentivizes individuals to obtain higher-paying jobs, work more hours or accept promotions without the ramifications of increasing taxes. The non-refundable tax credit provides savings to the taxpayer and increases future taxable revenue for the government. Lastly, this solution is not a one-time debt cancellation and can be incorporated into the regular tax code.

Overall, this study contributes to the discussion on how to handle the current student loan debt crisis. An alternative to the proposed Biden-Harris debt relief program currently facing legal challenges has been provided. However, this study is still limited in its contribution. It would need to be empirically tested to verify the benefits of the proposed non-refundable tax credit and estimate the benefits the taxpayer and government would receive from this proposed tax rule. However, the proposed plan does address the concerns raised with the current debt relief plan.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Cash flow effect and financial performance of quoted oil and gas sector 2013-2022: Evidence from Nigeria

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The study aimed to explore the impact of cash flow on the financial performance of publicly listed oil and gas companies in Nigeria. An ex post facto research design was employed for this investigation. The study's focus was on the seven oil and gas companies listed on the Nigerian Exchange Group (NGX) as of December 31st, 2022, which constituted the population and sample due to its manageable size. The time frame of analysis spanned a decade, from 2013 to 2022. The necessary data for the study were sourced from the published annual reports and accounts of the quoted oil and gas companies. Both descriptive and inferential statistical techniques, particularly multiple regression, were employed for data analysis, with a significance level (α) set at 0.05. The findings of the study indicated that cash flow had a significant effect on key financial indicators, including return on assets (Adjusted R^2 = 0.767, F-statistics = 13.612, p-value = 0.000), return on equity (Adjusted R^2 = 0.266, F-statistics = 3.772, p-value = 0.001), and earnings per share (Adjusted R^2 = 0.388, F-statistics = 5.854, p-value = 0.000) for the quoted oil and gas companies in Nigeria. In conclusion, the study established that cash flow played a notable role in influencing the financial performance of the examined oil and gas companies in Nigeria. As a recommendation, the study advised that the management of these companies should prioritize the interests of investors and leverage cash flow management strategies to drive sustainable financial performance.

Key words: Cash flow, Earnings per share, Oil and gas companies, Return on assets, Return on equity.

INTRODUCTION

Background to the study

The financial performance of any organization holds paramount importance for its business continuity and sustainability. The manner in which a company manages its resources ultimately determines the nature of its performance, whether it is short-term or long-term (sustainable). A firm's performance carries implications

for investor interest and shapes the perception it fosters among the public (Ironkwe and Wokoma, 2017). A company that exhibits a positive profitability trend and robust liquidity position signals a promising future for shareholders, employees, potential investors, governmental bodies, and the environment. Companies with strong track records yield favorable returns for investors, maintain employee salaries, meet tax obligations to the government, and fulfill corporate social responsibilities within the communities they operate in (Joseph and Chiemeka, 2020). Performance serves as a guiding factor for investors in deciding where to deploy their investible funds.

The financial performance of a company hinges on the management's proficiency in leveraging available resources to achieve the maximization objectives of investors (Salami et al., 2019). This objective encompasses not only profit maximization but also fulfilling other obligations, such as corporate social responsibility, employee compensation, tax remittance, and ensuring business continuity.

Financial performance can be evaluated through various metrics including sales growth, cost minimization, profitability, return on assets, return on equity, earnings per share, Tobin's Q, dividend per share, and market price per share (Etim et al., 2020). Cash flow stands as a pivotal element in elevating a company's financial performance. Effective cash flow management entails allocating financial resources across different investment segments. Decisions must be made about allocating funds to operational activities, investment ventures, and financing endeavors, all with the overarching goal of achieving the company's objectives (Olaoye et al., 2019). The cash flow cycle encompasses operational, investment, and financing activities, as well as the current ratio. A company that adeptly manages this complex interplay can achieve strong performance, attracting investors and fostering a positive public image. A company's management should know how to allocate its financial resources to achieve good performance that is sustainable for the company and its stakeholders. It is inappropriate for a company to commit short term fund to a long term project to avoid business failure and eventual closure of the company (Taouab and Issor, 2019; Kadioglu et al., 2017). A proper treatment of cash flow along with other management activities in its business lines will determine its business and financial success while a company with poor management of its cash flow may suffer poor performance such as low sales, high cost, high debt, loss, low return on assets, poor return on equity, low or negative earnings per share, low Tobin's Q or falling market price per share (Nangih et al., 2020).

Oil and gas sector is a critical sector that impacts every aspect of world's economy. The price of oil is the basis for other commodities. The sector is a major foreign earner for every country that has it. Oil remains the major source of energy for the global economy and it accounts for 3% of world's economy. The United States of America (USA) is ranked as the top producer of oil in the world. The top five oil producers in the world after USA are Canada, Columbia, Mexico, Russia, and Saudi Arabia. Nigeria cannot boast of meaningful results achieved from its oil success. Nigeria is the top oil producer in Africa and is ranked 11th among the oil producers in the world. The National Bureau of Statistics reported that Nigeria recorded 5.67% annual contribution of oil to aggregate GDP in 2022 against 7.24% achieved in 2021. Nigeria is considered as a mono-product economy due its major dependence on oil and gas for its earning. Oil and gas accounted for 90% of export income in the first quarter of 2022 and 85% of government revenue. Available figures from Q4 2018 revealed that Nigeria's oil and gas contribution to GDP has not crossed 9%.

Cash flow is very critical in managing a company's financial performance. A company may be profitable and not liquid. This can result where there is much sales credit without corresponding collection. There will be no fund to finance production and other lines of business hence imminent collapse will result. This was the case with Singer Company Limited located in Ibadan, manufacturer of sewing machine, where the company extended sales credit to customers without appropriate documentation of the customers (Appah et al., 2021). The customers could not be traced to collect the credit sales and this led to the collapse of the company. The sales had been captured to generate profit but there was no cash to turn over the activities of the company for business continuity. There would be no cash to pay dividend from the profit and tax on profit declared. A company should be able to balance its receivables and payables to ensure a sustainable business.

Nangih et al. (2020) in their study revealed that cash flows from operating and investing activities had a negative insignificant relationship with profitability while financing activities had a positive significant effect on firm performance in the oil and gas sector. Nwarogu and Iormbagah (2017) also showed a negative relationship on cash flow and return on assets and return on equity but there was a positive relationship between cash conversion cycle, cash holding and return on assets of quoted firms in Nigeria. Some studies were carried out on working capital management and financial performance of listed Oil and Gas companies in Nigeria which include Aitimon and Aniche (2020), Ironkwe and Wokoma (2017), Salami et al. (2019), Etim et al. (2020) Other studies carried out on cash flow and performance of companies are: Al-Zobi and Dhaimesh (2021), Aguguom (2020), Nwaiwu and Oluka (2017), Yazan et al. (2017), Hayek (2018), Abdullahi et al. (2020). Studies on cash flow, cash management, and liquidity management from other authors covered other sectors such as manufacturing, public construction, food and beverages sector in Kenya, Ghana, India, Jordan, Turkey, and Saudi Arabia.

The study was carried out with the aim of contributing

to literature in this area in Nigeria and other places. There are few studies (Nangih et al., 2020 was the only paper found which wrote cash flow management and financial performance of quoted oil and gas firms in Nigeria) in this area hence this paper will fill a gap and add value to the academic and industry. None of the papers reviewed made use of the theory adopted for this paper (Miller and Orr Model of Cash Management) hence the paper will fill a theoretical gap in this area. The paper considered the current list of quoted oil and gas sector in Nigeria as at 31st December, 2022.

LITERATURE REVIEW

Conceptual review

Financial performance

Financial performance is referred to as the ability of an organization to generate income from its daily operations in a particular period, this is measured as net income in relation to assets or equity provided or outstanding shares provided by the owners of the of the business. Financial performance can be measured in two ways either accounting-based or market-based. Accounting-based measures include return on assets, return on equity, sales growth while market-based measures include Tobi's Q, market return, market price per share (Sulaiman et al., 2019; Abubakar et al., 2020). Accounting measures reflect historical or short-term performance of a firm but the market-based measures show the long-term or future performance (Abubakar et al., 2020).

Return on assets (ROA)

This is a performance metric that measures the efficiency of a company's assets used in generating revenue. This is the division of net income by total assets (Aguguom, 2020; Ironkwe and Wokoma, 2017).

Return on equity (ROE)

This is a performance metric that measures the profitability of a company by its equity. Divide net income by shareholders' equity to arrive at this figure (Abdullahi et al., 2020).

Earnings per share (EPS)

This is a company's profit earned divided by the outstanding shares of its common stock.

Cash flow statements

Financial statements had been prepared on accrual basis

to forecast share performance (income statement and changes in financial position) since the development of financial markets between 1920 and 1970s (Al-Zobi and Al-Dhaimesh, 2021). This position changed when companies went bankrupt despite positive results from their financial statements. It was believed that accrual basis gave opportunity to manipulate financial performance to attract investors. As a result of this challenge, FAS issued a Statement of Financial Accounting Standards No, 95 which made it mandatory for companies to include statement of cash flows in place of listing changes in equity.

International Accounting Standards Committee (IASC) issued a revised IAS 7 (Statement of Cash Flows) to replace Statement of Owner's equity issued in 1977. This was made mandatory for companies to prepare and include statement of cash flows as an addition to other financial statements to provide information on the operating, investment, and financing activities of a company on a cash basis. Useful information about cash receipts and payments is obtained from statement of cash flows by the users of financial statements (Kasmiati and Santosa, 2019).

The dynamics of cash flow are captured on the statement of cash flow in three headings; cash flows from operating activities, cash flows from investing activities, and cash flows from financing activities (Ryu and Jang, 2004). Some studies have shown that the statement of cash flows is very critical as it provides vital information that is not available from income statement and financial position. The cash flow is a reflection of the market value of a company.

Operating cash flow (OCF)

This is the amount of cash generated by a company's normal business operations (Liman and Mohammed, 2018). It reveals whether a company can produce enough funds to sustain and expand its business activities; otherwise, capital expansion may necessitate outside funding. The operating activity head includes cash flows related to producing and selling the company's product or service which starts with payments for merchandise, material and ends with the collection of the proceeds from sales within the reporting period (Nangih et al., 2020; Al-Zobi and Al Dhameish, 2021).

Financing cash flow

The financing activity head includes cash flow information from the issuance and settlement of, or reacquisition of, a firm's debt and equity securities. This reflects the company's capital structure as it contains financing policy for equity, short term debt and long term debts (Nangih et al., 2020; Utomo and Pamungkas, 2018).

Investing cash flow (ICF)

The investing activity head includes cash flow information from the purchase of operating assets, debt and equity security investments, and their financial investments forming the foundation of operations (Setyawati, 2018; Gathu, 2018). The investing activity can be broken down into (i) cash flows from property, plant, and equipment (operating) transactions, and (ii) cash flows from other (non-operating) investing activities. Increased cash flow from investing activities is an indication of disposal of long term assets or other investments while the lower cash flow is an indication of increased growth and profits (Al-Zobi and Al Dhameish, 2021).

Cash flow activities and return on assets

The relationship between cash flow activities and return on assets from prior studies suggest mixed results. The studies of Musah and Kong (2019), Liman and Mohammed (2018), Appah et al. (2021), Aguguom (2020), Nwaiwu and Oluka (2017), Soet et al. (2018), Gathu (2018), Rahman and Sharma (2020) revealed that cash flow activities had positive significant effect on return on assets. Nangih et al. (2020), Salami et al. (2019), Aitimon and Aniche (2020), Bingilar and Oyadonghan (2014), Abdullahi et al. (2020) revealed negative impact of cash flow on return on asset.

Cash flow activities and Return on equity

The relationship between cash flow activities and return on equity showed mixed results. The studies of Musah and Kong (2019), Abdullahi et al. (2020), Rahman and Sharma (2020) had a positive significant effect on return on equity. The studies of Nwarogu and Iormbagah (2017), Ironkwe and Wokoma (2017) showed a negative relationship between cash flow activities and return on equity.

Cash flow activities and Earnings per share

Only few studies revealed results on the relationship between cash flow activities and earnings per share. Ironkwe and Wokoma (2017) revealed a neutral significant relationship between cash flow activities and earnings per share.

THEORETICAL REVIEW

Miller and Orr model of cash management

Miller and Orr (1966) propounded cash management

model. The model assumes that a firm's cash flow is stochastic, which means that different amounts of cash are paid out at different times. It is assumed that changes in cash balance occur at random. It enables modern businesses to manage their cash while accounting for fluctuations in daily cash flow. Businesses use this model to plan their cash balance between the upper and lower limits. Companies only buy or sell marketable securities if their cash balance equals or exceeds any of the following: When a company's cash balance reaches a certain threshold, it purchases a certain number of sellable securities to help it return to the desired level. If the company's cash balance falls below a certain threshold, it will sell its sell-able securities to raise the necessary funds (Li et al., 2020).

The cash management model developed by Miller and Orr was predicated on the following assumptions: (i) the average value of the distribution of net cash flows is usually assumed to be zero. It is also understood that the standard deviation of the net cash flow distribution exists cash flow distribution is normal. The Miller-Orr model holds the assumptions that I the daily interest received on the transaction is consistent (Alvarez and Lippi, 2017), (ii) the transaction cost is continuous and independent of transaction size (Baik et al., 2016) (iii) the lead time in securities trading is insignificant, and (iv) the cash balance will increase or decrease by a certain amount (Gathu, 2018). Equational representations in Miller and Orr model of cash management (Gathu, 2018):

Target cash balance (Z):
Where TC denotes the transaction cost of purchasing or selling securities.
V = daily cash flow variance
r denotes the daily return on short-term investments.
L denotes the minimum cash requirement.
The following equation determines the upper limit for the cash account (H):
H = 3Z - 2L

Since it allows cash flows to fluctuate randomly between the lower and upper limits, this theory is more realistic and superior to the Baumol model. Financial managers need items below in using the model (Li et al., 2020):

1. Identifying the estimated prices that could be used for trading the saleable securities
2. Determination of minimum cash balance for the business
3. Review of interest rate
4. Computation of standard deviation of regular cash flows

The theory applies to businesses with volatile cash inflows and outflows. It allows for the setting of lower and upper cash balance limits, as well as the determination of the target cash balance. Companies can effectively plan

and manage their cash (Li et al., 2020). The theory is applicable to this study considering the fund movement in achieving the company's objectives.

Empirical review

Cash flow statement as part of financial statements includes cash flow from operating activities, cash flow from investing activities, and cash flow from financing activities. Previous studies that have reviewed the variables are looked at:

Odo and Udodi (2022) examined the influence of cash management on financial performance of selected manufacturing companies in Nigeria. Ex post facto research design was used hence data for the study were drawn from the annual reports of the 26 sampled companies out of population of 55 listed manufacturing companies in Nigeria. The panel least square regression was used to analyze the data. The findings showed a positive significant effect of cash management on return on assets and Tobin's Q but it had a negative insignificant effect on return on equity.

Mukadar et al. (2021) examined the effects of cash flow, funding, and investment on financial performance of mining companies in metal and other mineral sub sector listed on Indonesia Stock Exchange. Ex post facto research design was used. The population of the study covers all the mining companies listed on Indonesia Stock Exchange as at 331st December 2019. There were 7 companies considered for the sample, these companies were listed on Indonesia Stock Exchange, they had data for the variables considered for the study in the published annual reports. SmartPLS was used to analyze the data. The results revealed that operating cash flow and Funding cash flow had a positive insignificant effect on the financial performance of mining companies in the metal and other mineral sub-sectors listed on the Indonesia Stock Exchange. Investing cash flow had a positive significant effect on financial performance of mining companies in the metal and other mineral sub-sectors listed on the Indonesia Stock Exchange.

Appah et al. (2021) examined cash flow accounting and corporate financial performance of listed consumer goods in Nigeria. The study used ex post facto and correlational research designs respectively. 23 firms were selected out 25 firms in the industry with the use of Taro Yamene formula. Data was obtained from the annual reports of the sampled firms listed on the Nigerian Exchange (NGX). Descriptive and inferential statistics were employed for data analysis. The findings showed a positive significant effect of operating cash flow, financing cash flow, and firm size on profit after tax of listed consumer goods industry but investing activities and financial leverage showed a negative significant effect. The study concluded that cash accounting influenced the corporate financial performance of consumer goods firms in Nigeria.

Rahman and Sharma (2020) examined the cash flows and financial performance in the industrial sector of Saudi Arabia. Ex post facto research design was adopted. Annual reports of sampled companies from insurance and manufacturing sectors were used. The results showed a positive significant effect of operating cash flows on return on assets and return on equity respectively.

In another study, Nangih et al. (2020) examined cash flow management and financial performance of quoted oil and gas firms in Nigeria. Ex post facto research design was adopted. Multiple regression and correlation techniques were adopted to analyze data obtained from the annual reports of sampled oil and gas firms quoted on the Nigerian Exchange as at 31st December 2018. The results showed a negative insignificant effect of operating and investing cash flows on profitability. In the same vein, financing activities showed a positive significant effect on firm performance. This reflected increase in stock volatility and higher returns.

Musah and Kong (2019) examined the relationship between cash flows and financial performance of firms listed on Ghana Stock Exchange. Ex post facto research design was adopted. Data were obtained from annual reports of sampled firms. The results showed that cash flows had positive significant effect on return on asset but it had positive insignificant effect on return on equity.

Gathu (2018) examined the influence of cash flows from investing activities on returns of shareholders in listed manufacturing and allied companies in Kenya. Primary and secondary data were adopted for the study using questionnaire and annual reports of sampled manufacturing and allied firms in Nairobi; with a population of 227 Finance and Accounting staff of the listed manufacturing and allied firms in Nairobi Kenya. Stratified sampling was adopted to take a sample of 54 respondents for the study. SPSS was used to process the collected data. The study showed a positive significant effect of cash flow investing activities on shareholders' returns (t=3.8499; p<0.05). Cash flow from investing activities is very critical in determining dividend payment to shareholders especially if there is need to decide on project expansion.

Nwaiwu and Oluka (2017) examined cash flow accounting and financial performance of quoted companies in Nigeria in relation to IFRS. Ex post facto research design was used. Annual reports of sampled companies were used to provide data for the study. The findings revealed that cash flow accounting had a positive impact on financial performance of quoted companies in Nigeria.

CONCEPTUAL FRAMEWORK

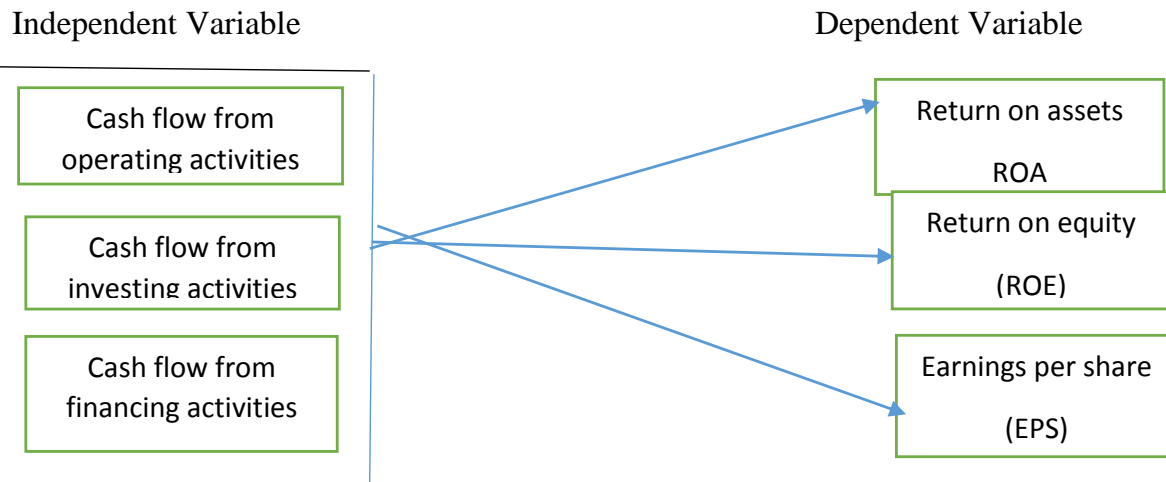The conceptual framework of the study is shown in Figure 1.

Independent Variable   Dependent Variable

Figure 1. Conceptual framework.
Source: Researcher's computation (2023).

METHODOLOGY

The research design used for this study is ex-post facto. The data were derived from the secondary source of sampled oil and gas companies quoted on the Nigerian Exchange (NGX). The annual reports of quoted oil and gas companies were reviewed for the period 2013-2022 (ten years). The population of the study comprises eight (8) quoted oil and gas companies in Nigeria on the Nigerian Exchange (NGX) between 31st December 2013 and 31st December 2022 (a period of ten years). Two firms were not included in the list of eight companies, they are 11 Plc and Oando Plc. 11 Plc was delisted from the Exchange in May 2021 while Oando did not provide annual reports for 2019 through 2022. Seplat was an addition considering their listing on the Exchange from 2013. The seven (7) quoted oil and gas companies made use of are: Ardova Plc, Conoil Plc, Eternaoil Plc, Japaul Gold and Ventures Plc, MRS Oil Plc, Seplat Petroleum Plc, Total Nigeria Plc.

The period 2013 was chosen with the aim of capturing Seplat Petroleaum Plc which is missing in most literature on oil and gas sector in Nigeria (Abdullahi et al., 2020; Ironkwe and Wokoma, 2017; Nangih et al., 2020; Nwarogu and Iombagah, 2017; Hayek, 2018; Yazan et al., 2017; Nwaiwu and Oluka, 2017; Al-Zobi and Al-Dhaimesh, 2021; Aguguom, 2020). Seplat Petroleaum is a key player in the industry that should not be missed out. The year 2022 was chosen to ensure currency of data used for the study which will also provide up to date information to readers and users of this report. A ten year period ending on the current is sufficient to capture sufficient information required for the study.

The study used simple random sampling technique in selecting the sample to give opportunity of being selected by every company in the population. The selection was also dependent on the availability of annual reports and accounts of the target companies in the population. The sample was arrived at using Taro Yamane formula for the companies in oil and gas industry as shown below:

$n = N/(1+(N*e^2))$
$n = 8/(1+(8*0.05^2))$
$n = 8/(1+(0.02)) = 8/1.02 = 7.84$

Sample size required for the study is 7.84 out of eight quoted oil and gas companies in Nigeria. Oando Plc was not included due to non-availability of annual reports up to date.

The study made use of data obtained from the annual reports and accounts of the sampled oil and gas companies in Nigeria for the periods under review (2013-2022). The choice of oil and gas sector was as a result of scanty studies in this area and the importance of the sector to Nigeria's economy. Descriptive statistics and regression analysis, where Pooled regression with Fixed and Random Effects, were adopted for the study analysis. The study used multiple regressions for the analysis with the aid of E-views package.

The model specification of the study is represented below following balanced panel data of Ordinary Least Square (OLS):

ROA = f (CFF, CFI, CFO)	(Equation 1)
ROE = f (CFF, CFI, CFO)	(Equation 2)
EPS = f (CFF, CFI, CFO)	(Equation 3)

$ROA_{it} = \alpha_0 + \beta_1 CFF_{it} + \beta_2 CFI_{it} + \beta_3 CFO_{it} + e_{it}$	(Model 1)
$ROE_{it} = \alpha_0 + \beta_1 CFF_{it} + \beta_2 CFI_{it} + \beta_3 CFO_{it} + e_{it}$	(Model 2)
$EPS_{it} = \alpha_0 + \beta_1 CFF_{it} + \beta_2 CFI_{it} + \beta_3 CFO_{it} + e_{it}$	(Model 3)

Where:
ROA_{it} = Return on assets ROE_{it} = Return on equity EPS_{it} = Earnings per share
CFF_{it} = Cash flow Financing activities CFI_{it} = Cash flow Investing activities CFO_{it} = Cash flow operations
α_0 = intercept e_{it} = error term $\beta_1 - \beta_3$ = Coefficient of independent variables
i = Firm   t = time

RESULTS, INTERPRETATION, AND DISCUSSION

Descriptive analysis

Descriptive statistics

The mean value for the data set of return on equity is 31.91, the standard deviation is 170.65. Standard deviation measures the extent of dispersion from the mean which suggests some levels of fluctuation in the

Table 1. Descriptive statistics.

Variable	CFF	CFI	CFO	EPS	ROA	ROE
Mean	-5.613550	-0.071056	7.123096	3.251726	2.894918	31.91172
Median	-3.525000	-1.710000	6.405000	1.410000	2.839650	8.987968
Maximum	43.27000	240.0000	34.43000	49.66000	176.2700	1099.683
Minimum	-212.0800	-35.78000	-27.20000	-50.00000	-71.36000	-230.3800
Std. Dev.	27.62943	30.19034	11.71551	11.04367	24.93896	170.6496
Observations	70	70	70	70	70	70

Source: Researcher's computation (E-View 2023).

data distribution. A low standard deviation suggests closeness of data points to the mean while a high standard deviation indicates that the data points are spread over a large range of values. The difference between the minimum value of -230.38 and the maximum value of 1099.68 shows the extent to which oil and gas companies in Nigeria vary from each other in return on equity (ROE) (Table 1).

The mean value for the data set of return on assets (ROA) is 2.89, the standard deviation is 24.94. The difference between the minimum value of -71.36 and the maximum value of 176.27 shows the extent to which oil and gas companies in Nigeria vary from each other in return on assets (ROA). The mean value for the data set of Operating Cash flow (CFO) is 7.12, the standard deviation is 11.72. The difference between the minimum value of -27.20 and the maximum value of 34.43 shows the extent to which oil and gas companies in Nigeria vary from each other in Operating cash flow (CFO). The mean value for the data set of investing cash flow (CFI) is -.0.07, the standard deviation is 30.19. The difference between the minimum value of -35.78 and the maximum value of 240.00 shows the extent to which investing cash flow (CFI) of oil and gas companies in Nigeria vary from each other. The mean value for the data set of financing cash flow (CFF) is -5.61, the standard deviation is 27.63. The difference between the minimum value of -212.08 and the maximum value of 43.27 shows the extent to which financing cash flow (CFF) of oil and gas companies in Nigeria vary from each other. The mean value for the data set of Investing cash flow (CFI) is -0.071, the standard deviation is 30.19. The difference between the minimum value of -35.78 and the maximum value of 240 shows the extent to which oil and gas companies in Nigeria vary from each other in Investing cash flow (CFI).

Test of hypotheses

Ho_1: Cash flow has no significant effect on return on assets of quoted Oil and gas companies in Nigeria.

Ho_2: Cash flow has no significant effect on return on equity of quoted Oil and gas companies in Nigeria.

Ho_3: Cash flow has no significant effect on earnings per share of quoted Oil and gas companies in Nigeria.

Interpretation of results

$$ROA_{it} = \alpha_0 + \beta_1 CFF_{it} + \beta_2 CFI_{it} + \beta_3 CFO_{it} + e_{it} \qquad \text{(Model 1)}$$

$$ROA_{it} = 3.575 + 0.005 CFF_{it} + 0.777 CFI_{it} - 0.083 CFO_{it} + e_{it} \qquad \text{(Model 1a)}$$

Model One in Table 2 examined the effect of cash flow on return on asset of quoted oil and gas firms in Nigeria. Table 2 showed a positive insignificant effect of financing cash flow on return on assets (β = 0.005, *p = 0.980)*. The positive value of its coefficient implies that a unit of CFF introduced will lead to a marginal increase of 0.01% in return on asset. Investing cash flow has a positive and significant effect on Return on asset (β = 0.777, *p = 0.0002)*. The positive value of its coefficient implies that a unit of CFI will lead to a 0.777 percent increase in Return on asset. The regression estimates results also revealed that Operating cash flow has a negative insignificant effect on ROA (β = -0.084, *p = 0.651)*. The negative value of its coefficient implies that a unit of CFO introduced will lead to a 0.08 decrease in Return on asset. At a 5% level of significance, F-statistics of 13.61, the p-value is 0.000 which is less than the adopted level of significance. Therefore the study rejected the null hypothesis which states that Cash flows have no significant effect on return on assets of quoted oil and gas firms in Nigeria. The alternate hypothesis was accepted which states that Cash flows have significant effects on return on assets of quoted oil and gas firms in Nigeria. This result is consistent with the *a priori* expectation of this model. The Adjusted R^2 showed 0.767 which reflects that independent variables (CFO, CFF and CR) accounted for 76.7% of changes in return on asset while only 23.3% were changes outside the independent variables..

$$ROE_{it} = \alpha_0 + \beta_1 CFF_{it} + \beta_2 CFI_{it} + \beta_3 CFO_{it} + e_{it} \qquad \text{(Model 2)}$$

$$ROE_{it} = 36.96 + 0.421 CFF_{it} + 3.486 CFI_{it} - 0.342 CFO_{it} + e_{it} \qquad \text{(Model 2a)}$$

Table 2. Result on Regression Equation of ROA.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.575406	1.919975	1.862214	0.0683
CFF	0.005182	0.208774	0.024822	0.9803
CFI	0.777284	0.193700	4.012814	0.0002
CFO	-0.083695	0.183741	-0.455505	0.6507
R-squared	0.827715	Mean dependent var		2.894918
Adjusted R-squared	0.766909	S.D. dependent var		24.93896
S.E. of regression	12.04040	Akaike info criterion		8.040601
Sum squared resid	7393.538	Schwarz criterion		8.650906
Log likelihood	-262.4210	Hannan-Quinn criter.		8.283022
F-statistic	13.61233	Durbin-Watson stat		1.189323

Source: Author's computation (E-view output 2023).

Table 3. Result on Regression Equation of ROE.

Dependent Variable: ROE				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	36.96044	22.38568	1.651075	0.1039
CFF	0.421207	2.161893	0.194832	0.8462
CFI	3.485887	2.088260	1.669278	0.1003
CFO	-0.342065	1.924039	-0.177785	0.8595
R-squared	0.361362	Mean dependent var		31.91172
Adjusted R-squared	0.265566	S.D. dependent var		170.6496
S.E. of regression	146.2452	Akaike info criterion		12.94001
Sum squared resid	1283260.	Schwarz criterion		13.26122
Log likelihood	-442.9004	Hannan-Quinn criter.		13.06760
F-statistic	3.772210	Durbin-Watson stat		2.544984
Prob(F-statistic)	0.000820			

Source: Author's computation (E-View output 2023).

Model Two in Table 3 examined the effect of cash flow on return on equity of quoted oil and gas firms in Nigeria. Table 3 showed a positive and insignificant effect of financing cash flow on return on equity (β = 0.421, *p = 0.846).* The positive value of its coefficient implies that a unit of financing cash flow (CFF) will lead to a 0.421 percent increase in Return on equity. The table also revealed that Investing cash flow had a positive and insignificant effect on return on equity (β = 3.486, *p = 0.100).* The positive value of its coefficient implies that a unit of investing cash flow (CFI) will lead to a 3.486 percent increase in return on equity. The regression estimates results also revealed that Operating cash flow had a negative and insignificant effect on ROE (β = -0.342, *p = 0.859).* The negative value of its coefficient implies that a unit of operating cash flow (CFO) will lead to a 0.342 percent decrease in return on equity. At a 5% level of significance, F-statistics of 3.772, the p-value is

0.001 which is less than the adopted level of significance. Therefore the study rejected the null hypothesis which states that Cash flows have no significant effect on return on equity of quoted oil and gas firms in Nigeria. The alternate hypothesis was accepted which states that Cash flows have significant effects on the return on equity of quoted oil and gas firms in Nigeria. This result is consistent with the *a priori* expectation of this model. The Adjusted R^2 showed 0.2656 which reflects that independent variables (CFF, CFI and CFO) accounted for 26.56% of changes in return on equity while 73.54% of changes on return on equity were outside the independent variables..

$$EPS_{it}=\alpha_0+\beta_1 CFF_{it}+\beta_2 CFI_{it}+\beta_3 CFO_{it}+e_{it} \qquad \text{(Model 3)}$$

$$EPS_{it}=2.647-0.054CFF_{it}+0.004CFI_{it}+0.042CFO_{it}+e_{it} \qquad \text{(Model 3a)}$$

Table 4. Result on Regression Equation of EPS.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.646670	1.322779	2.000840	0.0499
CFF	-0.054135	0.127747	-0.423766	0.6733
CFI	0.004381	0.123396	0.035504	0.9718
CFO	0.042324	0.113692	0.372268	0.7110
R-squared	0.467557	Mean dependent var		3.251726
Adjusted R-squared	0.387691	S.D. dependent var		11.04367
S.E. of regression	8.641695	Akaike info criterion		7.282638
Sum squared resid	4480.734	Schwarz criterion		7.603852
Log likelihood	-244.8923	Hannan-Quinn criter.		7.410228
F-statistic	5.854239	Durbin-Watson stat		2.604906
Prob(F-statistic)	0.000008			

Source: Author's computation (E-View output 2023).

Model Three in Table 4 examined the effect of cash flow on earnings per share of quoted oil and gas firms in Nigeria. Table 4 showed a negative and insignificant effect of financing cash flow on earnings per share (β = -0.054, $p = 0.673$). The negative value of its coefficient implies that a unit of financing cash flow (CFF) will lead to a 0.054 percent decrease in Earnings per share. The table also revealed that investing cash flow had a positive and insignificant effect on Earnings per share (β = 0.004, $p = 0.972$). The positive value of its coefficient implies that a unit of investing cash flow introduced (CFI) will lead to a marginal increase of 0.004 percent in Earnings per share. The regression estimates results also revealed that Operating cash flow had a positive and insignificant effect on EPS (β = 0.042, $p = 0.711$). The positive value of its coefficient implies that a unit of operating cash flow (CFO) will lead to a marginal increase of 0.042 percent in Earnings per share of quoted oil and gas companies in Nigeria. At a 5% level of significance, F-Statistics = 5.854, p-value = 0.000 which is less than the adopted level of significance. Therefore the study rejected the null hypothesis which states that Cash flows have no significant effect on Earnings per share of quoted oil and gas firms in Nigeria. The alternate hypothesis was therefore accepted which states that Cash flows have significant effects on Earnings per share of quoted oil and gas firms in Nigeria. The Adjusted R^2 showed 0.3877 which reflects that independent variables (CFF, CFI and CFO) accounted for 38.77% of changes in earnings per share and 61.23%.of changes in earnings per share were outside the independent variables.

Discussion of findings

The regression results in model one investigated the relationship of cash flow effects and Return on asset of quoted oil and gas firms in Nigeria and found out that Cash flow activities (CFF, CFI, and CFO) had a significant effect on the Return on asset of quoted oil and gas firms in Nigeria (F-statistics = 13.612, p-value = 0.000). The individual results for each variable revealed that the three cash flow measures (CFF, CFI, and CFO) from the regression had a mixed result. CFF had positive and insignificant effect. CFI had positive and significant effect while CFO had negative and significant relationship with Return on assets. This result agreed with the prior study of Odo and Udodi (2022) which reported a positive significant effect of cash management on return on assets. The works of Musah and Kong (2019), Soet et al. (2018), and Aguguom (2020) which reported a positive significant effect of cash flows on return on assets are in tandem with this study. The work of Aitimon and Aniche (2020) also supported this work which showed that average collection period had positive significant effect on return on assets. The work of Ironkwe and Wokoma (2017) reported a positive significant effect of financing activities on return on assets which was not in agreement with this study where financing activities was negative and significant on return on assets. Same was the result of Rahman and Sharma (2020) which reported a positive significant effect of operating cash flow on return on asset as against the negative significant effect on return on assets reported by this study.

The regression results in model two investigated the relationship of cash flow effects and return on equity of quoted oil and gas firms in Nigeria and found out that cash flows (CFF, CFI, and CFO) had a positive significant effect on the return on equity of quoted oil and gas firms in Nigeria. The individual results for each variable revealed that the three cash flow measures (CFF, CFI, and CFO) of regression results showed mixed results. The three independent variables statistically had insignificant effect on return on equity. CFF and CFI had positive effect on return on equity but CFO had negative effect. This result is in tandem with the reports of Li et al.

(2020) which showed a positive insignificant influence on return on equity (ROE). Li et al. (2020) also reported a negative insignificant effect of liquidity management which supported this study that showed negative and insignificant effect of CFO. The result of Musah and Kong (2019) showed that cash flows had positive and insignificant effect on return on equity which is not in tandem with this study. The work of Soet et al. (2018) was also not in agreement with this study, it reported a positive insignificant effect operating cash flow on return on equity. Ironkwe and Wokoma (2017) reported a negative insignificant effect of financing activities on return on equity which is not in agreement with this study that reported a positive and insignificant effect of financing activities on return on equity. The study of Rahman and Sharma (2020) showed a positive significant effect of operating cash flow on return on equity which is not in tandem with this study that showed a negative and insignificant effect of operating cash flow on return on equity.

The regression results in Model Three investigated the relationship of cash flow effects and Earnings per share of quoted oil and gas firms in Nigeria and found out that cash flows (CFF, CFI, and CFO) had a positive significant effect (F-statistics = 5.854, p-value = 0.000) on Earnings per share of quoted oil and gas firms in Nigeria. The individual results for each variable revealed that Investing cash flow and Operating cash flow (CFI and CFO) of regression results were positive and insignificant while financing cash flow was negative and insignificant on Earnings per share. This study is in tandem with the study of Nwaiwu and Oluka (2017) which reported that cash flow accounting had a positive impact on the financial performance of quoted companies in Nigeria. This result is in tandem with the study of Ironkwe and Wokoma (2017) which showed an insignificant effect of financing policies on earnings per share. Mukadar et al. (2021) had positive insignificant effect of operating cash flow on the financial performance of mining companies in Indonesia which is in tandem with this study but their report on financing cash flow showed a positive insignificant result with the financial performance which is not in agreement with this study. The study of Bingilar and Oyadonghan (2014) agreed with this study where operating cash flow had positive effect on earnings per share. Bingilar and Oyadonghan (2014) did not agree with this study in significance of operating cash flow on earnings per share as this study showed that operating cash flow was not significant on earnings per share. Bingilar and Oyadonghan (2014) was not in tandem with this study on the effect of financing cash flow on financial performance where they reported a positive and significant effect on financial performance but this study showed that financing cash flow was negative and insignificant on earnings per share. The study of Nangih et al. (2020) reported that financing activities had a positive and significant effect on firm performance unlike the results shown by this report with a negative and insignificant effect on earnings per share. Nangih et al. (2020) also revealed a negative effect of operating cash flow on profitability which is not in agreement with this study that showed a positive effect of operating cash flow on earnings per share.

Implications

Cash flow as an important as of a business needs to be looked into by the managers of oil and gas sector in Nigeria as identified in this study. Financing Cash flow had negative insignificant effect on return on asset and earning per share. This may put investors on enquiry whether they continue to invest in such business. This effect can also affect the price performance of oil and gas stocks on the trading floors of Nigerian Exchange Group. The finance managers of oil and gas companies need to review their financing strategy to improve the return on assets of their businesses to attract investors and improve their stock price performance. This also suggests that assets do not justify the finance incurred on it. Operating cash flow had a negative effect on return on equity with a statistical insignificance. Operating cash flow is an important aspect of cash flow that keeps the business alive but it did not impact the return on equity. Investors may not be encouraged to increase their investment in oil and gas industry. This may also discourage potential investors from investing their investible funds in oil and gas industry. The study revealed that there are other factors industry managers need to address to improve their profitability and returns to various stakeholders. This is due to Adjusted R^2 squared generated on each hypothesis (ROA – 0.767; ROE – 0.313; EPS – 0.388) that revealed the changes caused by the independent variables on each of the dependent variables. The industry managers should consider government policy, exchange rate fluctuations, corruptive practices, economic, social, and technological factors outside the independent variables used for this study. The industry needs to be turned around to contribute more to the country's gross domestic product (GDP) as seen in other oil rich countries. Nigeria seems to have the lowest contribution to GDP among the oil producing exporting countries (OPEC) despite its position as the largest oil producer in Africa. There is potential to increase its contribution to GDP if the barriers are worked on.

Conclusion

From this study, it was concluded that:
1. Financing cash flow and Investing cash flow had positive effect on return on asset of quoted oil and gas companies in Nigeria. Financing cash flow had

insignificant effect while investing cash flow showed a statistical significant effect on return on assets of quoted oil and gas companies in Nigeria. This showed a mixed result of independent variables on the return on assets. This implies that these variables had an inverse relationship with return on asset. Good management of investing capital improves return on asset of quoted oil and gas companies in Nigeria with significant effect.

2. Operating cash flow had negative and insignificant effect on return on assets. This implies an inverse relationship of operating cash flow with return on assets. Their introduction to the company's operations did not improve return on assets which an investor should pay attention to.

3. Financing cash flow and Investing cash flow had positive and insignificant effect on return on equity of quoted oil and gas companies in Nigeria. This implies that application of financing cash flow and investing cash flow had an impact on return on equity of quoted oil and gas companies in Nigeria though no statistical significance was achieved.

4. Operating cash flow was negative and insignificant on return on equity of quoted oil and gas companies in Nigeria. This implies that operating cash flow did not improve the return on equity of shareholders of quoted oil and gas companies in Nigeria.

5. Financing cash flow revealed a negative and insignificant effect on earnings per share of quoted oil and gas companies in Nigeria. This implies that introduction of financing cash flow did not add value to the earnings per share performance of quoted oil and gas companies in Nigeria. This has an implication for the stock of oil and gas shares on the capital market.

6. Investing cash flow and Operating cash flow had positive and insignificant on Earnings per share of quoted oil and gas companies in Nigeria. This implies that Investing cash flow and operating cash flow had a direct relationship with earnings per share of quoted oil and gas companies in Nigeria. The introduction of investing cash flow and operating cash flow showed a marginal improvement in earnings per share of these oil and gas companies in Nigeria.

Recommendations

In view of analysis and findings carried out on this study, we recommend that:

1. The managers of oil and gas companies should pay attention to operating and financing cash flows which had negative impact on performance of these oil and gas companies. Some of these companies had low and negative ROA, ROE and EPS between 2013 and 2022.

2. The industry managers may seek further training on fund management to improve the returns of their shareholders. The investors should seek training on financial management to understand the basics in annual reports and accounts of the companies they invest in. This will help them understand how their investment is performing.

3. The finance managers of these oil and gas companies should regularly review their cash flow position to identify its impact on their financial performance. This will help attract investors to the companies.

Research limitation

The following are the identified limitations in the course of carrying out the information:

1. The cost of obtaining data is enormous for an ex post facto research which constituted a strain on researchers to bear considering the present economic challenges in Nigeria.

2. The source of data slows down the research work when you want to use current data for the study but you have to wait for the release of annual reports and accounts. In some situations, it is difficult to obtain some companies' data which frustrates researcher's efforts.

Suggestion for future research

The following points could be valuable for guiding further research in this area:

1. There is a need for additional research in this field, particularly considering the limited existing studies conducted in Nigeria.

2. To comprehensively understand the performance of the oil and gas industry, it's worth considering the introduction of additional variables that could potentially influence its performance.

3. Recognizing the significance of cash flow as a critical factor affecting various industries, it's recommended to extend the study to other vital sectors such as manufacturing and services.

4. The establishment of a research repository is advisable, which would allow researchers to access data easily for their studies, minimizing unnecessary challenges. This repository would streamline the process of data collection for various research works.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests

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