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Generativity is a Core Value of the ESJ: A Decade of Growth

Erik Erikson (1902-1994) was one of the great psychologists of the 20th century[1]. He explored the nature of personal human identity. Originally named Erik Homberger after his adoptive father, Dr. Theodore Homberger, he re-imagined his identity and re-named himself Erik Erikson (literally Erik son of Erik). Ironically, he rejected his adoptive father's wish to become a physician, never obtained a college degree, pursued independent studies under Anna Freud, and then taught at Harvard Medical School after emigrating from Germany to the United States. Erickson visualized human psychosocial development as eight successive life-cycle challenges. Each challenge was framed as a struggle between two outcomes, one desirable and one undesirable. The first two early development challenges were 'trust' versus 'mistrust' followed by 'autonomy' versus 'shame.' Importantly, he held that we face the challenge of **generativity** versus **stagnation in middle life**. This challenge concerns the desire to give back to society and leave a mark on the world. It is about the transition from acquiring and accumulating to providing and mentoring.

Founded in 2010, the European Scientific Journal is just reaching young adulthood. Nonetheless, **generativity** is one of our core values. As a Journal, we reject stagnation and continue to evolve to meet the needs of our contributors, our reviewers, and the academic community. We seek to innovate to meet the challenges of open-access academic publishing. For us,

[1] Hopkins, J. R. (1995). Erik Homburger Erikson (1902–1994). *American Psychologist*, 50(9), 796-797. doi:http://dx.doi.org/10.1037/0003-066X.50.9.796

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generativity has a special meaning. We acknowledge an obligation to give back to the academic community, which has supported us over the past decade and made our initial growth possible. As part of our commitment to generativity, we are re-doubling our efforts in several key areas. First, we are committed to keeping our article processing fees as low as possible to make the ESJ affordable to scholars from all countries. Second, we remain committed to fair and agile peer review and are making further changes to shorten the time between submission and publication of worthy contributions. Third, we are looking actively at ways to eliminate the article processing charges for scholars coming from low GDP countries through a system of subsidies. Fourth, we are examining ways to create and strengthen partnerships with various academic institutions that will mutually benefit those institutions and the ESJ. Finally, through our commitment to publishing excellence, we reaffirm our membership in an open-access academic publishing community that actively contributes to the vitality of scholarship worldwide.

Sincerely,

Daniel B. Hier, MD

European Scientific Journal (ESJ) Natural/Life/Medical Sciences

Editor in Chief

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Asymmetric Pass-through Effects of Oil Price Shocks and Exchange Rates on Inflation in Nigeria: Evidence from a Nonlinear ARDL Model

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Abstract

This paper employs the linear autoregressive distributed lag (ARDL) model, the asymmetric nonlinear ARDL (NARDL) model developed by Shin, et al (2014) to examine the asymmetric effect of oil price and exchange rates pass-through on inflation in Nigeria over a period of 1970 to 2020. The result of the asymmetric test revealed the existence of asymmetries among the variables of the study, suggesting that there is a nonlinear interaction among the variables used in the study. This validates the choice of a non-linear ARDL model for the study. Results of the long-run estimates show that rising (Positive) oil price shocks have a greater impact on inflation than falling (negative) oil price shocks. Furthermore, it is evident from the result that the depreciation of the exchange rate has a much and significant effect on inflation than the appreciation of the exchange rate in Nigeria. However, a rising

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interest rate increases inflation by 0.84 per cent while a falling interest rate increases inflation by 0.85 per cent. This implies that the effect of negative interest rate on inflation is higher than its positive effect on inflation, though, by a smaller amount of about 0.01 per cent. Again, the short-run dynamic model revealed a high speed of convergence of more than 90% from the short-run disequilibrium. During the study period, the oil price fluctuations showed a significant and incomplete pass-through to both exchange rates and inflation in Nigeria. Moreover, the results suggest that positive oil price changes have a larger impact than the negative ones, that the effect of an oil price shock on inflation and exchange rates is larger in the long-run than in the short-run, and that there is incomplete pass-through effect of oil price on domestic inflation and exchange rates. Based on the findings, the study recommends policies that set oil prices and exchange rates within reasonable limits to check inflation in Nigeria and should diversify its economy as well as withdraw the current subsidy regime completely.

Keywords: Non-linear Autoregressive Distributed Lag (NARDL), asymmetric pass-through, oil price shock, exchange rates, and inflation

1. Introduction

The sharp and persistent volatility of international oil prices over the last five decades has piqued the interest of researchers and policymakers alike, owing to the significant impact oil price fluctuations have had on exchange rates and domestic inflation in oil-consuming and oil-producing countries. This phenomenon has sparked several studies on the potential influence of oil price shocks on macroeconomics, primarily in developed OECD nations, with a few studies in developing non-OECD nations, though there is disagreement on whether oil price shocks cause economic downturns. According to empirical evidence, oil price shocks affect domestic inflation and exchange rates in both oil-consuming and oil-producing economies.

According to López-Villavicencio and Pourroy (2019), the impact of oil price shocks on domestic inflation and exchange rate happens via two channels: the direct channel and the indirect channel. The direct channel is related to variations in the cost of production of a firm induced by an increase or decrease in energy resources; while the indirect channel is associated with to the fluctuations in exchange rates caused by rising and falling oil prices.

However, the oil-consuming and oil-exporting nations are more likely to benefit from the indirect channel, disproportionately. The Central Bank of Nigeria relies on a thorough understanding of the empirical linkage between oil price shocks, domestic inflation, and exchange rates to formulate a comprehensive policy. In the advent of disruptions caused by fluctuations in oil prices in both oil-consuming and oil-producing countries, the monetary

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policy framework can play a critical role in exchange rate policies and inflation targeting. According to Bernanke, et al (1997), tighter monetary policy in response to fluctuations in oil prices in the global oil market may instigate an unnecessary economic recession.

Understanding the actual response of exchange rate and domestic inflation to the shock of oil prices will guide the monetary policymakers to design a sound and suitable policy to guard against any negative shocks of prices on a country's macroeconomy. When there is a sudden and unexpected increase in oil prices, which may result in an increase in domestic production costs, which may be passed on to domestic consumer prices, monetary policymakers may change their course to achieve the desired outcome. Monetary policy's emphasis may shift to regulating inflation from the wonky handling of the exchange rate or output.

Many studies have attempted to explore the dynamic of oil prices and the macroeconomy nexus in developed and developing countries using various data sets and methodologies. This paper is interested in López and Pourroy's research (2019) because they used the state-space model to evaluate the pass-through from changes in prices of crude oil to inflation from 1970-2017 in a large sample of countries. Therefore, how can an all-encompassing monetary policy formulation be implemented in Nigeria in response to the likely negative influences of oil price pass-through on domestic inflation and exchange rates? Is there a difference in how exchange rates and inflation react when international oil prices rise or fall? If this is the case, how can monetary policy be designed to cushion the likely unexpected transmission of shocks when oil prices rise or fall?

These questions appear necessary in the context of discussions about the Central Bank of Nigeria's policy, particularly on inflation control, because the Nigerian economy is heavily reliant on oil exports (and, to a large extent, imports of oil products), and the economy's reaction to changes oil price shock may be strong. According to Kartaev and Luneva (2018), the target function of the Central Bank in pure inflation targeting policy may include, when the inflation diverts from the actual target. However, the central bank does not intercede for the foreign exchange market (except in emergencies) and is less likely to achieve monetary policy goals through the interest rate.

As a result, aiming hyperinflation may necessitate the use of the monetary policy device which is the exchange rate together with the interest rates. As a result, anti-inflationary policies and monetary authority credibility are critical factors in reducing oil price pass-through and changes in exchange rate into consumer price inflation. In line with this, this paper attempts to add to the existing writings by conducting a methodical exploration of the impact of socks on global oil prices on Nigerian exchange rates and domestic inflation from 1970 to 2020. The study attempted to specifically examine the

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asymmetric response of shocks in global oil prices on exchange rates and domestic inflation, also, with the effect of pass-through of global oil prices on exchange rates and domestic inflation.

In-depth knowledge of the connection between exchange rates, oil prices, and domestic inflation, may help policymakers form a more accurate assessment of inflation risk and exchange rate misalignment. This is likely to accompany oil price shocks and respond appropriately to international oil price shocks that may affect these variables and transmit into the workings of the Nigerian economy. The paper adds to the existing literature in developing countries by investigating the oil price pass-through effects on exchange rates and inflation in Nigeria, as well as the impact of (A) symmetric oil price deviations on domestic inflation and exchange rates using non-linear Autoregressive Distributed Lags Models.

The second section of this paper examines the movements of the exchange rate, domestic inflation, and global oil prices. Section three examines the existing studies on the linkage between global oil prices, exchange rates, and domestic inflation. The empirical methodology is in Section four, while section five is the empirical findings and discussions. The sixth section is the conclusion and policy implication of the findings.

2. A Review of Nigerian Oil Price, Exchange Rate, and Inflation Developments

Nigeria has the largest economy in Africa and one of the top ten oil producers in the world. The Nigerian economy, on the other hand, is both resource-rich and resource-dependent. Nigeria's economy is heavily reliant on the fortunes of oil. Since the early 1970s, oil has been responsible for large macroeconomic fluctuations in Nigeria, which have had an impact significantly on the overall feat of the economy. The high volatility of international oil prices, which was transmitted into the Nigerian economy, was the major contributing factor accounting for the business cycle in the Nigerian economy during that period. Figure 1(a) shows that the price of oil increased by more than 400% in 1974, from $1.90 in 1972 to $10.41 in 1974. The price of oil increased further in 1980, reaching $102.62 in 1980 and $111.67 in 2012.

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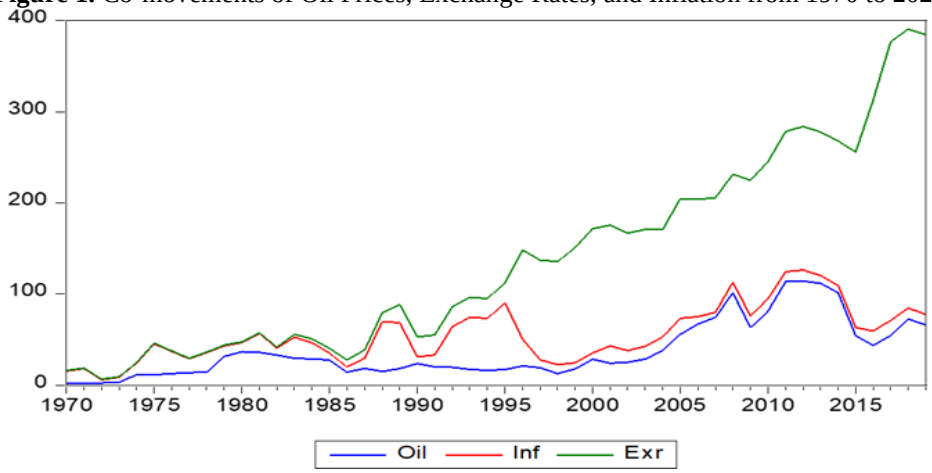
Figure 1. Co-movements of Oil Prices, Exchange Rates, and Inflation from 1970 to 2020

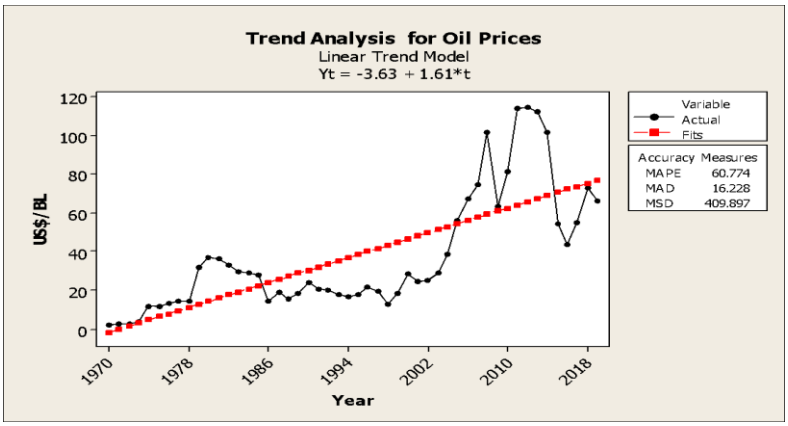


However, most increases in oil prices resulted in a downward trend; for example, the collapse of the international oil market during the 1980s saw oil prices fall to $17.91 in 1988 from their early 1980 levels. Despite a price recovery in 2012, prices eventually fell to $52.39 in 2015.

One of the recent developments in the International Oil Market (IOM) is the current Covid-19 pandemic, which has resulted in global lockdown measures to contain the spread of COVID-19, causing an unprecedented shock to global oil demand. The drop in global oil demand caused the IOM to fail, resulting in a drop in international oil prices from $18/barrel to a historic minus $37/barrel.

Figure 2. Trends in Oil Prices, Exchange Rates, and Inflation from 1970 to 2020

(A)



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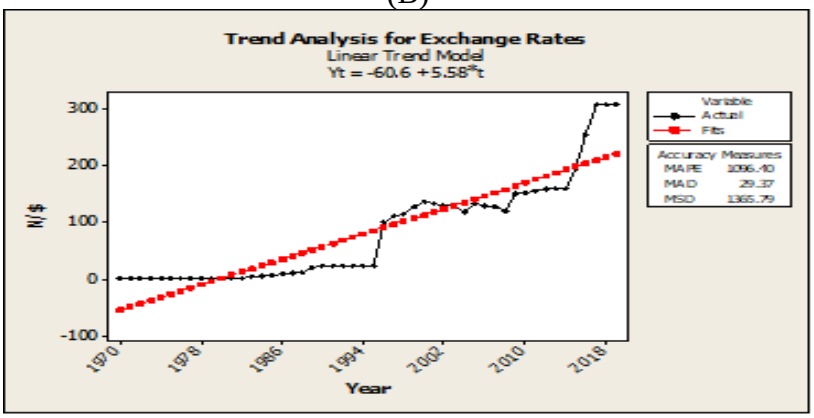
(B)



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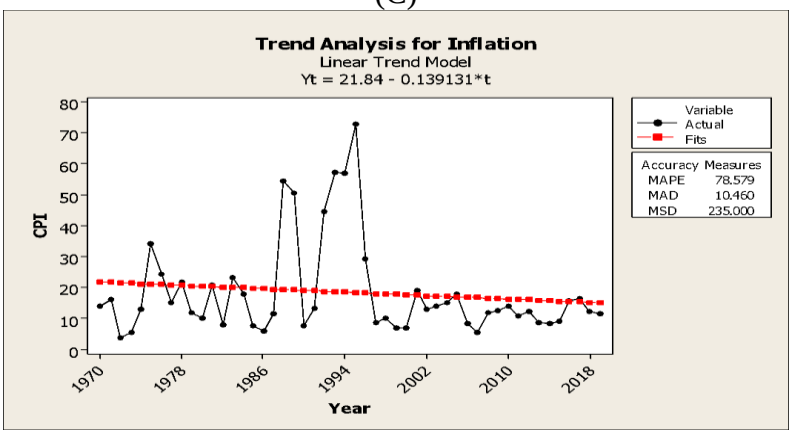

Source: Authors' computation via Minitab 16

These historical swings in international oil prices caused a spillover from the oil sector into the rest of the Nigerian economy, including a large transfer of wealth in dollars from oil exports, which also resulted in high real exchange rate appreciation and a high rate of inflation. Nigeria maintained a fixed exchange rate regime to protect the naira from exchange rate fluctuations from its independence in 1960 until the introduction of the Structural Adjustment Program (SAP) in 1986. Figure 1(b) depicts an average of N 0.85 / $1.00 during the pre-adjustment period from 1970 to 1985 when the nominal value of the Nigerian naira was stronger than the US dollar. The influx of foreign exchange from oil sales contributed to the naira's strong value. Even during the early 1980s economic crisis, which resulted in a sharp decline in foreign exchange earnings, Nigerian policymakers did not see devaluation as a viable option. The 1982 economic crisis accorded with the escalation of

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parallel markets, resulting in Nigeria having a prohibited floating rate in parallel markets coexisting with an official rate (Pinto, 1987).

As the economic crisis worsened, the government resorted to abandoning the previous fixed exchange rate regime to implement a market-determined regime. As a result of this policy, the naira fell to N2.413/$1.00 and then to N 7.901 against the US dollar in 1987 and 1990. The government later implemented a deregulation policy which nailed the Naira at N21.886 against the dollar; additionally, the Naira was devalued to N86.322 and N131.5 to the dollar between 1999 and 2008, and by early 2017, the nominal value of the Naira had depreciated to around N350.00/dollar. However, the crash of the international oil market during the Covid-19 crisis in international oil prices caused the Nigerian exchange rate to depreciate further from around N360/$1.00 to over N500/$1 and the rate of inflation to rise from 11.4 per cent in 2019 to 13.39 per cent in 2020. (CBN, 2020).

The combined effects of fluctuating oil prices, which resulted in an influx of petrodollar oil revenue, and an overvaluation of the domestic currency also had an impact on domestic prices of goods and services in Nigeria during the period under review. According to Figure 1(c), the combination of these factors resulted in an increase in inflation from about 10% in 1970 to about 33.7 per cent in 1975, indicating the effect of the 1974 oil crisis, which brought a large amount of petrodollar to Nigeria, resulting in an increase in domestic money supply through the Udoji Salary Awards and a construction boom in the face of insufficient commodity supply due to an unprecedented rise in aggregate demand. Inflation, on the other hand, fell to 22 per cent in 1978 and peaked at 72.8 per cent in 1994. Despite a significant decline over the last decade, the CBN's single-digit inflation target has remained elusive. For example, inflation rates in 2000, 2002, 2010, and 2011 were 15.4, 12.2, 12.1, and 10.3 per cent, respectively (Zubair, A., et al, 2013), rising to 16 per cent in 2017 and dropping to 11 per cent in 2019. By 2020, the inflation rate was around 17 per cent.

Overvaluation of the naira and large influx of oil revenues during the pre-adjustment period resulted in the crowding out of investable resources from real tradable sectors to non-tradable service sectors, resulting in a "Dutch disease" in Nigeria. According to Pinto, (1987) overvaluing the Naira relative to price changes will result in factors of production budging away from the resource-based sector (the resource-movement effect) which increase the demands of the non-tradable good (spending effect), and favors the appreciation of real exchange rate.

Throughout the period of this study, the movement of inflation in Nigeria has been erratic. The trends in inflation are, arguably, a reflection of multiple factors. For example, during the initial period of the study, the economy was monetized as a result of an influx of crude oil revenues during

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three successive global oil shocks led to an increase in the supply of money in the economy. This results in crowding out of investments from tradable to non-tradable sectors, as well as the migration of labour from rural agrarian sectors to urban service sectors, drawing out resources from the tradable sector to the non-tradable sector, causing the non-tradable output to rise while tradable output to fall. The resulting decline in the tradable sector is known as "All of this created an excess demand for tradable goods, but the supply of goods from the weak manufacturing sector could not adjust to meet the excess demand, resulting in a sharp rise in prices. Furthermore, since the late 1980s, the domestic productive capacity of Nigerian refineries has declined significantly; by 2019, nearly 90 per cent of the domestic consumption of petroleum in Nigeria was imported.

The depreciation of the naira during and after the Structural Adjustment period raises the prices of mostly imported intermediate and final goods (exchange rates pass through domestic prices); arguably, in addition to oil prices, nominal exchange rate depreciations are likely to be an additional factor that accelerates inflation in Nigeria. From the above analysis, it is clear that oil prices, exchange rates, and inflation are important factors for domestic economies, especially for Nigeria. The volatility of oil prices and exchange rate fuelled domestic prices and made Nigeria's economy both fiscally and externally vulnerable, apart from the influx of petrodollar to Nigeria during the oil price increase, the performance of Nigeria's terms of trade has also become synonymous with the movements of international oil prices; in most cases except during and years immediately follows oil price shocks, the country has recorded balance of payment deficits.

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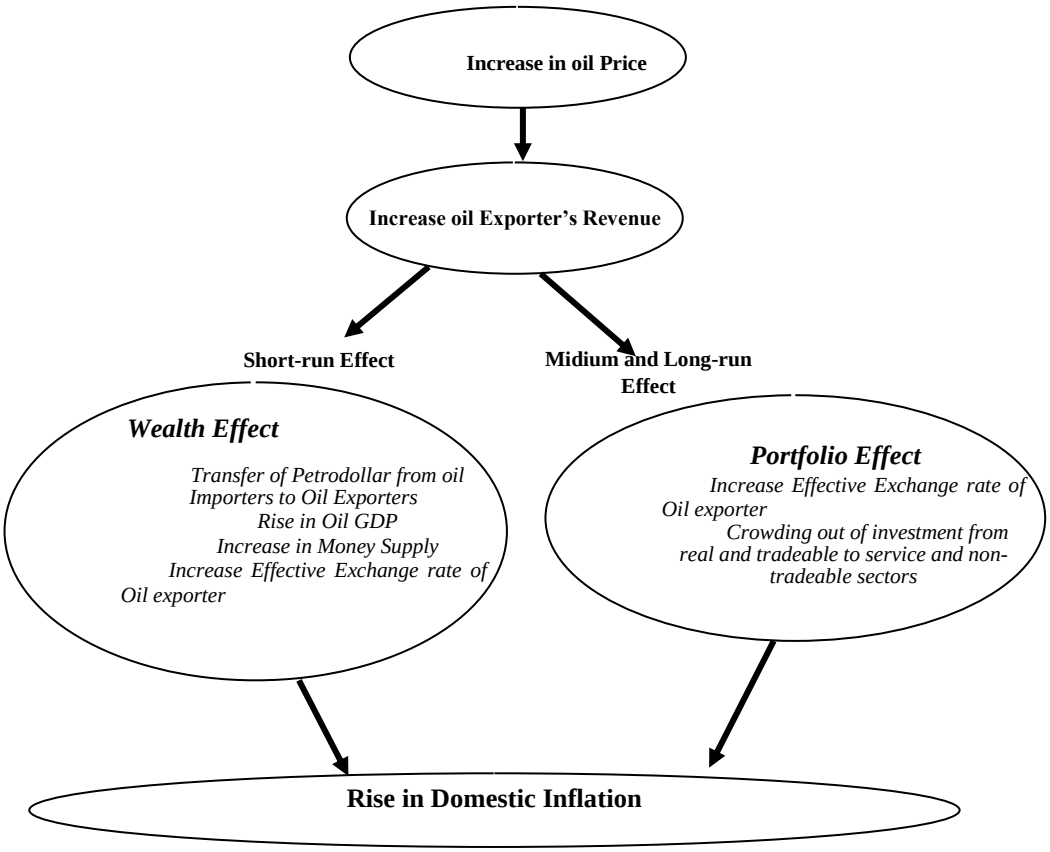

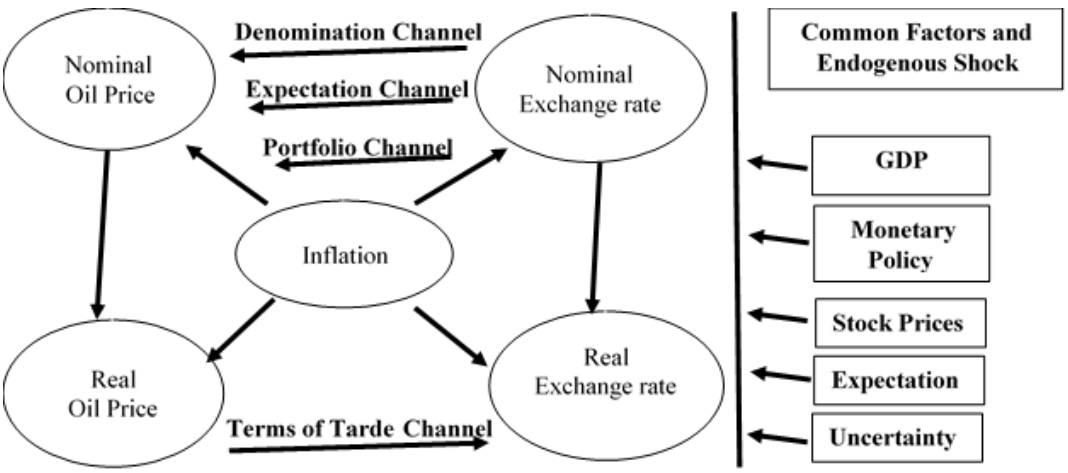

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Figure 3 a & b. Frameworks for Examining the Effects of Rising Oil Prices on Nigerian Exchange Rates and Inflation

A considerable number of literature backs the theoretical prediction of supply-side shock models that growing oil prices lead to rising domestic inflation and lower output. According to Kilian, (2014), the two transmissions mechanism through which crude oil prices impact economic activities such as exchange rate regimes and domestic inflation in both oil-consuming and producing countries are the supply and demand channel. Interestingly, Nigeria has been one of Africa's major crude oil exporters for nearly three decades, importing approximately 70% of its domestic requirements for refined petroleum products. In essence, the analysis of the effects of oil price shocks on the Nigerian economy must be done with caution.

Review of the Empirical Literature

More than a few studies have attempted to analyze the effect of oil prices on fluctuations in the exchange rate and inflation in both oil-producing and oil-consuming countries (see Joscha, et al., 2020; Ahmad, et al., 2020; Alley, 2018; Wena, et al., 2020; Shangle & Solaymani, 2020). The dynamic connection between the fluctuations in the prices of goods and the variability in the exchange rate in an open economy has piqued the curiosity of researchers and policymakers alike. The theoretical linkages between the prices of crude oil and the exchange rates are the terms of the trade conduit introduced by Amano and van Norden (1998a,b) and (Bénassy-Quéré et al., 2007) is intended to link oil prices with exchange rates. First, disposable income is positively influenced by an increase in commodity prices, resulting in a rise in the demand for tradable and non-tradable commodities and raising the exchange rate; it will also lead to rising demand for imports. Second, the surplus in Balance-of-payment and accrued foreign reserve tends to be positively influenced by an increase in commodity prices. Mandoza (1995, and Chen, (2004). observed that terms-of-trade shocks account for about 45% to 65% of the observed change in GDP and exchange rates in developing countries. Also, Chen and Rogoff, (2002) also state that shows that a rise in the global price of a country's commodity exports will put forth upward pressure on its real exchange rate via its impact on wages and demand for non-traded goods. In the words of Armano and Norden (1998, 2010), government expenditure rises due to a rise in petro-dollar revenue, money supply increases, and demand for real money balance also increases leading to an increase in income distribution. However, inflation prevails only when the quantity of money supplied is larger than the quantity of money demanded. Also, Armano and Norden (1998) discovered a long-run relationship between exchange rate and oil prices and a Uni-directional causality running from crude oil prices to

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exchange rate. After examining the exchange rate and oil prices nexus in Nigeria, Osuji (2015) found oil prices affecting the exchange rate significantly, and evidence of Uni-directional causality running from crude oil prices to the exchange rate, and to foreign reserve. And that implies that the exchange rate appreciates, and foreign reserve boost after a unit increase in oil prices. In Nigeria, movements in real oil prices and real and effective exchange rates have a positive linkage; in which a unit increase in crude oil prices has a positive and significant impact on the real and effective exchange rate in Nigeria (Olomola & Adejumo). Moreover, after employing the threshold and momentum threshold model in studying the connection and asymmetric adjustment between real oil prices and a bilateral real exchange rate in 12 countries; Ahmad and Ricardo (2013) found the variables cointegrated in 6 of the countries, while 4 countries proved cointegration as well as asymmetric adjustment.

The impact of the nominal oil price on inflation

When the crude oil price increases in the international oil market, retail oil marketers will swiftly raise the pump price in order to uphold their habitual profit margin and avoid losses. Because refined oil is assumed to be one of the factors of production for industrial products. Therefore, an increase in oil prices will lead to an increase in the cost of production and quite a number of products will rise, hiking the producer and consumer prices (PPI and CPI, respectively). Energy (oil), along with labor and capital, is considered a key input into the production process that transforms factors of production into goods and services (Nordhaus, 1980). As a result, a unit increase in the cost of energy will pass through to production costs, to domestic prices of finished goods. The effects of crude oil price shocks can be replicated to some magnitude by the reactions of raw material procurement costs and product ex-factory prices to variations in oil prices (Huiming, & Xiuyun, 2019). Furthermore, theories assert that if all things are equal, higher or lower crude oil prices will result in a higher or lower cost of operation in many industrial enterprises, and the rise in production costs will be passed on to finished goods prices. Exorbitant prices of oil in the global market translate to increases in production costs, leading to a shortage in the aggregate supply of goods and services, resulting in inflation a and fall in production.

Furthermore, rising oil prices, whether sudden or expected, will increase oil-based revenues for oil-producing economies, which will consequently, increase the money supply, which increases government expenditure due to an increase in petro-dollar revenue, which will lead to an increase in money supply and real income in the system, then translate to inflation (Pinto, 1987). (2016). Similarly, Choi et al. (2018) state that Nigeria is supposed to have the lesser impact of fluctuations in the world oil prices on

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domestic inflation because of the huge energy subsidy it used to give. Researchers discovered oil price dynamics to be the reason for economic slumps and inflation in many countries over the last few decades (Lu, Carib, & Hamonic). As a result, a unit increase in the prices of crude oil will pass through to the cost of production and transportation of raw materials and finished goods, and this will invariably be passed onto prices of finished goods, particularly when demand for such products is inelastic (Humming, & Chen, 2019).

All things being equal, increases or decreases in the prices of crude oil will result in rising or fall in the cost of operation in most industries. The increase in production costs will be passed on to finished goods prices. Hikes in the cost of production are related to increases in the prices of crude oil in the international oil market, which reduces aggregate supply, and results in inflation and falling output (Nusair, 2019). In line with theoretical postulations, Sirag (2018) used the NARDL approach to detect asymmetries in the correlation between oil prices and inflation. The findings showed a significant nonlinear impact of oil prices on inflation, but the negative oil price showed no significant effect on inflation. The NARDL model was used by Davari and Kamalian, (2018); Nusair, (2019); Bala and Chin, (2018); Renou-Maissant, (2019); Shitile and Usman, (2020); Agboola et al., (2020) to examine the relationship between crude oil price shocks and inflation rate. The results revealed an asymmetric effect of crude oil price shock on inflation, and the effect of rising crude oil prices is larger than the effect of falling crude oil prices on inflation. Wang et al., 2019 used the New Keynesian DSGE model on the Chinese economy, consisting of oil demand to examine the impact of crude oil price shocks on the business cycle in China. The model revealed oil prices have a significant influence on income and investments in China. Chen, (2020) used the TVP-SVAR-SV model to disintegrate the shocks of crude oil price fluctuations into four parts, and the result showed that the pass-through effects of the four fluctuations of oil price shocks on inflation in China at each stage are time-varying, with significant variations at different time horizons.

4. Empirical Methodology and Data

Where the *inf* is inflation (proxied by a consumer price index), *oil* is the bonny light oil price, while *exr*, stance for the nominal exchange rate (N/US$). The *exr* is included becuse, it is dynamic has a significant connection with macroeconomic variables (Udeaja and Isah, 2019; Ha, Stocker and Yilmazkuday, 2019); and Nigeria is an inflation targeting and open economy adopting the flexible exchange rate regime. Furthermore, the study included *r* as for interest rate because, high-interest rates induce inflation, as such equation (1) is re-specified in equation (2)

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$$inf = f(oil, exr, r) \tag{2}$$

First, we look at the linear ARDL model because, before specifying the NARDL model, it is ideal to specify the linear ARDL model. After the bounds testing process (Pesaran & Shin, 1998; Pesaran *et al*., 2001), the linear ARDL specification of the linear ARDL models can be pictured as follows and note that all variables are in log forms (*L*):

$$\Delta LINF_t = \mu + \alpha_1 LINf_t + \alpha_2 LEXR_{t-1} + \alpha_3 LR_t + \alpha_4 LOIL_{t-1} + \sum_{t=1}^{p-1} \gamma_1 \Delta LINf_{t-1} + \sum_{t=1}^{q-1} \gamma_2 \Delta LEXR_{t-1} + \sum_{t=1}^{q-1} \gamma_3 \Delta LR + \sum_{t=1}^{p-1} \gamma_4 \Delta LOIL_{t-1} + \epsilon_1 \tag{3}$$

In which; α_1, α_2, α_3, and α_4 represent long-run equations while, γ_1, γ_2, γ_3, and γ_4 are the short-run equations of Δ*LINF*, Δ*LEXR*, Δ*LR* and Δ*LOIL*, respectively, for inflation, exchange rate, interest rate and oil prices. μ represents the constant term, *p* and *q* are lag orders of the dependent and 0…d independent variables. The long-run cointegration in the ARDL model is selected using the optimal lag length which is based on *Akaike, Schwartz or Hannan Quin criteria.* The null hypothesis (H_0) of no levels relationship is defined as H_0: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = 0$. Therefore, equation (3) can be re-specified in order to capture the error correction mechanism in equation (4).

$$\Delta LINF_t = \delta + \mu\lambda_{t-1} + \sum_{t=1}^{p-1} \gamma_1 \Delta LINF_{t-1} + \sum_{t=1}^{q-1} \gamma_2 \Delta LEXR_{t-1} + \sum_{t=1}^{q-1} \gamma_3 \Delta LIR_{t-1} + \sum_{t=1}^{q-1} \gamma_4 \Delta LOIL_{t-1} + \epsilon_1 \tag{4}$$

Where δ stance as the constant term, μ is the linear parameter of speed of adjustment and λ_{t-1} is the error correction model. However, equations (3) and (4) represent the symmetry ARDL. Before carrying on with the NARDL specification, it is fitting to introduce a nonlinear long-run cointegrating equation which is presented in equation (5) and the partial positive and

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negative sum decomposition for rising and falling effects within the variables are presented in equations (6) and (7).

$$y_t = \beta^+ X_t^+ + \beta^- X_T^- + \mu_1 \tag{5}$$

For the positive partial sum

$$X_t^+ = \sum_{t=1}^{t} \Delta x_t^+ = \sum_{t=1}^{t} \Delta x_t^+ \, max(\Delta x_{t,} 0) \tag{6}$$

And for negative partial sum

$$X_t^- = \sum_{t=1}^{t} \Delta x_t^- = \sum_{t=1}^{t} \Delta x_t^- \, min(\Delta x_{t,} 0) \tag{7}$$

The nonlinear ARDL can be re-specified to capture asymmetries (NARDL) as indicated in the following equations.

$$\begin{aligned} \Delta LINF_t = {} & \mu + \partial LINF_{t-1} + \varphi_1^+ LEXR_{t-1}^+ + \varphi_1^- LEXR_{t-1}^- + \varphi_1^+ LOIL_{t-1}^+ \\ & + \varphi_1^- LOIL_{t-1}^- + \varphi_3^+ + \varphi_3^- LR_{t-1}^- + \sum_{t=1}^{p-1} \gamma_1 \, LINF_{t-1} \\ & + \sum_{t=1}^{q-1} \delta_t^+ \, \Delta LOIL_t^+ + \sum_{t=1}^{q-1} \delta_t^- \, \Delta LOIL_t^- + \sum_{t=1}^{q-1} \partial_t^+ \, \Delta LEXR_t^+ \\ & + \sum_{t=1}^{q-1} \partial_t^- \, \Delta LEXR_t^- + \sum_{t=1}^{q-1} \varphi_t^+ \, \Delta LR_t^+ + \sum_{t=1}^{q-1} \varphi_t^- \, \Delta LR_t^- \\ & + \epsilon_1 \end{aligned} \tag{8}$$

Note in equation (8), only the independent variables are structured into X_t^+ and X_t^- but the dependent variable is in a single form. However, equation (8) will be re-specified to introduce the error correction model in equation (9).

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$$\Delta LINF_t = \mu + \partial\eta_{t-1} + \sum_{t=1}^{p-1} \gamma_1 \, LINF_{t-1} + \sum_{t=1}^{q-1} \delta_t^+ \, \Delta LOIL_t^+ + \sum_{t=1}^{q-1} \delta_t^- \, \Delta LOIL_t^- + \sum_{t=1}^{q-1} \partial_t^+ \, \Delta LEXR_t^+ + \sum_{t=1}^{q-1} \partial_t^- \, \Delta LEXR_t^- + \sum_{t=1}^{q-1} \varphi_t^+ \, \Delta LR_t^+ + \sum_{t=1}^{q-1} \varphi_t^- \, \Delta LR_t^- + \epsilon_1 \quad (9)$$

In which μ stance for the constant term, while η_{t-1} is the asymmetry error correction model and ∂ is the coefficient of the speed of adjustment. The pretesting of the long-run cointegration is similar to that of linear ARDL using the F-distributed bound test. Though, the NARDL test of asymmetries (to find out whether the independent variables have a nonlinear relationship with the dependent variable in both the long and the short run) is carried out using F_{pss} of Pesaran, et, al. (2001) which conduct the hypothesis of no-co-integration (H_0: $p = \pi^+ = \pi^{--} = 0$). The t_{BDM} test is used to for asymmetries in long-run and short-run terms which is conducted by testing the null hypothesis of no long-run asymmetries ($\delta^+ = \delta^{--}$, *where* $\delta^+ = -\pi^+/p$, *and* $\delta^- = -\pi^-/p$); and the null hypothesis for short-run asymmetries ($\sum_{J=1}^{n_1} \delta_t^+ = \sum_{J=1}^{n_1} \delta_t^-$).

The previous dissimilarity between positive and negative changes is essential for at least two reasons. First, the impact on inflation is not necessarily of the same amount as positive and negative changes. Second, oil price increases and decreases are not understood in the same way by monetary authorities.

Empirical Data

The variables used in arriving at the analysis of the oil pass-through are: (i) Consumer Price Index (P), (ii) the Bonny light Oil price, and (iii) the nominal and effective exchange rate defined as naira per unit of US dollar. The data are sourced from the International Monetary Fund (IMF) *International Financial Statistics (IFS), 2021*edition.

Descriptive Statistics for the Oil price, Exchange rates and inflation

A	B	C

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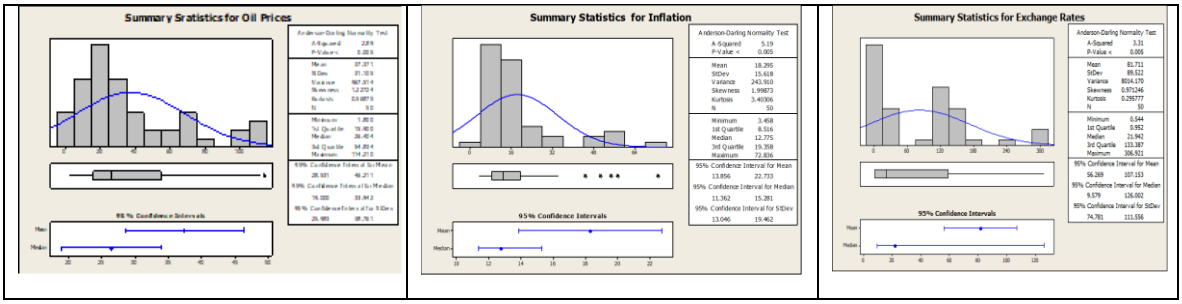

Figure 4.
Source: Authors' computation

Figure (a, b & c) showed the synopsis of statistics for the data utilized in the study. All the variables (OIL, EXR and INF) have high small mean values, implying a quite robust distribution. Also, the corresponding standard deviations for all the variables, except EXR, are quite small, indicating that the analysed values of the variables are quite close to their true values. Besides, the skewness of the distribution for all the variables is inside the acceptable limit of -3 to +3. Again, the skewness measures shows that all the variables are positively skewed (to the right). This insinuates that the datasets utilized in this study are asymptotically normally distributed as suggested by the normality curve in the respective figures.

5. Results and Discussion

A preliminary analysis which is the test of unit root conveys if the dataset in question has stationarity. Stationarity has three different stages which are: I(0), which is stationary at levels; I(1), stationary at the first difference; and I(2) stationary at the second difference, respectively. In all cases, dataset which is stationary at the second difference is to be disregarded because using it may cause spurious regression analysis. The Philips and Peron (PP) stationary check was employed as it modifies the non-parametric test equation. And it also modifies an unspecified heteroskedasticity and autocorrelation. The unit root result is presented in table 1, where the null hypothesis, H_0 states that the series has unit root against the alternative hypothesis that the series has no unit root. However, all the variables are stationary after the first difference test I(1), except for inflation which is also the regressand in the model is stationary at levels I(0). The NARDL model condition before employing it is that there must be no presence of second difference I(2) therefore, employing the NARDL model is warranted.

Table 1. PP unit root test

Variables	Levels	First difference	Order
Exchange rate	1.142231	-4.63371	I(1)
Oil price	-1.57992	-5.93626	I(1)
Inflation	-3.20423	--	I(0)

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Interest Rate	-2.27498	-7.4136	I(1)

Source: extracted from eviews10. Note: the unit root test is conducted using intercept only and at a 5% critical value. further, the optimal lag is based on the Akaike Information Criterion

Table 2. Bound test for Non-linear co-integration

Critical values	Upper bound	Lower bound	F-statistics
10%	3.23	2.12	6.261389
5%	3.61	2.45	
2.5%	3.99	2.75	

Source: extracted from eviews10. Note: the H_0 suggests no level relationship/cointegration. When the f-statistics is greater than the upper-bound at 5%, then reject the H_0 and conclude that there is a levels relationship/cointegration but, once the f-statistics is less than the lower-bound at 5%, then accept H_0 and conclude that there are no levels relationship/cointegration in the model.

Table 2 is for the result of the F-bound test of levels relationship or cointegration. From the result of the bound test, the f-statistics is larger than the upper-bound at 10, 5, and 2.5 per cent critical values which means that long-run relationship exist in the model in which the short-run model and the error correction mechanism can be estimated.

Table 3. Long-run model

Variable	**Coefficient**	**t-Statistic**	**Prob.**
LOIL_POS	-2.42	-3.9677	0.0005
LOIL_NEG	-2.1564	-4.1709	0.0003
LR_POS	0.84246	2.49387	0.0196
LR_NEG	0.85212	1.28046	0.2121
LEXR_POS	-0.2887	-1.5618	0.1309
LEXR_NEG	-16.656	-3.6396	0.0012

Source: extracted from eviews10

Table 3 is the long-run estimate and the result shows that positive and negative oil prices have negative effects on inflation in Nigeria over the period of the study. The result indicated that inflation slowdown by about 2.42 per cent for every rising oil shock, but upswing by about 2.16 per cent, for every falling oil shock in Nigeria. Although the coefficient of positive oil price (*LOIL_POS*) does not conform to the apriori expectation, however, it is theoretically underpinning. When oil price rises, the demand for oil falls only by a lesser amount. This is due to the inelastic nature of demand for oil. This means that revenue from oil is likely to increase with increase in oil prices. An increase in oil revenue is expected to increase government expenditure and aggregate demand. When aggregate demand rises at full employment (where aggregate supply cannot change significantly), there will be upward pressure on the general price level which eventually transmits to inflation in the economy.

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However, falling oil price upswings inflation by about 2.16 per cent. When price of oil falls, given inelastic demand for oil, the demand of oil will increase by sizeable amount. This means that being an oil-dependent country, falling oil price in Nigeria is likely to cut back revenue from oil. This reduces fiscal petro-dollar revenue to the government, and that will lead to the shrinking of influx cashflow to the foreign reserve account, which could lead to depreciation of foreign exchange, to high cost of importation, and acccelerates cost of production, and further exert an absolute pressure on prices of goods and services in the economy. Hence, falling oil price has the tendency to fume inflation. However, what could be inferred from the estimated coefficients of oil price is that the effect of rising oil prices (2.45%) on inflation is larger than the effect of falling oil prices (2.16%) on inflation in Nigeria over the study period. This finding agrees with Bala and Chin, (2018), Renou-Maissant, (2019), and Shitile and Usman, (2020) in their separate studies.

The result also shows that rising interest rate increases inflation by 0.84 per cent while falling interest rate decreases inflation by 0.85 per cent but insignificant. This implies that the effect of negative interest rate on inflation is higher than its positive effect on inflation, though, by a smaller amount of about 0.01 per cent. Both the effect of rising and falling interest rate on inflation does not conform to apriori expectation. This is because, one of the way the monetary authority in Nigeria reduces inflation is by increasing official policy rate or reducing it. Even though, an increase in policy rate leads to instantaneous increase in bank lending rate which then transmits to interest rate (the cost of borrowing for investment). With rising cost of borrowing, investors are discouraged from undertaking loans for investment. This reduces the amount of liquidity in the economy and brings downward pressure on inflation. But this findimg proves that increasing the interest rate during rising prices of goods and services by monetary authorities will fuel inflation. A classical example is the year 2022 where inflation rose on monthly basis throughout, while on the other hand, the monetary authority keep on raising interest rates. In first half of the year, inflation was around 18.2 per cent but after december inflation rose to 21.34 per cent. Meanwhlie, the Central bank raised the interest rate from 13 per cent in July, to 14.5 per cent September, to 16.5 per cent in December (NBS, 2022). This agrees with Alfa (2019) in his study on long-run impact of interest rate, exchange rate and inflation on private sector investment in Nigeria.

However, appreciation of exchange rates decreases inflation, while depreciation of exchange rate inreases inflation, though the effect of appreciation of exchange rate on inflation is insignificant. The result shows that inflation falls by about 0.29 per cent when exchange rate is appreciated by one per cent but rises by about 16.7 per cent when exchange rate is

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depreciated. This logically implies that depreciation of exchange rate has much and significant effect on inflation than the appreciation of exchange rate in Nigeria over the period of this study. This finding does not confrom to the theoretical postulate that when domestic currency is devalued, exports from the domestic economy becomes cheaper while imports become dearer. This equally implies that the demand for export will increase and revenue from exports will also increase. If the proceeds from exports are judiciously used to enhance the productive capacity of the economy, the multiplier effect on general price level is likely to create a downward pressure on inflation in the economy. However, the success of this exchange rate policy trust depend largely on the elasticity of demand for import and for export. Where import is highly elastic but export highly inelastic, as is the case in Nigeria, such exchange rate policy is likely to fail.

Table 4. Short-run model

Variable	Coefficient	t-Statistic	Prob.
C	1.921335	6.39735	0.0000
D(LOIL_NEG)	0.754755	1.580393	0.1266
D(LOIL_NEG(-1))	1.890035	3.296985	0.0029
D(LR_NEG)	-0.20793	-0.29773	0.7684
D(LR_NEG(-1))	-1.35223	-1.93794	0.064
D(LEXR_POS)	0.202268	0.88703	0.3835
D(LEXR_POS(-1))	-0.3235	-1.42617	0.1662
D(LEXR_POS(-2))	-0.49245	-2.07909	0.048
D(LEXR_NEG)	-7.93962	-1.93019	0.065
$ECM_t(-1)$*	-0.914223	-7.37217	0.000

Source: extracted from Evies10

Table 4 is the short run results of NARDL model. The results in table 4 shows that falling oil shock has a negative and significant effect on inflation, while falling interest rate has positive and significant effect on inflation. But for rising exchange rate, the effect on inflation is positive and significant; but falling exchange rate has a significant positive impact on inflation. The error correction mechanism (ECM_t) is statistically significant and negative which means that for every disequilibrium, in the long-run, there is going to be automatic convergence in the model (Dhungel 2014). The study went ahead to estimate the asymmetry relationship in which it found that in the long run, all the variables have a nonlinear relationship with inflation.

Table 5. Asymmetric relationship

Variables	F-statistics	Chi-square	Probability
Oil price	17.19611	17.19611	0.0002
Exchange rate	21.28678	21.28678	0.0001
Interest rate	5.007226	5.007226	0.0252
Serial Correlation	1.406757	10.29318	0.1128

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Heteroskedasticity Test	0.566009	0.586522	0.4438
Ramsey RESET	0.038101	-	0.8465

Source: extracted from Evies10. Note: the hypotheses of the Asymmetry test are that: H_0 states that there is no asymmetry relationship at a 5% critical value. While the diagnostic tests hypotheses are also tested at a 5% critical value.

Moreover, table 5 presents the asymmetric relationship together with the post estimation result. In the case of all the three variables (oil price, exchange rate, & interest rate) the null hypothesis of no-asymmetries is rejected. This implies that there is asymmetric or nonlinear relationship in the study. However, post estimation tests were conducted on the model, whereby the serial correlation with the null hypothesis of no-serial correlation is accepted using the Breauch-Godfrey LM test. The RAMSEY RESET cleared the model from having model misspecification error, while the null hypothesis of homoscedasticity was not rejected using the ARCH test which means, the residuals have equal variation.

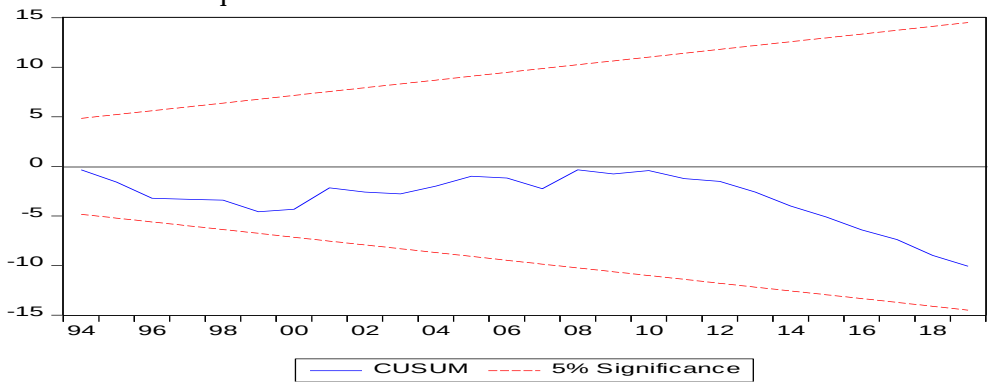

Figure 5. *CUSUM test*
Source: extracted from Evies10

Figure 5 is the CUSUM test (Cumulative Sum) for the structural stability test using Brown et. al, (1975) approach. The figures indicate that the model is stable at a 5% critical value (the two blue lines are critical bound within 5% and the red line is moving within the bound). The asymmetry dynamic multipliers are presented in the figure which shows the adjustment of inflation to long-run equilibrium after a positive or negative oil shock and rising or falling exchange rate. However, the magnitude at which rising oil prices affect inflation is greater than the magnitude at which falling oil prices affect inflation and it takes less than a year to adjust or converge to the long-run multipliers after a positive or negative unitary oil shock. Also, the impact of a depreciating exchange rate is greater than the impact of an appreciating exchange rate on inflation and it takes more than a year for inflation to adjust

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or converge to long-run multipliers after a falling or rising exchange rate regime.

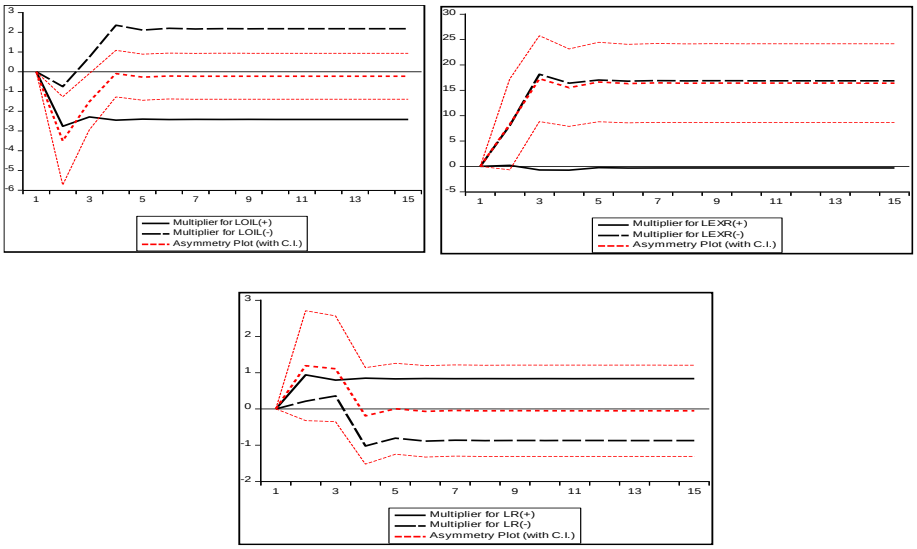

Figure 6. Dynamic Multipliers

Conclusion and policy implications

This study employs the linear autoregressive distributed lag(ARDL) model to examines the asymmetric pass-through effect of oil prices and exchange rate on inflation in Nigeria from 1970 to 2020. Shortrun and long-run asymmetries are introduced in the models via positive and negative partial sum decompositions of the price of oil. The study find positive long-run relationships, implying that positive changes in oil prices has greater effect on inflation than the negative changes in oil prices; and that also implies that, in the long-run, the effect is greater than in the short-run.

Overall, the results suggest that, in the long-run, positive oil price changes have a considerably larger impact on consumer prices and exchange

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rates than negative changes, and that the pass-through effect of oil price on domestic inflation is incomplete. Given our findings in this paper, we may conclude that excess fluctuations in the price of oil will lead to volatile exchange rates and consumer prices and volatile inflation, which may exert challenges on policymakers. In fact, inflation and exchange rates rates in the Nigeria have been volatile over the sample period as indicated in Figure 1

The implication of rising oil price is increase in oil revenue leading to increase in the number of barrels sold thereby translating to economic growth. For the interest rate, the reaction of exchange rates to rising and falling interest rate is indifferent, implying that exchange rates appreciate regardless of whether the interest rate rises or falls.

Also, the long-run result shows that depreciation of exchange rate has much and significant effect on inflation than the appreciation of exchange rate in Nigeria over the period of this study. The implication of this finding is that, in Nigeria where import is highly elastic but export highly inelastic, depreciation of her currency may not be an optimal exchange rate policy trust for the country.

Additional important policy implication of our findings is that Nigeria should take serious steps to reform the various subsidy programs that have been in place for decades now. Reforming subsidy programs can reduce price distortions, which can reduce inefficiencies and production costs.

Another important policy implication of our findings is related to economic diversification. Nigeria economy heavily depend on oil export revenues and therefore, lack economic diversification. Consequently, Nigeria depend heavily on the outside world for the supply of most of goods and services. As importer of refind products, this will transmit into rising domestic cost of production. Thus, when oil prices are rising, import prices will increase and, in order to keep domestic prices stable, nigerian government have been providing subsidy to avoide backlash from public and trade unions at the expense of providing infrasyructure and social services.

The current initiative by the government on total subsidy withdrawal, will reduce budget deficits, encourage investiments into oil industry and rove more revenue for infrastructure and social services.

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Dividend Pay-out Policy and Share Price: A Study of Listed Firms in Morocco

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Abstract

The main purpose of this study is to examine the relationship between dividend policy and financial performance in Morocco stock market. The panel data regression method is used to analyze the relationship of share price with dividend per share. This study presumes that dividend policy has an effect on the share price in Morocco. Also, it assumes that companies that pay dividends tend to have a higher financial performance than those that do not. On the other hand, companies that do not distribute dividends are more indebted and have a smaller size compared to distributors. The results of the econometric analysis conducted indicate that the dividends distributed and the profits are found to be significantly positive for the financial performance of Moroccan companies.

Keywords: Dividend Policy; panel data; financial performance; dividend; business finance

Introduction

Dividend policy is one of the most debated topics in corporate finance. Moreover, many researchers have tried to find the missing pieces of this

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enigma as described by Black (1976). From another perspective, the dividend payout controversy is one of the top ten thorny issues in corporate finance (Brealey, Myers, & Allen, 2008). We must reconsider more advanced researches pushed in this field in order to improve the perception of this subject. In the same perspective, Modigliani and Miller (1961) presented a relevant argument on the impact of dividends on the value of the company. They show that whether or not a company pays a dividend does not affect its value; under the strict assumption that all investors are rational and markets are perfect. They reveal that the value of the firm is determined solely by the earning capacity of its assets. However, contradictory opinions have been expressed, indicating that the dividend policy has a positive effect on the value of companies. Proponents of this postulate Gordon (1963) and Lintner (1962) indicate that investors prefer high dividends to counter market imperfections (asymmetry of information and certainty). The theory developed by these authors suggests that shareholders - having an aversion to risk - prefer to receive cash dividends than to expect higher dividends in the long term.

Many researchers have focused on different types of market imperfections to explain why dividends are important in driving businesses. Arguments explain that the payment of dividends vary from one theorist to another. Among the most advanced arguments is the tax preference argument. According to this argument, investors enjoy favorable tax treatment on capital gains. This type of investor prefers companies that pay low dividends. This position contradicts that defended by Lintner and Gordon. Other explanations deal with the adversarial nature of the relationship between shareholders and managers; this is agency theory. In accordance with this theory, the interests of shareholders and managers diverge, hence the use of the dividend as a means of controlling them. This control is manifested by the reduction in liquid assets made available to managers (Rozeff (1982), Easterbrook (1984), Jensen (1986)). Still in the sequence of explanations relating to the imperfection of the market is projected the theory of signal. The contribution of the latter stipulates that dividends serve to communicate information to shareholders and other market participants (Bhattacharya (1979), John and Williams (1985).

Theories dealing with dividend policy have accompanied the evolution of the business environment. In this sense, we are witnessing the appearance of fairly recent theories (the theory of "catering" and the theory of the life cycle of the company and distribution) which deal with the subject. The first theory states that companies can adjust dividend policy over time to meet personal investor demand. If managers respond to investor demand, they will initiate or continue to pay dividends when investors prefer dividends, but fail to pay dividends when investors do not demand them (Baker & Wurgler, 2004b). According to the second theory, the optimal dividend distribution policy

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depends on both the evolution of companies' investment opportunities and the amount of internal funds retained (De Angelo et al., 2006). A young company faces a relatively large set of investment opportunities, but is not profitable enough to meet all of its financing needs with its own cash. In addition, it faces an array of hurdles in raising capital from external sources. As a result, the company will conserve its cash by foregoing the distribution of dividends to shareholders. Once the company reaches the maturity phase; the opportunities for its investments are reduced. Therefore, the company starts paying dividends to distribute its profits to the shareholders.

The theoretical context of dividend policy is rich by scientific production that clarifies the notion of performance and its link with the decision relating to the distribution of dividends. However, this subject arouses less interest in the countries of North Africa and even less in Morocco. Through this study, we will first try to understand and analyze theoretically and empirically the decisions relating to corporate dividends in Morocco. Secondly, we will seek to know if there is a link between these decisions and the financial performance of companies.

1. Literature review and formulation of hypothesis

1.1. Financial performance

Performance is at the center of the concerns of all companies. It can be presented as the action report. What makes this notion complex is the fact that it is assessed from several sides: economic, commercial, financial and social performance, etc. Thus, the existence of so many proposed conceptual models of performance allows each stakeholder to approach it as they see fit. It remains that this term is often surrounded by a semantic vagueness. In management, the word performance is declined in various ways. Thus, we will speak of the financial performance of a company measured by a certain number of ratios (ECOSIP, 1999). These indicators will be used to rank firms against each other.

It is interesting to point out that in the range of studies carried out until now on the link between financial performance and the dividend policy, we notice a great diversity of performance indicators (rate of return, share price, Tobin's Q, M/B, Earning per share, EBIT etc). In this study we use the share price to measure the financial performance of the company.

1.2. The dividend policy

Finance theories offer different perspectives on the relationship between dividend policy and firm performance, while empirical results are often divided into two perspectives; neutrality and non-neutrality of dividends. Modigliani and Miller's dividend neutrality proposition finds that firm value as a determinant of financial performance is not influenced by dividend policy

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in a perfect market. Studies by Peter (1996), Fersio et al. (2004), Geary and Moser (2004) support the neutrality thesis of the dividend policy. However, previous studies support the dividend non-neutrality hypothesis of Gordon (1962) and Lintner (1956) who state that dividend decisions are an active variable that can influence firm performance (e.g. : Asquith and Mullins (1983), Anand (2004), Amidu (2007), Al-Malkawi (2007) Ji-ming et al., (2009), Stiriba (2013) and M'rabet and Boujjat (2016)…) .

1.3. The debt policy

Indebtedness is another variable that has been widely used in later studies. A large number of studies have been conducted in various countries and sectors to assess the impact of debt on the financial performance of the company. However, there is no general consensus for a specific country or for a specific industry. For example, Laurent (2002) tests the relationship between these two variables in France, Germany and Italy. The study found mixed evidence by country; although significantly negative in Italy, the relationship between indebtedness and firm performance is significantly positive in France and Germany. According to Jensen (1986), debt financing increases the pressure on managers because it reduces the free cash flow available to them. Therefore, companies with the highest debt ratio should have the most incentive to improve their performance. However, according to Jensen & Meckling (1976), a higher debt ratio means higher agency costs due to divergent interests between shareholders and bondholders. So, it can be suggested that leverage may be negatively related to performance.

1.4. The profits made by the company

Profits are used as indicators of the profitability and efficiency of running a business. In this study, earnings will be measured by annual earnings per share for comparability purposes. Empirical studies suggest that earnings per share is one of the strongest factors affecting share price. The pioneers of studies on the determinants of stock prices were Collins (1957) and Gordon (1959). In their independent studies, the two identified profits as one of the factors influencing the course of action. In view of the above, we assume that there is a significant relationship between the share price and the profits made by Moroccan companies.

In light of the literature review on this topic, key explanatory variables have been identified as determinants of dividend policy: current and future earnings, leverage, stock price behavior, company size, industry and life cycle of the company.

Based on the analysis of our literature review, we formulated the following hypothesis.

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Hypothesis 1: There is a significant relationship between financial performance and the distribution of dividends.

Hypothesis 2: Debt has a negative effect on corporate financial performance.

Hypothesis 3: There is a significant relationship between financial performance and profits earned by the firm.

2. Research methodology and data

To test the above hypothesis and study the impact of dividend policy on the financial performance of companies listed on the Casablanca Stock Exchange, the study undertook empirical tests of the following variables:

- Financial performance was measured by share price. The latter is the price of a security which, at a given time, maximizes the number of securities traded. In the stock market, the price of stocks is ultimately determined by the interactions of the forces of demand and supply.

- The dividend policy measured by the dividend per share. DPS is the total amount of dividend allocated to each outstanding share of a company. The dividend per share is an important metric for investors because it gives them insight into how much income they could generate by investing in a particular company.

- The debt policy was apprehended through the debt ratio. This ratio was calculated manually since the measure was not available in official data or in annual reports. However, most companies include some form of debt ratio in their annual reports, but the variables included in the ratio vary differently from company to company. In our study, indebtedness is measured by the financial debt/equity ratio.

- The profits made by the company have been measured by earnings per share. The latter is the amount of outstanding earnings per share of each share of a company. Table 1 provides the definitions of all the variables used in our analysis.

Table 1. Unit measurement

Variables	Codification	Unit measurement
Financial performance	CA	Share Price
Dividend Policy	DPA	Dividend per share
Profits	BPA	Earning per share
The debt policy	EN	financial debt/equity ratio

Source : Authors

The econometric model to be tested for this link is as follows:

$$CA_{it} = \beta_0 + \beta_1 DPA + \beta_2 EN + \beta_{3_{it}} BPA + \varepsilon$$

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3. Data, descriptive statistics and preliminary analyzes

The empirical data relating to the study correspond to those collected from the companies listed on the stock exchange subject of the study, their processing is done through the use of the statistical software STATA 13.

3.1. Period and data collection

Our sample consists of 43 listed Moroccan companies. The period of the study extends from 2008 until 2016. This sample is in line with previous studies.

3.2. Descriptive statistics of the model variables

The sample companies in this model are classified into distributors and non-distributors of dividends for each year, during the study period. A total of 387 observations were analyzed over the 108 months of the study. Of this total amount, 63 of the observations were found to be non-dividend paying and the other 324 to be dividend paying.

Table 2. Dividend payment trend during the period 2008-2016 for Casablanca Stock Market

Years	Non-dividend distributors		Dividend distributors	
	Number of firms	Total number	Number of firms	Total number
2008	4	9	39	91
2009	4	9	39	91
2010	6	14	37	86
2011	12	28	31	72
2012	7	16	36	84
2013	5	12	38	88
2014	5	12	38	88
2015	7	16	36	84
2016	13	30	30	70

Source : compiled from our database

In the light of the data given in the table above, we note that the number of companies having paid dividends during the study period had shown stagnation until 2009, and then it had decreased thereafter. This can be explained, among other things, by the overall less favorable economic activity that characterized the 2009-2011 period. Thus, after 2012, it experienced a constant decrease reaching 4% in 2013 and 2014. The total number of non-distributors of dividends fell from 4 in 2008 to 12 in 2011, then to 13 in 2016. The increase in the number of companies that do not distribute dividends can be explained by the poor performance of the Moroccan stock market which is part of an unfavorable macroeconomic context.

Below are the descriptive statistics of the financial performance of the companies selected in our sample.

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Table 3. Descriptive statistics of the financial performance of all companies distributing and not distributing dividends

The financial performance of dividend distributors

	Min	Max	Standard Deviation	Average	Median
2008	17,10	6 450,00	1 131,36	842,04	489,00
2009	17,98	10 490,00	1 701,74	1 035,08	612,00
2010	20,98	12 550,00	2 039,60	1 131,05	540,00
2011	17,94	3 790,00	864,19	872,46	640,50
2012	17,48	3 690,00	814,76	729,66	278,45
2013	18,40	3 660,00	792,66	687,45	330,00
2014	19,00	3 100,00	730,90	686,92	348,55
2015	18,50	2 550,00	698,55	676,20	399,50
2016	20,95	2 950,00	928,24	954,78	609,55
All years	18,70	5 470,00	1 078,00	846,18	471,95

Financial performance of non-dividend distributors

	Min	Max	Standard Deviation	Average	Median
2008	203,25	1 180,00	444,86	529,76	367,90
2009	193,90	501,00	137,67	298,70	249,95
2010	247,95	1 800,00	647,26	747,36	433,00
2011	36,12	1 920,00	568,83	479,47	293,50
2012	117,90	1 019,00	314,84	314,33	193,65
2013	117,00	1 450,00	580,83	412,60	166,00
2014	147,00	1 450,00	558,31	454,73	206,90
2015	24,99	420,00	129,78	137,84	100,00
2016	22,30	1 340,00	341,80	263,47	130,00
All Years	123,38	1 231,11	413,80	404,25	237,88

Source **:** compiled from our database

The table 3 shows the descriptive statistics of the financial performance of companies listed on the Casablanca stock market. Over the 9 years of study, the share prices of companies distributing dividends vary between 18.70 and 5470 dhs. While, the share prices of non-distributors evolve between 123.83 and 1231.11dhs. The analysis of this indicator shows that distributing companies have on average a higher financial performance than non-distributing companies. For the study period 2008-2016, the share price for all distributors is on average 846.18 against 404.25 for non-distributors. Both groups regardless of distributors or non-distributors showed fluctuations in financial performance during the sample period. But, the non-distributors showed considerable fluctuations during the sampling period particularly in 2009 and 2015. In total, the two groups showed a downward trend during the intervening years or, as during the last year of the study period, they showed an increase.

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Table 4. Descriptive statistics of the model variables
Panel 1. Descriptive statistics of non-dividend distributors

Variable	Obs	Mean	Std. Dev.	Min	Max
CA	63	388.5494	452.3955	22.3	1920
DPA	63	0	0	0	0
BPA	63	.7878313	27.86865	-69.25474	119.3255
EN	63	42.01751	67.53501	0	229.4116
TAILLE	63	8.849657	.6435649	7.648344	9.953056

Panel 2. Descriptive statistics of dividend distributors

Variable	Obs	Mean	Std. Dev.	Min	Max
CA	324	841.51	1176.658	17.1	12550
DPA	324	41.43389	56.92433	.4	505
BPA	324	55.48063	73.91298	-46.63029	663.482
EN	324	21.11243	29.45769	0	194.1791
TAILLE	324	9.018997	.6042833	7.658217	10.38523

Source **:** compiled from our database Stata 13

We notice that distributors have on average a lower debt ratio than non-distributors. Dividend distributors had a ratio of 21.11, versus 42.02 for non-distributors. Furthermore, the size of dividend distributors seems much larger than that of non-distributors, according to Table 4. This observation is in agreement with Fama and French (2001). The average size measured by the logarithm of total assets of distributors was on average 9 and 8.84 for non-distributors. So not only is the financial performance of dividend distributors higher than non-distributors. But still, we find from the analysis of the descriptive statistics of all these companies that the payers are less indebted and having a higher size than the non-distributors for all the years of study. Before starting the regression, it was important to identify possible collinearity between the independent variables. Therefore, a Pearson correlation was undertaken and the result of this correlation is summarized in the following table.

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Tableau 5. Model correlation coefficients

	lca	lDPA	EN	BPA
lca	1.0000			
	387			
lDPA	0.6717*	1.0000		
	0.0000			
	387	387		
EN	-0.0754	-0.2189*	1.0000	
	0.1385	0.0000		
	387	387	387	
BPA	0.6471*	0.6207*	-0.1570*	1.0000
	0.0000	0.0000	0.0020	

* The correlation is significant at level 10
Source **:** compiled from our database Stata 13

This table (5) shows the bivariate correlations between the variables: share price (CA), earnings per share (EPS), dividend per share (DPA) and the debt ratio. The results showed a positive correlation between all the variables, except between the dividends per share and the debt ratio which had a negative correlation coefficient of -0.075. EPS and DPA had a significant correlation with the share price at 10%. DPA and CA were positively correlated with a correlation coefficient of 0.67. BPA and CA also had a positive correlation coefficient of 0.64. A high correlation between explanatory variables may indicate the presence of multicollinearity. One of the most widely used methods for testing collinearity between independent variables is the determination of the variance inflation factor (VIF) for each independent variable.

Table 6. The inflation factor of the variance of the independent variables

Variable	VIF	1/VIF
lDPA	1.67	0.599641
BPA	1.63	0.614300
EN	1.05	0.951361
Mean VIF	1.45	

Source **:** compiled from our database Stata 13

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Based on the results in Table (6), all the VIF values between the independent variables are around 1. It can therefore be concluded that there is no multicollinearity between the independent variables and the dependent variable, at a level 95% confidence.

4. Empirical results

To examine the validity of the correlation results, this study used a fixed-effects and random-effects regression model. In order to develop this model we carried out a logarithmic transformation. Transformations, which are applied to stock prices and/or independent variables, are applied to correct for nonlinearity problems and to correct for heteroscedasticity. As the logarithm of any negative number or number less than 1 is undefined. We left the variables (BPA, EN) that contain negative values without transformation, for the remaining variable (DPA), a constant is added to move the minimum value of the distribution, preferably to 1.00.

The results of the models have been presented in the following table, using the dividend per share as the measure of the dividend policy with other variables as the independent variables and the stock price as the dependent variable.

Table 7. The estimation results of the first model

Dependent variable : LCA	fixed effect (FE)		Random effect (RE)	
Explanatory variables	Coeff	t-stat	Coeff	t-stat
LDPA	0.155***	6.00	0.179***	6.93
EN	-0.001	-1.15	-0.001	-0.77
BPA	0.004***	9.25	0.004***	9.45
Constant	5.35***	72.62	5.27***	40.18
F test de modèle				
F statistic (42, 321) pour FE et wald statistic pour RE	27.72		252.29	
P- value >F	0.0000		0.0000	
Observations	387		387	
Groups	43		43	
Groups				
Min	9		9	
Max	9		9	
Average	9.0		9.0	
R-squared				
Within	0.3873		0.3867	
Between	0.6187		0.6361	
Overall	0.5174		0.5265	
Hausman test				
Test statistic	156.67			
Prob > chi2	0.0000			
Decision	Fixed effects model			

Note: Results significant at the 10% significance level are followed by *, at the 5% significance level by **, and at the 1% significance level by ***.

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Although this study integrates both the fixed effects model and the random effects model, we find that the fixed effect model is more applicable to the random effect due to the result of the Hausman test (Prob>chi2 = 0.0000) so our analysis will be based on FE. Our study tested whether DPA, BPA and EN have a significant impact on the stock price of 43 companies listed on the Casablanca Stock Exchange for the period (2008-2016). From the analysis of the fixed effects model, it can be said that there is a significant relationship between stock price, DPA and EPS. For example, the dividend per share has a positive and significant effect on the evolution of the share price ($p \leq 0.05$). Moreover, earnings per share has a positive and significant effect on stock price movement ($P \leq 0.05$). However, leverage has a negative but insignificant effect on stock price movement. The F test has a value of 156.67, and a corresponding p-value of 0.000 shows that the model significantly explains variations in the dependent variable. In other words, the explanatory variables strongly determine the behavior of the market values of stock prices.

From the estimation model of the regression results, the following equation can be constructed:

$$LCA=5.35+0.155LDPA-0.001EN+0.004BPA$$

The dividend policy

The distribution of dividends has a significant impact on share prices. A change of 1% in the value of the dividend per share results in a change of 0.1609% in the value of the share price. Meaning, an increase in the value of the dividend per share will lead to an increase in the value of the stock price and vice versa. This result contradicts the conclusions of Miller and Modigliani (1961) that dividends have no effect on stock price. Moreover, it partially confirms the dividend signaling hypothesis, according to which the company can use dividends to reveal to the market its state of "health". So as dividends rise, investor confidence improves, leading to higher stock prices. This finding is consistent with the views of Anand (2004) and Asquith and Mullin (1983) that the dividend policy gives information about the future of the company and also has an important impact on the stock price.

The debt policy

On the other hand, we find a negative relationship between the debt ratio and the stock price, but with a somewhat high level of insignificance (p-value = 0.252). The reason for the inverse relationship can be attributed to the fact that investors do not prefer companies that have large debt because a higher debt ratio exposes the company to higher risk. The insignificance can be attributed to the low level of importance given to this factor as an important determinant of stock price in the eyes of investors. The negative coefficient

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observed between the debt ratio and the share price is consistent with the results of Midani (1991) and Pani (2008).

The profits made by the company

Also earnings per share has a positive impact on share prices. This is evident in the t-value of (t-statistics = 9.25 and p-value < 0.01). The results can be explained by the fact that an increase in earnings per share will lead to a significant increase in the market prices of the shares. In other words, investors would therefore be willing to pay more for the shares of companies that have made higher profits. This result is consistent with the results provided by Collins (1957), Gordon (1959) Ball and Brown (1968), Beaver (1968), Baskin (1989). These various authors have observed that earnings per share is a major determinant of stock prices.

Conclusion

The result of our study concerning the link between financial performance and dividend policy shows that the variables, including stock dividends and profits, were found to be significantly positive for the financial performance of Moroccan companies. However, the indebtedness of these companies is not significantly linked to dividends. This means that the reduction or increase in dividends affects the price of shares and the behavior of shareholders. Since, the reduction in dividends and hence the decline in the stock price of the company will lead to the reduction in the wealth of the shareholders. This result contradicts the conclusions of the irrelevant theory of Miller and Modigliani that dividends have no effect on firm performance. This result can be explained by the unrealism of the market efficiency assumptions that are the basis of this theory, because one cannot be sure of their existence in any financial market. Furthermore, it provides support for the dividend relevance theory developed by Lintner (1962) and Gordon (1963). Shareholders seem to prefer a higher percentage of profits distributed as dividends. While this hampers future growth, it does provide shareholders with a secure return. Also, it partially confirms the dividend signaling theory developed by Bhattacharya (1979) and John and Williams (1985). This theory is based on the existence of information asymmetry between the various participants in the financial market. It suggests that executives use dividends as a signaling mechanism to convey information about company prospects to the market.

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Socio – Economic and Financial Efects of Kidnapping in Birnin Gwari Local Governmant Area of Kaduna State

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Abstract

This paper focuses on the socio-economic and financial effects of kidnapping in BirninGwari Local Government Area of Kaduna State, Nigeria. Structured questionnaires were used to collect data from the study area. The data obtained were analyzed using descriptive statistics and inferential statistics. Chi-square ($\chi 2$) statistic was used to test the hypothesis. This study revealed that kidnapping has a significant effect on the socio-economic activities of the study area ($\chi 2$=13.849a, α=3, p-value=0.003). To enhance the reduction in the rate of kidnapping, the government needs to provide job opportunities for the youth, train the security agencies, and provide them with the necessary equipment to fight crime, especially kidnapping, in the country. The individual community should also form an active vigilante group or any other form of informal crime control mechanism to support the effort of the police to improve the level of security in the society. There is need for improved sensitization and collaboration between the security agencies and

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the community and all sections of society to pass the message of safety to Nigerians on the importance of reporting suspicious behaviour to the police and other security agencies.

Keywords: Socio-Economic, Financial, Kidnapping, Vigilante Group, Growth, BirninGwari, Crime

Background of study

Kidnapping can be defined as the illegal, forcible seizure and detention of an individual or individuals against their will, usually in exchange for money or to settle a score. According to criminal law, kidnapping is the forced removal or transfer of a person typically to place them in a fictitious prison without permission.

This act may be done principally to extract ransom or carry out another crime. Section 364 of the Nigeria criminal code deals with kidnapping. It states that any person who unlawfully imprisons any person or takes him out of Nigeria without his consent or unlawfully imprisons a person within Nigeria in such a manner as to prevent him from applying to a court for his release or from discovering where he is imprisoned or in such a manner as to prevent any person entitled to have access to him from discovering the place where he is imprisoned is guilty of a felony and is liable to imprisonment for ten years. The concept of kidnapping seems to have originated around 1682 among those who perpetrated this crime. The American Heritage Dictionary of the English language stated that the two words 'kid' and 'napper' were slang the criminals used. Kid still has an informal meaning such as little or joke, while 'napper' is an obsolete slang for a thief. This is from the verb “nap”, which means to steal. In 1678, the word kidnapper was first used. At that time, kidnappers plied their trade to secure labourers for plantations in colonies in North America. Certainly, the development of human society has positive and negative aspects.

On the positive side, there is growth in terms of living, communication, inventions of technology, etc. However, the negative sides involve crime and other vices (Popescu et al., 2018). Globally, crime has been quite an issue and has become alarming in recent time (Fajnzylber et al., 2002).

Depending on the elements that are taken into account when analyzing it, there are various ways that crime can be defined. Paul Tappan (2008) defined crime as a deliberate act or omission that violates the law. It is performed without explanation or defense, and is punishable by the state as a felony or misdemeanour. Crime is also described by Shackleford (2015) as a public wrong, an act of offense which violates the law of the state and is strongly disapproved by society. Clifford (2010) asserted that a crime must have specific features in other to be seen as a crime. In a social setting, crime

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must be legally forbidden, it must have done harm to some people or external consequence, it must be an intentional act or reckless action or inaction, it must be a criminal intent and the intent must coincide with the criminal action, and there must be a causal relationship between the legally forbidden act and the voluntary reaction. Sellin (2011) argues that crime transcends mere violation of law per se and maintains that mere violation of the criminal law is an artificial criterion of criminality.

There are different experiences of various types of crimes, but they are at different rates and levels in countries around the world. In a recent United Nations report on crime statistics for each country, major assaults dominate the types of crime reported. The highest-ranked continent with major assaults was Africa. North America was ranked second and relatively lower than Europe, Asia, and South America (Heiskanen & Harrendorf, 2010). Within the same report, homicide rankings for the continent were stated. High rates of homicide were accounted for within Africa, South America, and the Caribbean. On the contrary, homicide rates were relatively lower in North America, Asia, and Europe. From this example, it is important to note that various rates of crimes and their effects can depend on a geographical location. Each geographical location with various rates has different social and cultural perspectives that can influence crime rates. However, social factors within countries can have many links to crime rates.

There are concerns that most serious crimes are within developing countries, of which Nigeria is included (Natarajan, 2016). Nigeria has its share in the area of crime and other related vices. Thus, the evidence of teenagers and young adults committing all sorts of crimes in Nigeria has been challenging (Okei-Odumakin, 2011). However, criminal activities in a society usually hurt people (Huang et al., 2004). Specifically, crime-related matters may disrupt the development course like economic growth (Mauro & Carmeci, 2007). Also, economic inequalities between groups may stimulate or intensify ongoing conflict in a society by strengthening and reinforcing ethnic/racial and class disparities and antagonism (Demombynes & Ozler, 2002). Subsequently, high crime rates arising from all these factors bear negative consequences on the growth and development of a society (Mehlum et al., 2005). The damage caused by crime has a significant negative impact on the welfare of the society, which can lead to serious impediments for creating and maintaining a developed and well-functioning economy (Usman, 2016). It imposes high costs on the private and public sectors. This further causes harm to the personal well-being of an individual, as well as the welfare of the society as a whole. The effect of crime on the economy is substantial because it generates a greater cost to society at different levels, ranging from individual to national level. It is against this background that this study

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examines the socio-economic effects of kidnapping in Kaduna State, Nigeria, using Birnin Gwari Local Government Area of Kaduna state as a case study.

Implications of kidnappin and crimialities

Rational choice, routine activities, and broken versions of the window theory suggest that criminal opportunity causes crime rates to rise. Therefore, it is believed that crime rate should decrease by increasing the number of guardians. As a result, targets will be less suitable and the number of offenders will decrease. The criminal justice system is capable of controlling crime and vigorous law enforcement and harsh punishment should dissuade criminals. This in turn will result in a significant decrease in criminal offending as a primary implication of interpreting offending in terms of a logical calculation. Nonetheless, the query, "Is crime rational?" still stands. These theories are flawed from the start because they assume that criminals are rational calculated individuals. Although there is ample data to support this theory's essential premises, its applicability has a fundamental problem in the notion that criminals think before acting and weigh their options before deciding to commit a crime. The prosecution of criminal organizations do not considerably support the consequences of assuming this rationality in terms of deterrence, despite the appearance of rationality in crime. The certainty, seriousness, and rapidity (speed) of legal consequences all contribute to deterrence. According to deterrence, rationally calculated criminals may be dissuaded from committing crimes if there is a good probability they will be caught, given severe punishment, and served justice quickly. As a result, if criminals are logical, punishment and crime should go hand in hand. As the cost of breaking the law rises, it should eventually become counterproductive for the offender to continue their unlawful behavior. It is implied that the threat and likelihood of receiving a criminal punishment affects and regulates crime rates. It is also a prevalent belief that if offenders faced harsher penalties, they would decide not to commit crimes as this would not be in their best interests. However, a thorough examination of deterrence literature from years ago by Doob and Webster (2003) concluded that differences in sentence harshness have little impact on the level of crime in society. Deterrence thus makes intuitive sense, but empirical study does not support it. According to LeBlanc and Frechette (1989), the challenge is that criminals, especially young offenders, make very little preparation for an offense. This indicates that the crime was not the result of careful planning or calculation. While Ladouceur and Biron (1993) acknowledge that some planning goes into committing crimes, these plans frequently concentrate on the immediate consequences of the crime rather than their long-term effects. Doob and Cesaroni (2004) contend that while analyzing consequences, it is important to distinguish between rational choice in the short term and long term. Young people often

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lack long-term thinking skills, act impulsively, and are more concerned with the short-term benefits of their actions. Youth may consider the repercussions for the criminal justice system, but they disregard them because they are unlikely to get caught. All 60 respondents in interviews with convicts (Tunnell, 1996) indicated that they merely did not consider the criminal repercussions of their activities. More than half of them were not aware of the severity of the punishment for the offense, despite the fact that they knew their acts were illegal and tried to avoid being caught as most offenders do.

Situational crime prevention attempts to dissuade offenders from focusing on particular targets. Therefore, it is believed that criminal activities can be prevented by closely monitoring possible offenders, carefully guarding potential targets, controlling the means of crime, and reducing opportunities for crime (Siegel & McCormick, 2006, p.135). The drawback of situational crime prevention measures and specifically closed-circuit television and public monitoring indicates that they have a tendency to shift criminal activity away from areas that are not being watched. According to Wood et al. (2004), enforcement initiatives are unable to effectively reduce crime because they do not address fundamental problems including poverty, health, harm reduction, welfare, and housing.

In addition, increasing the punishment also presumes that offenders were aware of the earlier sanction and believed the risk was worthwhile. However, the new harsher punishment renders the risk unprofitable in a cost-benefit analysis. Nonetheless, this is under the assumption that offenders are conscious of the increase in the harshness of the sentence and carefully consider their options. Both targeted and universal deterrence methods have not produced the outcomes predicted by rational choice theorists since the literature does not support this premise. System theory considers the whole institution as a functional unit where a crack or breakdown of one component of the unit affects the whole unit. Birnin Gwari Local Government Area and the communities that make it up are regarded as a functional unit where individuals, families, communities, and governments are seen as components of this functional unit. Anyone (individual or group) who engages in any type of crime, be it violent or not, automatically breaks down the system. This is because their action will negatively affect others, including the community, church or government as the case may be. It could also be regarded as a system where the institutions and law enforcement agencies such as courts, police, EFCC, and other legal systems through which crime offenders are tried, persecuted, and sentenced in most cases arms twist the justice because of personal gains, which breaks down the functional unit of the legal system of preventing crimes in our societies.

Consequently, having trained individuals in the neighborhood whose job is to ensure safety can aid in reducing crime and preserving security. When

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there is competent management directing them, law enforcement agents can be very effective since they have the training and tools necessary to address the various components of crime in the community. Many community watch initiatives will also play a similar role when professional law enforcement agents refuse bribes and favoring particular members of the society. The secure city model experiment clearly demonstrates that changes in police patrol procedures had minimal impact on crime because they collect money from these offenders and pave the route for them to pursue their goals (Omenyuru et al., 2014). No matter how likely it may be that they will be apprehended, most criminals do not believe they will be caught, presumably because they are aware that their money will clear the way for them. Burski et al. (2000) failed to identify a connection between the likelihood of being arrested or imprisoned and comparable crime rates which lends weight to this conclusion.

Impacts of kidnapping and crime on the ecomony

In addition to social isolation, criminality has detrimental economic effects. It is challenging to fully foresee economic loss based on crime.

People become afraid and retreat from society when there are crimes, which prevents them from going out and spending money. They avoid going to shops, eateries, and other public locations that they consider unsafe.

Businesses in these regions that are considered dangerous suffer loss of revenue as a result (Doran, 2012, p.16). Businesses close to chaotic areas will further experience a drop in foot traffic because people avoid these areas when they are alone due to the disturbance.

Additionally, people feel compelled to leave their current residences when there is an excessive amount of terror and chaos in one location. According to Dorah (2012), this has a detrimental effect.

Due to neighborhood inhabitants leaving and adverse attitudes among possible buyers, the real estate market tends to suffer.

Tourists in the neighborhood are also affected by crime. People respond negatively when a particular location portrayed in crime is more hazardous. This is because they are afraid of what can occur in such locations. The forcible removal of personal items like phones, handbags, etc., are some reasons people no longer want to travel to locations such as Masaka, Ado, etc. People may be discouraged from travelling to such areas if their safety is not guaranteed. In such a situation, security may become a new top focus. There are numerous types of security, but they are not necessarily inexpensive. For instance, those who are extremely fearful will probably invest a lot of money in security by increasing the lighting outside their homes, fences or other protective constructions. Also, getting a guard dog, a home alarm, guns, and cameras are a few items people might invest in (Doran, 2012, p.17-18).

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Additionally, if a person is very concerned about having something stolen or broken, they might purchase additional insurance (Grinshteyn, 2013, p.31). However, these have immediate financial consequences for the individual. Even while these purchases might benefit some sectors of the economy, people will have less money available to them. The government is another organization that invests a lot of money in security and security programs. To address many of these problems, the government is tasked with the responsibility of making effort to lower the overall crime rates. These courses are not inexpensive. Any program that the government develops will unavoidably be expensive because of how large it must be. Even small-scale initiatives have a high price tag since they affect entire cities or counties. Along with launching initiatives like putting up security cameras, the government also spends money on deploying more police personnel to fight crime (Doran, 2012, p.18). This is beneficial since a greater police presence can make locals feel safer and more protected.

Kidnapping and crime wave within the nigerian urban centres

An increase in crime rate in Nigeria has been reported as early as the eighties (Times International, London: November 4, 1985). Lives were no longer safe as the country was characterized by insecurity challenges posed by offenders. Essentially, urbanisation and development of large cities were not new, but the crime surge is rampant. Nigeria has over a century developed large towns and cities, but the reality of insecurity posed by criminals is worsening on a daily basis. The crime waves in Nigeria are becoming more frequent, more offensive, and horrendous. There are daily reports of more violent crimes (Agbola, 1997; Fabiyi, 2004).

The unexpected rise in urban insecurity has been associated with aggravated poverty that has become entrenched in most urban centres of many African nations. The population in poverty has been growing steadily in Nigeria. For example, in 1985, 27.2 percent of Nigerians were rated as poor; in 1990, it was measured as 56 percent; in 2000, it was estimated to be about 66 percent and in 2014, Nigeria was classified as the third poorest country in the world (Federal Office of Statistics, Nigeria, 1999; World Bank, 1999, 2000, & 2014). Insecurity and poverty both function in a symbiotic way to make life in most Nigerian urban cities very irritable and relatively irksome. Fabiyi (2004) also observed that another major cause of the increased wave of crime in Nigeria is due to technological advancement and opined that the internet has taught Nigerians (especially the young ones) how to kill themselves with impunity, to have little regard for human life, and to derive joy in shedding blood.

The official security apparatus in Nigeria has grossly failed to checkmate the security problems in the country. This is primarily due to

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inadequate facilities to fight crime efficiently and the poverty level that has brought uncontrolled corruption within the security systems (Agbola, 1997; Onibokun, 2003; Fabiyi, 2004).

Olufolabo, Akintande, and Ekum (2015) identified eighteen (18) major categories of crimes associated with Nigerian urban centres. They posited that police departments emphasized stealing/theft/burglary as the most committed crime in most cities. They went further to mention illiteracy, broken home, bad company, porous environment, and failure of police and other judicial authorities in administering justice as the main causes of residential urban crime.

2. Statement of the reasearch problem

There are over 200 ethnic groups in Nigeria with different cultures, different backgrounds, different levels of education, and different crime patterns as well. Kaduna has its crime rate, patterns and effects on society, and kidnapping seems to be one of such criminal activities. Therefore, it is important to comprehend the issues related to crime in the society for the community to adequately confront crime and the difficulties it causes. One of the criminal acts noted in the research region is kidnapping, which violates accepted social norms and can hinder the community's ability to function smoothly. Also, it can be disastrous when it happens on a wide scale. Kidnappings are now common in the Birnin Gwari area. Communities have been affected by the growth of fear and anger, which has an effect on people's behavior. Although not everyone is a victim, these consequences can still be experienced by simply knowing someone who has been a victim.

Crimes against an individual include any threat of force or the actual use of force against somebody which usually results in an injury or even death due to an individual's intent or negligence. Insecurity in the study areas is alarming to the point that residents are scared to express themselves in public. This is because crime, especially violent crime, and infringes on the free movement and expression of the society, especially at night, usually has negative effects on the personal state of individual well-being and the society at large. Nightlife in the study areas is nothing to write home about considering residents' feelings when they learn kidnappings happened in their area.

Another drawback of unabated crime is the negative consequences on the socio-economic life of such communities. The magnitude of resources lost due to crime and fighting crime could have been channelled into other more productive aspects of community development. The experience of kidnapping can predominantly affect individuals' emotional well-being causing anger and anxiety in society. Thus, it is reasonable to assume that kidnapping harms society and studying this issue has become pertinent.

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3. Purpose of the study

The purpose of this study is to determine the socio-economic effects of kidnapping with the view to proffering solutions that will help in reducing or preventing this criminal activity in society.

4. Research objective

The objective of the study is to examine the socio-economic effects of kidnapping. Specifically, the study sought to:

1. Examine the causes of kidnapping in the study area.
2. Find out why kidnapping is rampant in the study area.
3. Study the socio-economic effect of kidnapping on the people in the study area.
4. Proffer solutions and ways of preventing kidnapping in the study area.

5. Statement of hypothesis

H_0: kidnapping has no significant effect on the socio-economic activities of the study area

H_A: kidnapping has a significant effect on the socio-economic activities of the study area

6. Research question

1. What are the causes of kidnapping in the study area?
2. Why is kidnapping rampant in the study area?
3. What are the socio-economic effects of kidnapping on the people in the study area?
4. How can we prevent kidnapping in the study area?

7. Study area

Birnin Gwari is a Local Government Area in Kaduna State, Nigeria. Its headquarters are in the town of Birnin Gwari. It has an area of 6,185 km2 and a population of 252,363 at the 2006 census. Birnin Gwari has been identified by many people as one of the major areas where kidnapping usually takes place in Nigeria. Apart from kidnapping, a lot of banditry activities have been reported along the Kaduna-Birnin Gwari Road.

8. Sample and sampling technique

Three clusters (which are equivalent to wards) were selected in the study area, and 110 interviews were proposed to be conducted in each of the clusters. The justification for this sample size (i.e. n=110) in each cluster is in line with what most statisticians accept, which states that the minimum sample size to get any kind of meaningful result is 100.

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(http://www.tools4dev.org/resourceshttp://www.tools4dev.org/resources). Multistage random sampling technique was used to select respondents. In this method, 10 main streets were randomly selected from each cluster, and 10 households were selected in each of the streets with the use of a random sampling technique. From each household, an individual who is above 18 years was interviewed.

Table 1. Selected Clusters and Sample Size Distribution

State	**LGA**	**Selected Cluster (Ward)**	**Sample Size Distribution**
KADUNA	BIRNIN GWARI	Magajin Gari	110
		Kakangi	110
		Kuyello	110
TOTAL			**330**

Source: National Population Commission, 2006 and Researcher Field Effort 2021

9. Data collection

Structured questionnaires were administered to the target respondents in the study area to obtain information needed to answer research questions.

10. Test of research instrument and validation

To ensure the face of validity of the instrument, the questionnaire and discussion guide was presented to the supervisor for scrutiny. Having effected the necessary corrections, experts in the unit of test and measurement looked through the instruments to confirm their validity. The feedback from them certified the instruments as content valid to measure the variables in the study.

11. Data analysis

Statistical Package for Social Sciences (SPSS) was used to enter and analyze the data, and descriptive and inferential statistics were used to show the findings. The Chi-square statistic ($\chi 2$) was used to test the study hypothesis.

12. Data presentation and analysis

The data collected for this study are presented and analyzed in this chapter. Frequency and percentage distributions were used in the presentations.

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Table 2. Questionnaire Administration

S/N	Selected Cluster	No of Questionnaires Allocated
1	Magajin Gari	110
2	Kakangi	110
3	Kuyello	110
Total		**330**

Source: Field Survey, 2021

According to the table above, the 330 questionnaires that were distributed among the chosen clusters (wards) in Birnin Gwari LGA in Kaduna state were dispersed equally. Although the study used 310 questionnaires, it is still a good margin to build the results that follow.

Table 3. Profile of Respondents

	Frequency	Percentage
Gender		
Male	167	55.8
Female	133	44.2
Total	**300**	**100.0**
Age Group		
18-29 years	63	21.0
30-39 years	70	23.2
40-49 years	92	30.6
50-59 years	42	13.9
60 years and above	34	11.3
Total	**300**	**100.0**
Marital Status		
Single 101		33.5
Married	94	31.3
Divorced	12	3.9
Widow	56	18.7
Widower	38	12.6
Total	**300**	**100.0**

Source: Field Survey, 2021

The gender split was well balanced, with 55.8% for men and 44.2% for women. In terms of age, 13.9% fall between 50 and 59 years, 21.0% are between 18 and 29 years, 23.2% are between 30-39 years, 30.6% are between 40 and 49 years, and 11.3% are 60 years or older. The table also showed that 31.3% of respondents were married compared to 33.5% of respondents who were single.

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Table 4. Respondents' Residences Within the Study Area

	Frequency	**Percentage**
Yes	298	99.4
No	2	0.6
Total	**300**	**100.0**

Source: Field Survey, 2021

Analysis of the data in the table above reveals that fewer than 1% of the sampled population does not live in the study area, while 99.4% reside there. This demonstrates that the research area's information was gathered from the correct intended population.

Table 5. Duration of Respondents' Resident in the Study Area

Duration of resident	Frequency	Percentage
0 – 5 years	39	12.9
6 – 10 years	63	20.9
11 -15 years	133	44.3
Above 15 years	66	21.9
Total	**300**	**100.0**

Source: Field Survey, 2021

The analysis of the field data that was collected is covered in this part. The information in Table 5 shows that the majority of respondents have lived in the research area between 11 and 15 years (44.3%), while 12.9% of respondents have lived there for less than five years (0–5). 20.9% are those between 6 to 10 years and 21.9% are above 15 years. This indicates that the respondents have lived in the study region for a sizable amount of time. Therefore, they are qualified to comment on how abduction and other crimes that occur in their neighborhood affects them personally or have occurred over time in the study area.

Table 6. Witness of any Kidnapping or other Criminality Committed within the Study Area by the Respondents

	Frequency	**Percentage (%)**
Yes	196	65.2
No	104	34.8
Total	**300**	**100.0**

Source: Field Survey, 2021

Table 6 tries to find out how many people have seen kidnappings or other criminal activity that had previously been a feature of the research area. 65.2% of respondents said they had seen it over time, while 34.8% said they had not seen any kind of criminal activity there. However, based on the

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preceding data, it can be stated that the research area was marked by a higher number of crimes.

Table 7. Type of Crime Witnessed by the Respondents

	Frequency	**Percentage**
Kidnapping	165	84.2
Thefts	20	10.2
Sexual offences	11	5.6
Total	**196**	**100.0**

Source: Field Survey, 2021

Kidnapping (84.2%) is the most common crime in the research area based on the findings in Table 6. In other words, kidnappers commit the majority of crimes in the study's target area. 10.2% of crimes are thefts, while 5.6% are sexual offenses.

Table 8. Time Crime are Usually Being Committed in the Study Area

	Frequency	**Percentage**
10am – 2pm	117	39.0
2pm – 6pm	10	3.2
6pm -10pm	17	5.5
10pm -2am	81	27.1
2am - 6am	76	25.2
6am – 10am	0	0.0
Total	**300**	**100**

Source: Field Survey, 2021

Majority of the crimes were found to be perpetrated between 10 am and 2 pm and between 10 pm and 2 am (39.0%) according to 27.1% of the data. Others (25.2%) are between 2am and 6am. Only 3.2% and 5.5% of crimes are perpetrated between 2pm and 6pm and 6pm and 10pm, respectively. Consequently, it is confirmed that kidnapping is the most common crime in the studied area. This is because during the "off-peak period", between the hours of 10 a.m. and 2 p.m. and 10 p.m. and 2 a.m., students, traders, craftsmen, civil servants, and laborers must have left for the day's work, leaving the neighborhoods and roads largely deserted. The same thing occurs between the hours of 10 p.m. and 2 a.m., which is also a prime time for armed robbers and burglars to operate.

Table 9. Number of Respondents that Reported to Police After Attack

	Frequency	**Percentage**
Yes	102	33.9
No	117	39.0
Don‘t know	81	27.1
Total	**300**	**100.0**

Source: Field Survey, 2021

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Common issues such as the underreporting of numerous sorts of crime, including kidnapping, can obscure the true extent of victimization. In Nigeria, a large amount of victimization is unreported, and reporting varies depending on the incident. However, majority of domestic abuse, larceny, and burglaries go unreported. The ability to determine the nation's true victimization rates will be hampered by underreporting. The results showed that majority of crimes go undetected. 39.0% of people who are attacked or have their things stolen do not call the police, whereas 84 people (27.1% of the sampled population) show indifference. Only 33.9% of attacks are reported to police stations.

Table 10. Individual Effects of Kidnapping in the Study Area

Effects	**Frequency**	**Percentage**
1 (No effect)	74	24.5
10 (Total effect)	226	75.5
Total	**300**	**100.0**

Source: Field Survey, 2021

The red line in the table above represents the repercussions of crime. It affects 75.5% of the population while having little impact on the remaining 25%. In order to protect the communities under study from crimes, the security agencies need to intervene because abduction has eaten deeply into Birnin Gwari and its surroundings.

Table 11. Reasons Why Respondents Reported to Police After Attack by Offenders

	Frequency	**Percentage**
offender to be caught/punished	51	50.4
To stop it from happening again	14	14.0
To recover property	31	30.0
To get help	6	5.6
Total	**102**	**100.0**

Source: Field Survey, 2021

The reasons why people report occurrences of attacks to the police were looked at for 102 respondents who reported crime to the police (as shown in Table 11). While 30.0% report to police because they want their property recovered, 50.4% said they want the offender to be found and punished. 14.0% of people call the police because they do not want similar incidents to happen again, while 5.6% call the police because they need assistance.

It is the responsibility of the police to protect the lives and property of their constituents, but the real concern is: "Are the police doing enough to protect lives and property?" (For additional study).

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Table 12. Opinions of the Respondents if They are Satisfied With the Services Rendered by the Police

	Frequency	**Percentage**
Yes (satisfied)	28	27.2
No (dissatisfied)	47	45.6
Indifference	28	27.2
Total	**102**	**100.0**

Source: Field Survey, 2021

It is obvious that while 45.6% of those who complained to the police were dissatisfied with their services or responses, 27.2% chose to show little interest in the topic at hand. Only 27.2% said they were happy with the services provided by the police. The aforementioned result implies that the police force has failed to carry out its obligations under the Nigerian constitution.

Table 13. Major Causes of Kidnapping in the Study Area

	Frequency	**Percentage**
Too lenient sentencing	28	9.4
Poverty	68	22.6
Too few police	10	3.2
Lack of discipline from parents	27	9.0
Unemployment	86	28.7
too much strike from ASUU	43	14.2
Drugs	38	12.9
Total	**300**	**100.0**

Source: Field Survey, 2021

Table 13 shows that poverty (70%) and unemployment (89%) are the two main factors that lead to kidnapping. Another factor leading to kidnapping among young men is the excessive ASUU strike activity (14.2%). This is followed by too lenient sentencing (7.4%), and a lack of discipline from parents. From the above table, it can be inferred that unemployment is the driving force behind kidnapping and other crimes that people conduct to survive. Poverty is the second major cause of kidnapping. Therefore, anything that impacts "A" must also affect "B." ASUU's (Academic Staff Union of Universities) frequent strikes have a negative impact on the topic at hand. Engaging in an endless strike frequently causes young men to involve in criminal activities.

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Table 14. Opinions of the Respondents on How Safe They Feel Walking Alone After Dark

	Frequency	**Percentage**
Very safe	58	19.4
Fairly Safe	27	9.0
A bit safe	52	17.4
Very unsafe	163	54.2
Total	**300**	**100.0**

Source: Field Survey, 2021

Out of 300 populations that were studied, the aforementioned data showed that 54.2% are not safe, while 17.4% are somewhat safe. The implications of the aforementioned finding indicate that the study regions under consideration are not safe, and 168 locals have attested to this reality.

Table 15. Level of Kidnapping in the Study Area as Observed by the Respondents

Factors	**Frequency**	**Percentage**
A lot more crime	34	11.3
A little more crime	48	16.1
About the same	43	14.2
A little less crime	102	33.9
A lot less crime	74	24.5
Total	**300**	**100.0**

Source: Field Survey, 2021

The results indicated that 33.9% was the most important component. This is followed by 24.5%, 16.1%, 14.2%, and 11.3%. When kidnapping is out of control, facts about this were revealed by the choice of the table. It is not an overstatement to say that the police and other security authorities have not carried out their obligations under the constitution, which has resulted to an upsurge in kidnappings in the studied regions.

Table 16. Opinions of the Respondents if there is Any Vigilante Group Currently Operating in the Study Area

	Frequency	**Percentage**
No	80	26.5
Yes	154	51.3
Never heard of any vigilante group currently operating in my area	66	22.2
Total	**300**	**100.0**

Source: Field Survey, 2021

The data demonstrate that vigilante groups are active in the research areas as reported by 51.3% of respondents, whereas 26.5% and 22.2% of respondents indicated that there are no vigilante organizations in their localities. Either the aforementioned vigilante organizations are inactive due to a lack of professionalism or they lack the necessary tools to produce greater results which keeps the public in the dark about their presence.

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Table 17. Major Effects of Kidnapping in the Study Area

	NO	NO	NO	Total	%
Loss of personal belongings (e.g., Money, Appliances, handsets, Jewries, car, bicycle motorcycle etc)	40	20	30	90	30.0
Sleep disorders and Loss of appetite, excessive appetite, or eating disorders	22	30	14	70	23.3
Physical injuries that can lead to other health conditions (such as heart attack, stroke, fractures from falling, and loss of dexterity)	18	23	10	51	17.0
Assault victims: possible exposure to sexually transmitted diseases, exposure to HIV, and unwanted pregnancy.	12	8	21	41	13.7
Substantial lifestyle changes including restriction of activities once enjoyed	14	20	18	48	16.0
Total	**106**	**101**	**93**	**300**	**100.0**

Source: Field Survey, 2021

The information in Table 17 illustrates how kidnapping affects society. Loss of personal property accounts for the largest portion of the effect (30.0%). This is followed by sleep disorders and eating disorders (23.3%), as well as loss of appetite. Also, 17.0% of physical injuries result in other illnesses. On the other hand, significant lifestyle adjustments which includes limitations on previously liked activities is another major effect of kidnapping(16.0%), and assaulted victims are exposed to STI's, HIV, and unwanted pregnancies (13.7%). Failures by many security organizations tasked with the responsibility of protecting lives and property have led to offenders operating at will, robbing people of their possessions, hurting them, making them have restless nights, and instilling terror in them.

Table 18. Ways to Curb the Rate of Kidnapping in our Societies

Factors	**Frequency**	**Percentage**
Long sentencing	29	9.4
Job creation	102	32.9
Increase security	87	28.1
Good parental upbringing	37	11.9
Boost economic base of the study areas	55	17.7
Total	**300**	**100.0**

Source: Field Survey, 2021

The selection of the above table reveals that 32.9% of respondents believed that employment would significantly lower the rate of kidnapping in communities, while 28.1% opined that enhancing security both inside and outside the study regions would end these kidnappings. In the meantime, 17.7% feel that the economic foundation of the studied areas should be

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strengthened in order to lower the rate of kidnapping, and 9.4% stated that penalizing offenders would do the same.

Hypothesis testing

The analysis and interpretation of the study's hypothesis are covered in this part. Chi-square is the statistic that was used to analyze the data. The analysis level of significance is 5% (i.e., 0.05). There is no significant association between the variables if the P-value is larger than 0.05. Conversely, there is a significant relationship if the P-value is less than 0.05 according to the decision rule.

Hypothesis Statement

H_0: kidnapping has no significant effect on the socio-economic activities of the study area.

H_A: kidnapping has a significant effect on the socio-economic activities of the study area.

Table 19. Hypothesis Testing

Socio-Economic Effect Of Kidnapping	**Major Causes Of Kidnapping In The Study Area**							**TOTAL**
	Too lenient sentencing	Poverty	Too few police	Lack of discipline from parent	Unemployment	Too much strike from ASUU	Drugs	
1 (No effect)	7	17	2	7	21	11	10	**74**
10 (Total effect)	21	51	8	20	65	32	28	**226**
TOTAL	**28**	**68**	**10**	**27**	**86**	**43**	**38**	**300**
χ^2 =12.849[a]DF=3		P=0.003						

Given that the P-value (0.003) in the table above is below the threshold of significance (0.05), it is assumed that kidnapping has a major impact on the socio-economic activities of the studied area.

Discussion of the findings

The data obtained in this study was utilized to demonstrate how certain socio-demographic factors and kidnapping, as well as its consequences are related. It also helps to clarify how the theoretical claims about crime victimization can be supported by survey-generated empirical data.

Sex and age distributions

According to Table 3, there are 55.8% men and 44.2% women, which is proportional when their vocations are considered. The study was primarily concerned with individuals who were 16 years and older. Based on the result, the largest age cohort of residents in the study region is between 27 and 37,

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which accounts for around 23.2% of the population. This is followed by ages 21 and 26. This suggests that the study area's residents are in their prime years, and this is one of the factors contributing to kidnapping in the area. Adolescent exuberance can also be blamed for this.

Kidnapping and other of crimes often committed in the studty area

The primary offense that was frequently perpetrated in the research region was shown in Table 7. Burglary and armed robbery, which are the most prevalent crimes perpetrated in the research region, were confirmed by 39% and 30.7% of the respondents, respectively. This is because the majority of offenders are young men and women as indicated in Table 3.

Table 8 reveals that, according to 39% of the respondents, crimes are mostly committed between the hours of 10 a.m. and 2 p.m. and 10 p.m. and 2 a.m. (27.1%). This shows that thefts typically occur between 10am and 2pm and 10pm and 2am.

4.3.3. The causes of kidnapping and other types of crimes in the study area

The root causes of crime in the research area are discussed in Table 13. As evidenced above, 89% of respondents claimed that poverty and unemployment are the two main contributing factors to crime. This indicates that crime is continuously rising unabatedly as a result of people's struggles with poverty and unemployment as well as the area's weak economic foundation. On the other hand, poverty has its detrimental impacts on people, which raises the local crime rate. As seen in Table 13 , young unemployed youths or the underprivileged are typically involved in armed robberies.

4.3.4 The effects of kidnapping on the society

Table 17 revealed the effects of crime on society. Respondents confirmed that loss of personal belongings and loss of appetite are the major effects of crime as experienced in the area. This is followed by physical injuries that lead to other health conditions (16.5%), substantial lifestyle changes including restriction of activities once enjoyed (15.5%), and assaulted victims are exposed to STI’s, HIV, and unwanted pregnancy (13.2%).

According to Table 14, 54.2% of the respondent affirmed they are not safe, while 54 (17.4%) felt a bit safe. The implication of the result above shows that the study areas under study are not safe and 168 inhabitants of these areas attested to this fact.

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4.3.4 How to prevent kidnapping and other criminalities in the study area

In Table 18, the majority of respondents to the study's analysis believed that providing work for the populace would significantly reduce kidnapping and other crimes in the study area (32.9%). 28.1% opined that addressing insecurity head-on would unquestionably put an end to kidnapping and other crimes in the research area. Furthermore, 17% of respondents stated that increasing the economic foundation of the study areas would encourage people to start their businesses, which would lower abduction and other crimes.

5.1 Summary of findings

The results of the field study have shown that there is a strong correlation between crime, kidnapping, and other criminal acts with the socio-economic standing of society. However, there are risks and weaknesses associated with this. It is important to mention that the research area played a key role in the locals' (respondents') decision to associate local insecurity with unemployment and poverty.

The following is a summary of the results:

• This survey found that the most common crime committed in the study area was kidnapping.

• The research also found that the majority of these criminals, including kidnappers, operate between the hours of 10 a.m. and 2 p.m. and 10 p.m. and 2 a.m.

• Once more, the majority of offenses in the study area go undetected.

• The research area's crime rate is also continuing to rise.

• Due to the lack of protection, few people venture outside at night in the study area.

• In the research area, unemployment and poverty are the main contributors to insecurity.

• Although there are watchdog organizations in the research region, they are not active.

• The majority of those who use the police do not do so in a manner that is appropriate.

5.2. Recommendation

Given the above-mentioned facts, the government should create job possibilities for young people and give the police and other security agencies the necessary training and tools to combat crime, including abduction, in the nation. Additionally, each community should establish an active vigilante organization or some other kind of unofficial crime-control mechanism to support the police in their efforts to raise the level of security in the community. In order to spread the message of safety to Nigerians about the

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significance of reporting suspicious behavior to the police and other security agencies, there is a need for increased awareness and collaboration between the security services, the community, and all segments of society.

Conclusion

The Nigerian government has recently taken several actions to try and prevent abduction and other crimes, but it appears that none of these actions are sufficient to stop the nasty trend of various sorts of crime and insecurity in the nation. The suggestions provided above should be carefully followed to lessen the effects of kidnapping and other crimes devastating the research region.

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ESJ Social Sciences

Agroecological Transition in the Cotton Zone: Analysis of Technical-Economic and Environmental Performances in Northern Benin - A Literature Review

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Abstract

This article is a systematic review of the knowledge of technical-economic and environmental performance in agroecological transition. The data collected in the Scopus and dimension database concerned exclusively published articles and journals, using the relevant terms. Thus, 227 documents exported from Scopus and dimension were submitted to a bibliometric analysis with the Citespace software, then the inclusion and exclusion criteria were carried out according to the ROSES standards. The results reveal that the annual production of studies related to the technical-economic and environmental performance in agro-ecological transition is increasing with an annual growth rate of about 1.3%. There is a common understanding of agroecological transition. The agroecological transition addresses the problems of the food system from field to plate, covering all activities and actors involved in the cultivation based on natural resources. Among the agroecological practices analyzed, the application of compost seems the most promising to be scaled up to improve economic and environmental performance

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Keywords: Agroecological transition, bibliometric analysis

Introduction

Agricultural systems in the tropics, where many countries are still facing large increases in human population, are faced with increasing food demand, uneven food availability, and structural economic conditions that are not conducive to rural employment (Côte et al., 2022). Producing more and more, by all means, is the cultivation policy advocated by intensive farming systems. Unfortunately, these cultivation methods have ended up showing shortcomings with either increasingly resistant pests or soils that die over time. To overcome this, ecological cropping systems through agroecology offer sustainable, healthy, and economically viable methods of production by minimizing external inputs with interesting yields (Van Der Ploeg et al., 2019). This is a real opportunity that presents itself but raises many questions that must be answered upfront so as not to jump headfirst into a mud puddle. As is the case with agriculture in Northern countries, these challenges in tropical countries come with the need to reduce rural poverty, maintain a balance between rural and urban areas, and preserve natural resources (HLPE, 2019). Thus, to promote a transition to more sustainable agriculture, alternative solutions have emphasized the positive role of (bio)diversification and ecological processes and services (Kremen et al., 2012). These processes are called agroecological transition. They are systemic transformations that involve the greening of agriculture and food (Magrini et al., 2019). Proponents of agroecology also claim that it has the potential to make agri-food systems more socially just in addition to its ecological goals (Anderson et al., 2019; Boillat and Bottazzi, 2020; Coolsaet, 2016).

Nevertheless, the potential of agroecology to empower small farmers and other disadvantaged actors to achieve a socially just transition remains a contested issue. Agroecological transition initiatives are often constrained by the characteristics and politics of the movements behind them (Meek, 2016). Research results and observations from experiments and real-world cultivation are available in the form of scientific articles, journals, books, and others, and show what the application of ecological cultivation methods can bring to the renovation of farming systems. Agroecology is continuously gaining recognition in the scientific world regarding food production (Kerr, 2021). The ecological transition, therefore, builds on this learning effort to guide the gradual shift from chemical to ecological farming. In this momentum of knowledge, relevant questions emerge about the management of the agroecological transition itself. This article is a systematic review of the knowledge of technical-economic and environmental performance in agroecological transition. The bibliographic synthesis and the systematic review will allow answering the following questions:

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What are the publication trends in the field of agroecological transition? How is the concept of agroecological transition evolving? What are the technical, economic, and environmental performances in agroecological transition? and What are the current challenges and opportunities of agricultural practices toward agroecological transition?

Methodology

Geographical location

The study takes place in northern part of the Sudanese climate of Benin Republic and limited to the north by Niger river, to the northwest by Burkina faso, to the south by hills department, to the east by Nigeria and by Togo to west.

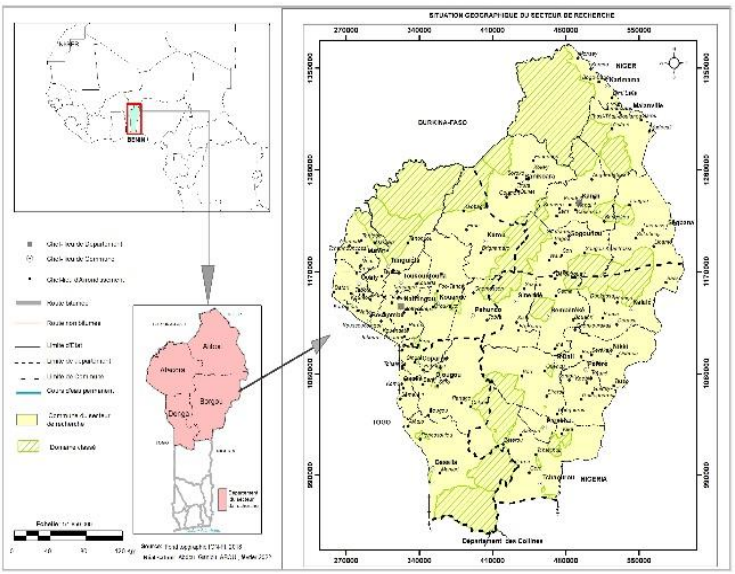

Figure 1. Geographical location area

Strategy and search term

A search strategy that includes search terms from a data source to collect the most relevant references was performed. The first step was to define a search string considering keywords and terms related to the PICO (Population, Interventions, Comparator, and Outcome) elements (Petrokofsky et al., 2015). The data source was the Scopus database (http://www.scopus.com/search/) and Dimension. These Scopus data were chosen because it includes a wide range of high-impact international academic journals (Caviggioli & Ughetto, 2019) and records mainly scientific articles, journals, and books, but also other documents such as conference reports, etc.

The keywords and terms used for searches in the main bibliographic databases were derived from the PIOS items detailed in Table 1.

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Table 1 : IOP elements

Elements	*Description*	**Syntax**
Population	Agro-ecological transition	***"Agroecological transition"*** **OR** ***"agroecological"*** **OR** ***"agro-ecological"***
Intervention	Cropping system, Farming, Activity	***"Cropping system"*** **OR** ***"farm"*** **OR "activity"**
Outcome or results	Technical performance or Economic performance or Environmental performance	***"Technical performance"*** **OR** ***"economic performance"*** **OR** ***"environmental performance"***

Each element was compared by the Boolean operator OR (Garcia-Yi et al., 2014; Petrokofsky et al., 2015) and their combinations by the Boolean operator AND. The terms were used to establish the search string (Search by titles, summary keywords) shown below:

(TITLE-ABS-KEY («Agroecological transition" OR agroecological OR "agro-ecological») AND TITLE-ABS-KEY («Cropping system" OR farm OR activity) AND TITLE-ABS-KEY («Technical performance" OR "economic performance" OR "environmental performance»))

Analysis method for bibliometric analysis

227 documents exported in RIS format from Scopus were subjected to bibliometric analysis with Citespace software. The analyses performed studied the evolution of the number of publications, and an analysis of the bursts of references (Chen, 2017; Xiao et al., 2017). The configuration parameters of the analyses in citespaces are left by default.

Study inclusion criteria

The inclusion criteria outlined in the IOP list (Table 1) specify the types of populations, interventions, outcomes, and geolocation. Figure 1 summarizes the evaluation steps according to the criteria for the documents to be included in the study. A set of 102 documents after deletion is subjected to an initial inclusion/exclusion step. This step consists in checking the relevance of the documents based on the title and abstract only (Petrokofsky et al., 2015). In case of doubt, the study is retained for further evaluation (Garcia-Yi et al., 2014). Then, the second step consisted of an evaluation of the relevance of the documents at the full-text level.

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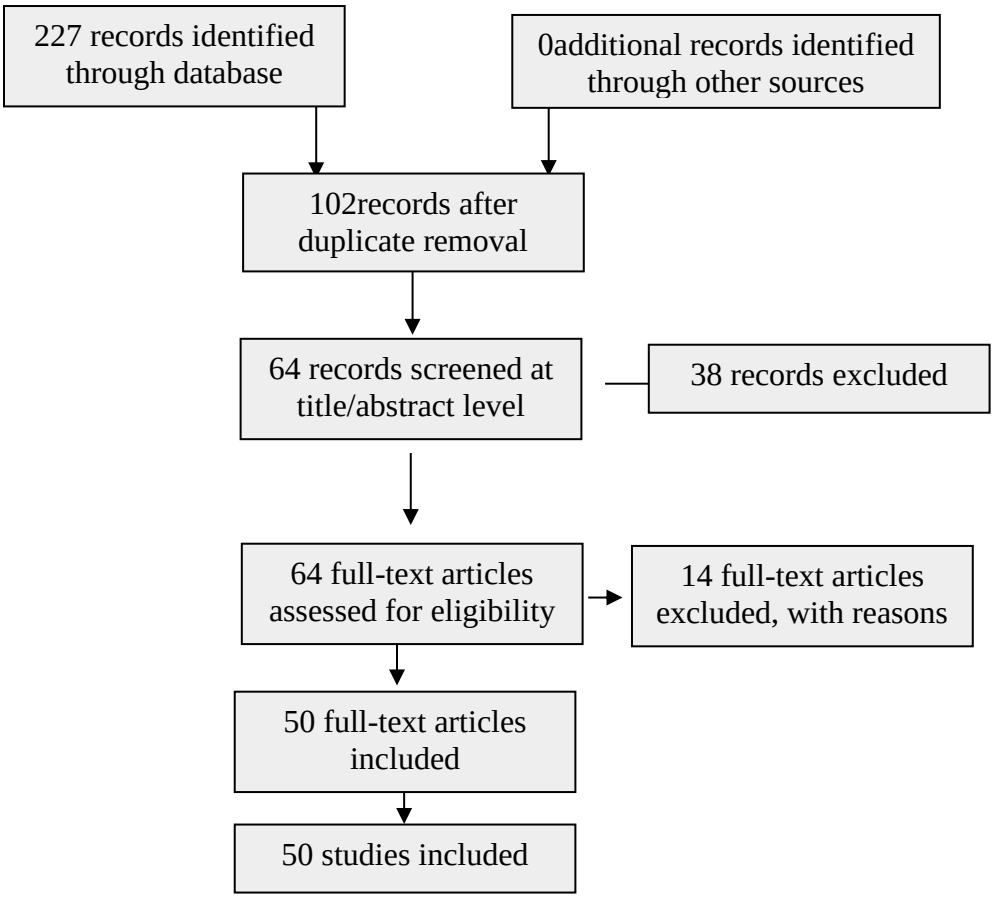

Results and discussion

Publication trend on the theme

The evolution of the number of publications on the theme can be divided into two main phases: a first phase from 2007 to 2012 characterized by low publications. The second phase from 2013 to 2022 characterized by the exponential growth of publications (Figure 2). This trend could be explained by the fact that the agroecological transition is a recent concept in the world.

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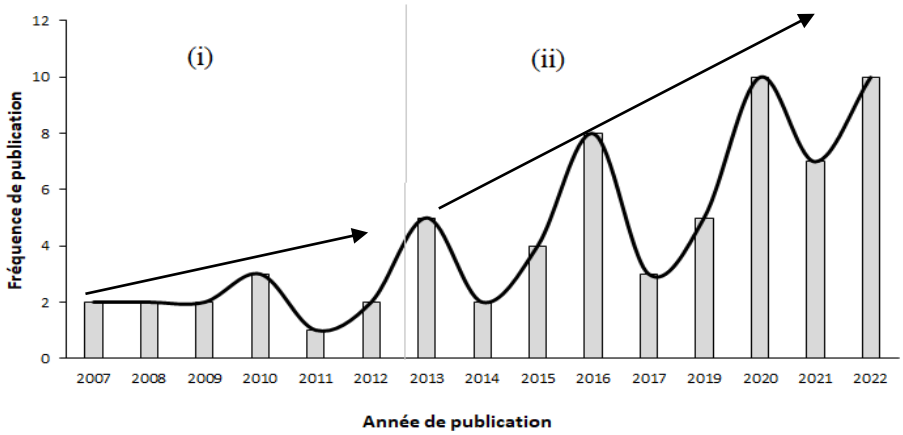

Figure 1. Evolution of the number of publications

2. Keyword analysis

2.1. Cluster analysis of keywords

Figure 3 shows the most cited articles in the area of agroecological transition performance. The size of the polygons represents the frequency of citation, and the lines between the polygons represent the cooperative relationship between them.

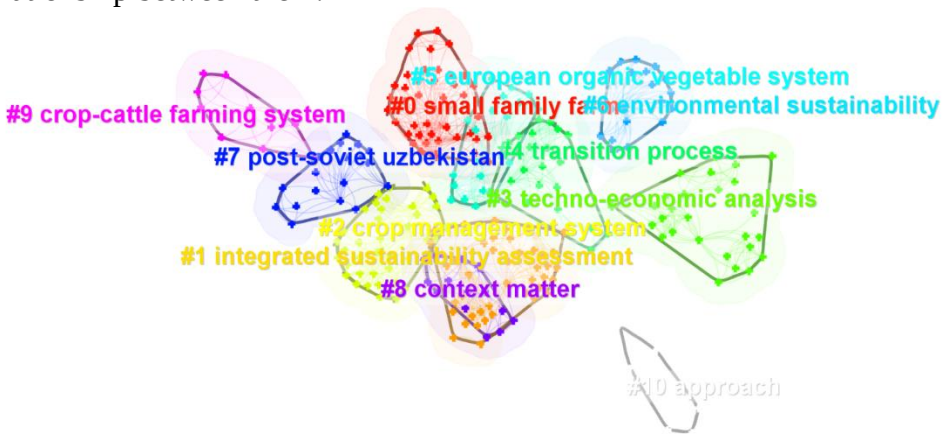

Figure 2. Cluster analysis of keywords

10 clusters were formed and the citation and silhouette information for each cluster (Table 2).

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Table 2. Summary of the 10 largest reference groups

Cluster-ID	Size	Silhouette	Label (SIF)	Label (LLR)	Label (MI)	Average year
0	43	0.907	Small family farm	small family farm (16.88, 1.0E-4)	Case Study (0.54)	2013
1	42	0.844	Economic indicator	integrated sustainability assessment (17.13, 1.0E-4)	farm level (0,3)	2012
2	39	0.799	Methodological framework	Crop management system (9.61, 0.005)	Cuba (0.2)	2009
3	27	0.935	Technical and economic analysis	Technical-economic analysis (14.23, 0.001)	Food sustainability (0.22)	2018
4	21	0.833	Agro-ecological performance	Transition process (15.37, 1.0E-4)	Economic evaluation (0.17)	2012
5	20	0.877	European organic vegetable system	European organic vegetable system (13, 0.001)	Multi-criteria evaluation (0.28)	2018
6	19	0.968	The role of input self-sufficiency in the economic and environmental sustainability of specialized dairy farms	Environmental sustainability (7.98, 0.005)	Environmental sustainability (0.03)	2015
7	19	0.869	An agronomic, economic, and behavioral analysis of nitrogen application to cotton and wheat in post-Soviet Uzbekistan	Post-Soviet Uzbekistan (7.47, 0.01)	Post-Soviet Uzbekistan (0.04)	2012
8	14	0.92	Sustainability of the agricultural system	Background (12.72, 0.001)	Opportunity cost (0.3)	2018
9	10	0.958	intersection	Cattle raising system (10.11, 0.005)	Productive sheet (0,17)	2010

Keyword burst analysis

Figure 3 shows a sudden detection analysis of cited keywords to explore the literature with significant contributions in the area of agroecological transition performance. We selected 07 keywords with the highest sudden appearance in the results of the article collection. Keywords with high values in the intensity value column are often important research papers in this field (Chen, 2017).

As shown in Figure 3, the oldest burst began in 2007, and the most recent in 2019. The most recent keyword bursts are related to "sustainability", "culture" and "biodiversity".

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Table 3. Graphical analysis of time zone for keywords

Keyword	Year	Strength	Start	End	2007 - 2022
zea may	2007	1.73	**2007**	2008	
mixed farming	2007	1.29	**2010**	2014	
food security	2007	1.15	**2012**	2013	
organic farming	2007	1.27	**2015**	2019	
sustainability	2007	1.74	**2016**	2020	
Farm	2007	1.28	**2016**	2022	
biodiversity	2007	2.11	**2019**	2020	

Concept of the agro-ecological transition

Agroecology has been broadly defined as "the ecology of sustainable food systems. (Francis et al., 2003). Thus, agroecology is study of ecological processes in agroecosystems. On the other it is a change agent for the complex social and ecological shifts that may need to occur in the future to move agriculture to a trulty sustainable basis. Together these complementary thurts forge the way toward achieving sustainable food systems. (Gliessman, 2006). In this definition, the key concept is the ecosystem: a functional system of complementary relationships between living organisms and their environment. Agroecological management uses practices such as no-tillage, plant cover, application of organic amendments, etc., to balance agricultural productivity and environmental concerns. (Wezel et al., 2014) to balance agricultural productivity and ecological functionality and improve resilience to external bio-physical disturbances (e.g., erosion, drought, plagues, etc.) (Altieri, 2002).

Therefore, the agroecological transition according to the FAO has been promoted as a potential solution to the ecological, social, and economic problems generated by dominant agricultural models (Audouin et al., 2019). It thus provides access to healthy agricultural products following a major ecological scandal caused by a persistent pesticide that contaminated water and agricultural soils (Andrieu et al., 2022).

Technical-economic and environmental performance in agro-ecological transition

Technical and economic performance

Economic performance varies according to the agroecological transition. Production activities also differ. The use of plant protection

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products allows farmers to maximize their economic performance and yields (Trabelsi et al., 2016)

However, farm economic performance and input self-sufficiency respond differently to farm growth. Although the study does not consider the underlying mechanisms, the results are consistent with the hypothesis that functionally diversified cropping systems offer farmers a wider range of potential growth factors and opportunities to exploit economies of scope in production that can improve their economic performance (Bommarco et al., 2013; Chavas and Kim, 2007; De Roest et al., 2018; Van der Ploeg et al., 2019).

Similarly, the satisfactory demand for legumes by the farm had a positive influence on socioeconomic performance at the territorial level, including an increase in the average gross margin (from 71 €/ha; to 4% more) (Catarino et al., 2021).

The French case study, based on self-sufficient farming systems belonging to a sustainable agriculture network, highlights that cost reduction management led to a win-win strategy including good economic and environmental performance (Bonaudo et al., 2014). Farms reduced their dependence on external inputs and suffered only a limited loss of production (Bonaudo et al., 2014). This is the case of a good procedure to attribute in most cases the greatest sustainability to permanent grasslands, thanks to good soil, nutrient, and pesticide management. The succession of rice continues, despite satisfactory economic results (Castoldi and Bechini, 2010).

Environmental performance

The environmental performance of agroecology is maintained and improved with the complete elimination of synthetic chemical plant protection products in mineral-ecological cropping systems (MECS) (Zimmermann et al., 2021). Therefore, the development of mineral-ecological cropping systems aims to improve the overall ecosystem services of agricultural landscapes by "(i) improving the provision of regulatory ecosystem services compared to conventional cropping systems and (ii) improving the provision of provisioning ecosystem services compared to organic cropping systems. (Zimmermann et al., 2021).

Furthermore, studies show that by decreasing dependence on external inputs, production systems are promising alternatives for an agroecological transition. Thus ecologically sustainable, resilient, and economically viable (Catarino et al., 2021). Therefore, the use of organic fertilizers such as composting is environmentally sustainable in terms of energy consumption and carbon emissions and produces a good quality fertilizer (Persiani et al., 2021).

Modern agricultural systems should combine healthy agricultural

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production with environmental benefits and high efficiency, to make them more sustainable. (Persiani et al., 2021).

Current challenges and opportunities of agroecological transition practices

Of the agroecological practices analyzed, compost application appears to hold the most promise for improving economic and environmental performance, and further research is needed to determine the results of a combination of compost and ground covers (De Leijster et al., 2020). A trade-off study of technical, economic, and environmental performance is also needed to show the dynamics of agroecological transition.

Conclusion

Based on the bibliometric analysis method, the scientific progress made on the performance of the agroecological transition is weak. Despite the low level of publications on the topic, there is common knowledge of the agroecological transition. The agroecological transition addresses the problems of the food system from field to plate, covering all activities and actors involved in the cultivation based on natural resources. Among the agroecological practices analyzed, the application of compost seems the most promising to be scaled up to improve economic and environmental performance. The trade-off studies of technical, economic, and environmental performance have shown the dynamics of agroecological transition. The evolution of the number of publications on the theme can be divided into two main phases: a first phase from 2007 to 2012 characterized by low publications. The second phase from 2013 to 2022 characterized by the exponential growth of publications

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