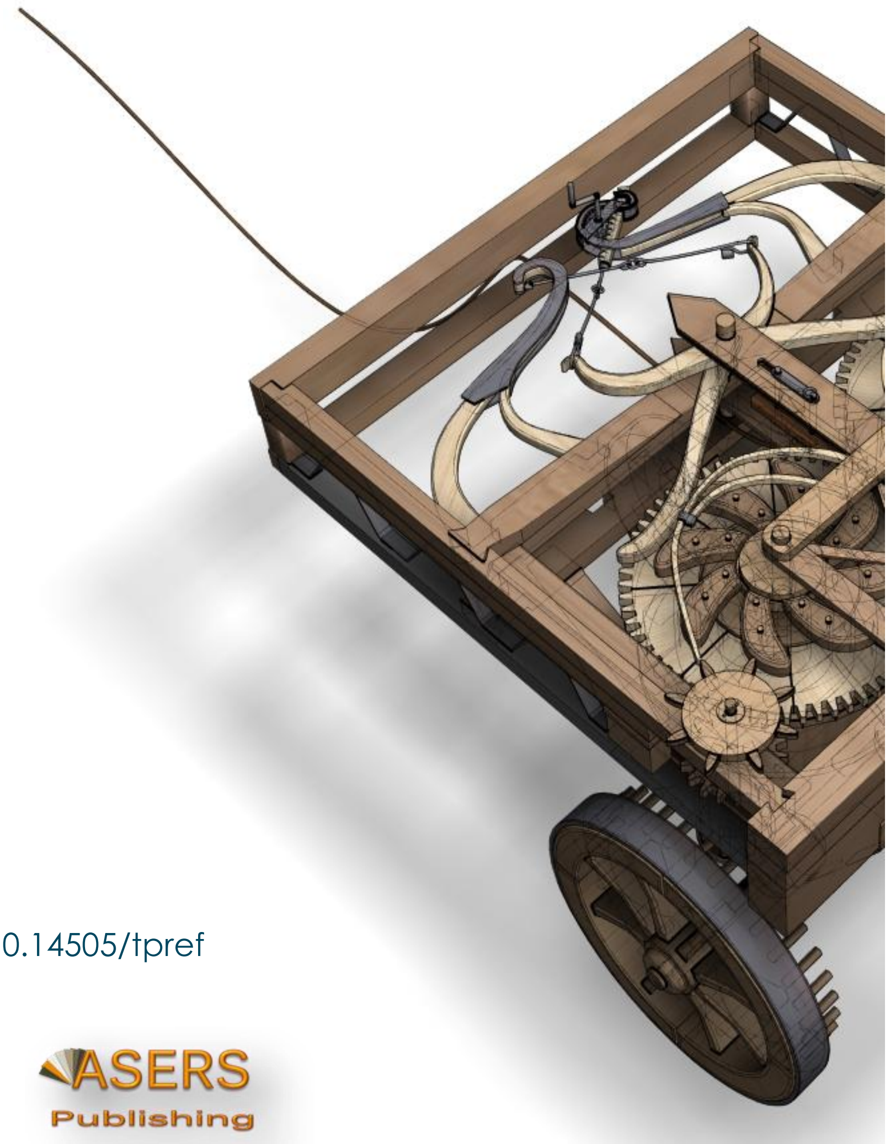
# Theoretical and Practical Research in Economic Fields



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# Tax Reform and Investment Decision Effects in an Emerging Economy: Insights from Ghana

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**Abstract**: This study focuses on both domestic and foreign investment as indicators of economic growth in an emerging market context, examining the effects of tax reforms on investment decisions in Ghana from 1985 to 2020. The research employs a time-series analysis to integrate control variables like inflation, gross capital formation, and base rate, revealing their significant influence on investment activity in tandem with tax policy changes. Unlike previous research that mostly uses gross fixed capital formation as a proxy for investment, this study includes a wider range of investment types, giving a more complete picture of how the economy works. We did unit root and co-integration tests, which showed that the variables were first-order co-integrated. We performed the model estimate using a Vector Error Correction Model (VECM) and Granger causality tests. Results reveal that tax reforms have a measurable impact on investment patterns, underscoring the importance of adaptive tax policies in promoting sustainable economic development. The findings contribute to the broader literature on investment and fiscal policy in emerging economies, offering insights for policy-makers on optimizing tax strategies to encourage investment and drive economic growth.

**Keywords:** tax reform; investment decisions; VECM; Ghana.

**JEL Classification**: H20; D92; C32; O55; R11.

## Introduction

Recently, developing economies have recognized tax reform as an essential mechanism for promoting investment. Historically, research evaluating investment reactions to alterations in tax policy has employed gross fixed capital formation as a surrogate for investment. This measure, however beneficial, encompasses only a fraction of investment activity, primarily concentrating on physical capital while frequently excluding other critical elements like finance or foreign direct investments. This method may be restrictive, as it might not adequately capture the complexities of investment decisions influenced by tax policy, particularly in economies with varied investment sources. This study bridges this gap by incorporating both domestic and international investment metrics, thereby providing a comprehensive view of how tax reforms affect a broader range of investment activities in Ghana. This method facilitates a more refined comprehension of the correlation between tax policy and investment, which enhances the efficacy of fiscal plans for developing economies. Tax policy is a government's determination of which taxes to levy, in what amounts, and on whom to levy them (Nyamadi, 2014).

Tax policies have been used by governments for many reasons, such as funding spending that boosts growth (Melo-Becerra, Mahecha, & Ramos-Forero, 2021), redistribution of resources and income (Engel, Galetovic, & Raddatz, 1999; Bucheli, Lustig, Rossi, & Amábile, 2014), fair distribution of consumer wealth (Enami, Lustig, & Taqdiri, 2019), and encouraging private investment (Villela & Barreix, 2002; Tavares-Lehmann, Coelho, & Lehmann, 2012; Gaspar *et al.* 2016). However, this study focuses on how tax reforms impact investment decisions in Ghana. Investment decisions involve careful consideration of various factors to maximise returns from investments while managing risks (Gaspar *et al.* 2016; Kuma and Singh, 2017). A key challenge for policymakers is to use taxes to promote investment and raise required domestic revenue while maintaining fiscal policies that are beneficial to both the state and prospective investors (Nwokoye & Rolle, 2019). There is no doubt that this would demand a full revamp of the tax system, which might increase efficiency by broadening the revenue base without increasing the tax rate (Hassett & Hubbard, 2012). A recent analysis of the budgets of the Government of Ghana has revealed that the government has been regularly lowering the tax rate to broaden the revenue base (Cummins, Hassett & Hubbard, 2016).

Indirect taxation, particularly VAT, serves as Ghana's primary source of tax revenue, with citizens paying the government on specified products and services through registered individuals or businesses (Aghion *et al.* 2005; Azémar & Dharmapala, 2019). This is a result of the government's continuous efforts to lower the corporate tax rate, which is part of its broader initiative to enhance the business environment for private-sector investment (Ghana Revenue Authority [GRA], 2019). Thus, Ghana's tax reform goal, among other things, is to improve private sector investment for growth. The primary aim of investors in any functioning economy is to invest scarce resources to maximise their prospective return on investment (Mohamud & Isak, 2019).

Investors, therefore, invest in countries that have favorable incentives for realizing their primary goal, which is to maximize their return on investment (Abdallah, 2016). As a result, governments, such as the Government of Ghana (GRA), use fiscal policy, particularly tax reforms, to attract investors to their countries (Barro, 1990; Mohamud & Isak, 2019). Thus, the policy recognizes tax reform as a powerful tool to shape investment decisions (Zed, Stotsky, & Ley, 2002). Changes in tax policies can impact the after-tax returns on investments, affecting the attractiveness of different asset classes and investment strategies (Bora, 2013 & Tanzi, 2012). Researchers have conducted numerous studies on this subject, resulting in varying outcomes and/or methodologies. Vergara (2010), for example, examined the empirical relationship between Chile's tax change and its subsequent investment performance and found evidence suggesting the corporate income tax drop played a significant role in Chile's investment boom in the late 1980s and early 1990s. The figures explicitly indicate that the tax reforms account for a three-point increase in private investment as a proportion of GDP.

Again, the analysis showed that using microeconomic data, there was sufficient evidence to conclude that the tax reforms have a beneficial effect on investment. Although interesting, Vergara's analysis is out of date since the study used data between 1975 and 2003. Again, Chile's tax changes at the time aimed to reduce taxes, in contrast to Ghana's, which consolidated all three revenue agencies and resulted in tax hikes. As such, Vergara's (2010) conclusion may serve as a point of reference rather than a definite conclusion for Ghana. Also, López-Gutiérrez *et al.* (2015) investigated the effect of financial problems on the investment behavior of businesses in Europe and North America using the Generalized Method of Moments. According to the research, the influence of financial problems on investment differs based on the investment options available to organizations. Thus, businesses in distress with fewer possibilities have a greater tendency to underinvest, whereas those with more chances exhibit no different investment behavior than healthy businesses. Lopez-Gutierrez *et al.* (2015) did not mention the tax component, which is relevant to this investigation. However, Muhammed *et al.'s* (2012) study in Pakistan revealed that tax reforms have no direct effect on investment decisions, but they do have an indirect effect on investment. The lack of empirical studies on the impact of tax reforms on investment decisions in Ghana, along with the inconsistent findings in the empirical literature, supports the need for an independent study on the relationship between tax reforms and investment decisions in Ghana. It is also important to emphasize that the majority of previous studies used gross fixed capital creation as a proxy for investment choices. Therefore, the previous studies primarily focused on local investment opportunities. However, both domestic and foreign companies invest in Ghana.

This study considerably enhances the conversation on tax reform and investment decisions by providing empirical insights from the viewpoint of a rising economy such as Ghana. This paper examines the distinct problems and opportunities arising from Ghana's tax reforms, in contrast to prior research that primarily concentrates on wealthy economies or broad regional assessments. This study's originality lies in its analysis of the interaction among tax incentives, compliance costs, and investment behaviour in a dynamic economic context. The findings underscore the essential importance of policy continuity and digitalization in influencing investor confidence. This research offers practical advice for policymakers seeking to integrate tax reforms with sustainable development goals in Ghana and other settings by connecting theoretical models with real-world applications.

As such, this study draws on theoretical views and attempts to close methodological and contextual gaps in empirical research by examining the impact of tax reforms on investment choices in Ghana, considering both domestic and international investment inflows. We have organized the paper as follows: Section 1 examines the literature review. Section 2 explains the study methods. These include data sources, model needs, and estimation methods used to conduct empirical research. Section 3 delineates the empirical results, whereas the remainder of 4 elucidates these findings and provides policy implications.

## 1. Literature Review

Incorporating certain economic models, such as Keynesian and neoclassical investment theories, into theoretical study is crucial to ensure its foundation in well-established frameworks that directly influence the relationship between taxes and investments. Neoclassical investment theory elucidates the effects of tax policy on investment by altering capital costs, hence affecting firms' resource allocation decisions for growth. Keynesian models underscore the significance of government involvement and fiscal policy, especially taxation, as mechanisms to enhance aggregate demand and investment in the economy. By delineating these models, the study can provide a more lucid, theoretically supported justification for the impact of tax reforms on both domestic and foreign investment. This specificity bolsters the study's analytical framework and increases its significance for policymakers by situating the findings within established economic theories that have traditionally informed fiscal decisions in emerging economies. Every nation establishes its tax system as one of the factors influencing its business environment. The correlation between tax reform and investment decisions has been a significant subject of investigation for politicians and academics in Ghana. Tax policies profoundly affect the economic landscape by determining incentives for both domestic and international investment. In recent years, Ghana has implemented numerous tax reforms to improve revenue mobilization, streamline tax administration, and promote private sector development. The efficacy of these reforms in influencing investment decisions continues to be a topic of contention. Ghana has executed significant tax reforms, encompassing the implementation of Value Added Tax (VAT), modifications to corporate tax rates, and the establishment of electronic tax systems to enhance compliance.

Tax-efficient investing theory, for example, is a collection of theories that help understand how tax reforms affect investment decisions. The tax-efficient investing theory revolves around minimizing the impact of taxes on investment returns. According to the tax-efficient investing theory, investors aim to structure their portfolios in a way that reduces taxable events, such as capital gains, and takes advantage of tax-efficient investment vehicles, like tax-advantaged retirement accounts. When tax reforms alter the costs associated with different investment choices, investors are likely to adjust their portfolios to optimize their post-tax returns. Changes in corporate taxes, for example, may influence whether investors invest within an economy or not, or invest in an industry or not. Also, economic theory suggests that firms respond to incentives.

Tax incentives, such as tax credits for certain types of investments or industries, can influence investment decisions. Investors may be more inclined to allocate capital to regions that benefit from favorable tax treatments. Thus, based on these three theories - tax-efficient investing theory, rational choice theory, and economic theory - tax reforms influence investors regarding which country to invest in and which industry to invest in. The term "tax reform" refers to a departure from the status quo. If the marginal cost of tax I exceeds the marginal cost of tax J, the basic concept of tax reform is violated, and it is advantageous to move from I to J at the margin. In general, tax reform is desirable if it improves revenue while also boosting social welfare. We should impose a tax if the direct impact of the shift on families outweighs the cost of the increased demand due to shadow pricing. The shadow price of a good represents the welfare consequences of changes in general equilibrium caused by increased demand for an item. Therefore, the economy's response determines the shadow price (Stein, 1988b, and Reinhart and Rogoff, 2004). Newbery and Stein (1988) examined tax reform using the concept of optimal taxation as a normative framework. The study seeks to account for both tax losses in resource allocation efficiency and vertical equity standards as a result of tax reform. The first component of the reform examines taxpayer sensitivity to tax-induced relative price increases, while the second examines the precise specification of a social welfare function. According to this perspective, optimal tax policies are those that minimise the efficiency costs (additional burden) of taxing while also taking income inequality into account. One of the most remarkable aspects of these schemes is their virtually complete lack of consistent tax rates.

For instance, Table 1 lists some of the tax reforms and policies that Ghana has implemented.

Table 1. Laws being administered by GRA

| 1991- 1999 | 2000- 2019 | 2020- |
|---|---|---|
| TIN Act, 2002 - Act 632<br>Stamp Duty Act 689<br>Free Zones Act 1995-Act-504 | Ghana Education Trust Fund Act, 2000 - Act 581<br>Value Added Tax Act, 2013 - Act 870<br>Internal Revenue ACT (2006 Amended Version)<br>Internal Revenue ACT (2012 Amended Version)<br>Communications Service Tax Act, 2008 -Act 754<br>Communications Service Tax (Amendment) Act, 2013 -Act 864<br>Excise Tax Stamp Act, 2014 - Act 873;<br>Excise Duty Act, 2014 - Act 878;<br>Customs Act, 2015 - Act 891;<br>Income Tax Act, 2015 (Act 896);<br>Value Added Tax Act, 2013 - ACT 870<br>Acts<br>Income Tax Act, 2015 - Act 896<br>Ghana Revenue Authority Act, 2009 - Act 791<br>VAT (Amendment) Act 954 | Penalty and Interest Waiver Act 2021<br>Financial Sector Recovery Levy Act 2021<br>Revenue Administration (Amendment) Act, 2020 Act 1029<br>Penalty and Interest Waiver (Amendment) Act, 2021 Act 1073<br>Covid 19 Health Levy Act<br>Ghana Infrastructure Investment Fundamental Act 2021<br>Electronic Transfer Levy Act, 2022 Act 1075 - E-Levy<br>Income Tax (Amendment) (No.2) Act, 2021 Act 1071<br>Income Tax (Amendment) Act, 2021 Act 1066<br>VAT (Amendment) Act, 2021 Act 1072 |

### 1.1 Factors Affecting Investment Decisions

Investment does not have a common definition. Investment has evolved, giving rise to a plethora of definitions and opinions on the concept. While various disciplines define investment differently, they all refer to the notion of allocating resources - whether time or money - to an activity to accomplish the desired goal. For this study, investment will be defined as the present placement of money in an activity with the anticipation of a return that takes time, uncertainty, and inflation into account (Barton, 2016). Investment entails incurring risks due to the unpredictability of events since current expenditures are paid to receive typically uncertain future rewards. Generating income to cover future costs is the primary objective of investing. Due to the critical nature of both the present and future elements of investment, components that aid in defining assurance in investments are in high demand. Though several factors influence investment decisions, this study focused on critical macroeconomic factors relevant to investment decisions in Ghana. The following discussion highlights some of these factors:

**Interest** rates denote the expense of borrowing funds and serve as remuneration for lenders, profoundly impacting the economy by altering the cost of capital and the accessibility of credit. The International Monetary Fund (IMF) delineates three principal functions of interest rates: they promote saving, influence the demand for loanable money, and assist in managing inflationary risks (Mohamud & Isak, 2019). Interest rates, shaped by the monetary policy rate (MPR), fluctuate, impacting enterprises' borrowing expenses and, subsequently, their profitability and market valuation (Patil & Bagodi, 2021). As interest rates rise, corporate bonds become less attractive due to diminished yields. The central bank is crucial in determining interest rates, specifically by overseeing interbank lending rates, which directly influence the loan and savings rates offered by commercial banks. Moreover, elevated interest rates may stimulate demand for government-issued bonds and influence currency valuation. Understanding interest rates is crucial for overseeing loans, credit cards, and various financial commitments. Borrowers with elevated risks typically encounter increased interest rates, underscoring the necessity of maintaining favorable credit scores for improved borrowing conditions. Ultimately, interest rates function as essential regulators in financial models, influencing economic conditions and personal financial choices.

Economic growth denotes the rise in the market value of all products and services generated by an economy over time, adjusted for inflation (IMF, 2012). Typically, we quantify it as the percentage rate of growth in real GDP. Economic growth is a fundamental macroeconomic objective since it signifies an increase in a nation's real per capita income (Davids, 2015). This expansion enhances an economy's productive capacity, facilitating the production of additional goods and services while simultaneously elevating living standards and diminishing income inequality. Monetary policies are essential instruments for fostering economic growth, as they govern the value, supply, and cost of currency within an economy (Folawewo & Osinubi, 2006). Robust and continuous economic growth is crucial for alleviating poverty and attaining the Millennium Development Goals. It can foster a cycle of wealthy generation, encourage education, and force governments to implement changes, thereby propelling future development (Davids, 2015).

**Inflation,** the country's overall price level of products and services, is consistently increasing. As a proxy for inflation, the yearly growth rate of the GDP implicit deflator represents the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current currency to GDP in constant currency in the prior year (World Development Indicators, 2018).

### 2.2 Empirical

This section examines empirical literature on tax reforms and investment decisions worldwide, concentrating on Ghana while noting gaps and proposing new study avenues. Alves (2019) examined OECD nations from 1980 to 2015, demonstrating that income taxation fosters investment development when tax collections attain 10.7%, whereas social security disbursements impede long-term growth. This study, however, ignored non-OECD nations, in contrast to Muhammad *et al.* (2012), who identified that taxes indirectly affect investment through disinvestment via income taxes, underscoring the necessity for further analysis in Ghana. Braunerhjelm and Eklund (2014) discovered that tax administration constraints hindered firm entry in 118 countries between 2004 and 2010, but their data may now be obsolete. Vergara (2010) associated Chile's corporate tax reductions from 1975 to 2003 with a spike in investment; nevertheless, Ghana's recent tax increases render Vergara's conclusions less applicable in the local context. Da Rin *et al.* (2010) discovered that corporate tax reductions diminish capital sizes for new enterprises across 17 European nations; however, labor-related consequences exhibit variability. Their results on tax reductions are at odds with the prior conclusions of Braunerhjelm and Eklund (2014).

López-Gutiérrez *et al.* (2015) investigated the impact of financial distress on investment decisions. Their findings revealed that distressed enterprises typically underinvest; they did not directly analyze taxes. Mungaya *et al.* (2012) conducted a survey of SME managers in Tanzania, revealing that tax policies adversely affect SME development; nevertheless, the descriptive character of their study constrains its statistical validity. Muhammed *et al.* (2012) discovered that Pakistan's tax structure influences investment via disinvestment; nevertheless, the simplicity of their technique undermines their conclusions. Mensah (2022) contended that corporate tax reforms in developing nations such as Ghana promote foreign direct investment (FDI) and local investment, consistent with the overarching notion that tax reforms influence investment patterns. Recent research by Okoth, (2023) indicates that tax incentives have short-term effects on capital formation in Ghana, but Osei and Addo (2021) emphasize that inflation diminishes short-term investment, despite the advantages of long-term tax reform. Boateng and Owusu (2024) discovered that decreases in company tax enhance investor confidence in capital-intensive industries within sub-Saharan Africa. Kwabena *et al.* (2022) underscored the significance of tax stability for fostering investor confidence, cautioning that frequent tax alterations may engender uncertainty and dissuade investment in Ghana.

Most research reveals that political stability, infrastructure, and access to finance influence the impact of tax reforms on fostering an investment-friendly climate. Tax policy significantly influences investment decisions and economic results, as evidenced by numerous recent studies. Rumasukun, Mohammad Ridwan, and Muhammad Yamin Noch (2023) examined the influence of tax policy on investment choices in the manufacturing sector, emphasizing that tax incentives can encourage investment in capital-intensive industries. Muslim (2024) evaluated the impact of tax accounting regulations on financial reporting, highlighting its dual function in guaranteeing compliance and promoting openness. Qi *et al.* (2023) conducted extensive research on the impact of tax policy alterations on business investment and economic growth, illustrating that effectively structured tax policies can enhance economic activity by mitigating uncertainty and promoting private sector engagement.

Nembe and Idemudia (2024) examined the difficulties of formulating efficient digital tax policies within the framework of global tax reforms, focusing on the intricacies of taxing digital economies and proposing adaptive techniques for the international harmonization of tax systems. Awuonda and Ombok (2024) examined inflation-driven VAT reforms in the sugar industry, demonstrating their effects on price stability and emphasizing the necessity of reconciling revenue generation with economic stability. Collectively, these studies highlight the complex nature of tax laws and their extensive effects on investment choices, financial reporting, and macroeconomic stability. These findings highlight the necessity of synchronizing tax policies with national development objectives to maximize their effectiveness. Although the existing literature emphasizes the macroeconomic consequences of tax reforms, there is no focus on their micro-level impacts on investor conduct in Ghana. The interaction between tax incentives and non-tax issues, including governance and market access, requires additional examination.

Cobbinah, Wen, and Sarpong (2024) emphasize that policy tools, including interest rates, inflation management, and government expenditures, profoundly affect investor confidence and market performance. Their research reveals that fiscal growth and lenient monetary policies frequently stimulate favourable stock market trends, but macroeconomic instability, such as currency depreciation and budget deficits, may counterbalance these impacts. This observation highlights the essential function of coordinated policy frameworks in promoting a robust and growth-focused stock market in Ghana. Frimpong, Asare, and Aggrey-Darkoh (2023) examine the complexities of tax policymaking in Ghana, highlighting its development within the wider framework of public administration and governance. Their contribution elucidates the difficulties of formulating equitable tax policy in the face of conflicting needs for revenue generation and economic expansion. Seidu, Queku, and Carsamer (2023) expand on this discourse by examining the impact of financial limitations on tax planning practices within Ghana's banking sector. Their findings indicate that banks facing greater financial limitations employ more aggressive tax planning tactics. Naama (2023) advocates a reform-oriented strategy to revitalize Ghana's economy, highlighting the necessity of structural modifications in taxation and economic policy to rectify fiscal inefficiencies and stimulate economic growth. These studies collectively offer a detailed understanding of Ghana's fiscal dynamics and their effects on economic performance.

Mobilizing tax revenue is essential for economic stability and prosperity, especially in sub-Saharan Africa, where fiscal issues frequently impede sustainable development. Kassa and Obeng (2024) examine the factors influencing tax revenue mobilization in the region, highlighting the substantial impact of economic development and digital infrastructure. Their analysis highlights that economic growth expands the tax base, while strong digital infrastructure improves the efficiency and transparency of revenue-collecting operations. These innovations mitigate tax evasion and administrative inefficiencies, resulting in enhanced revenue returns. Furthermore, the analysis underscores the capacity of these enhancements to establish conducive conditions for investment. By rectifying inefficiencies in tax systems, nations may create a stable and investor-friendly fiscal climate, crucial for attracting both domestic and foreign capital. Kassa and Obeng contend that harmonising tax policies with economic development methods might provide a synergistic impact, in which heightened investments further enhance economic growth and tax revenue production. This thorough examination highlights the significance of structural reforms and technology innovations in developing tax systems that efficiently generate revenue while promoting economic engagement and investment.

## 2. Research Methods

### 2.1 Data Sources

The research utilised a quantitative, explanatory approach to examine the effects of tax reforms on investment decision-making in Ghana. The study used time-series data from 1985 to 2020, concentrating on Ghana because of its significant tax reforms and its position as a pivotal investment center in sub-Saharan Africa. We obtained data from the 2021 World Development Indicators, the Bank of Ghana, and the Ghana Revenue Authority, which encompassed factors such as tax revisions, interest rates, inflation, and foreign direct investment. We chose the timeframe from 1985 to 2020 due to the availability of pertinent data. The researchers used summary statistics to detect and rectify mistakes or outliers in the data, ensuring precision through verification with official sources. This comprehensive evaluation furnished a dependable dataset for examining the correlation between tax reforms and investment decisions in Ghana. To enhance the study's methodology and clarify the role of control variables, a detailed explanation of each control variable - its relevance, expected effect on investment, and interaction with the independent variable (tax reform) - is essential. This section will discuss the selection of control variables such as inflation, gross capital formation, and the base rate, providing insights into their importance in isolating the impact of tax reform on investment decisions in Ghana.

Inflation affects purchasing power and economic stability, which can influence both investor confidence and real returns on investment. High inflation often creates uncertainty and deters investment, whereas low, stable inflation can create a favorable investment environment. In order to accurately attribute observed changes in investment to tax policy rather than inflationary pressures, this study incorporates inflation as a control variable. As a measure of total investment in the economy, gross capital formation includes physical assets such as buildings, machinery, and equipment. It reflects the overall capacity for production expansion and economic growth. By controlling gross capital formation, the study isolates the direct influence of tax reforms on investment from other general trends in asset accumulation, offering a more targeted view of the policy's impact on new investments. The base rate, or central bank interest rate, directly impacts borrowing costs for firms and individuals, which in turn affects their ability to finance investments. A higher base rate typically increases borrowing costs, reducing investment; a lower base rate can stimulate investment by lowering financing costs. Including the base rate as a control variable helps to distinguish the effects of monetary policy from those of tax reform, ensuring the study's results focus specifically on the relationship between tax changes and investment behavior.

Methodological Enhancements: To further enhance methodological rigor, the study acknowledges limitations associated with data availability (*e.g.*, pre-1985 data gaps) and the potential influence of external factors, such as global economic conditions. For instance, the study addresses how shifts in global conditions may have indirect effects on local investment, potentially interacting with domestic tax policies, given that international market trends shape Ghana's investment environment. These enhancements provide greater transparency and robustness, ensuring that conclusions drawn are reliable and consider contextual limitations. This comprehensive approach to control variables and methodological clarity strengthens the study's findings, offering a clearer understanding of how tax reforms specifically impact investment in Ghana.

Incorporating control variables like inflation, gross capital formation, and the base rate is essential to isolating the unique effects of tax reform on investment, thereby increasing the accuracy of the study's results. Each control variable plays a distinct role in shaping economic conditions and investor behavior. For example, inflation directly impacts the real returns investors can expect; as price inflation rises, real returns on investment decline, often leading traders to adopt more conservative strategies. Gross capital formation, on the other hand, is a direct indicator of economic growth and resource accumulation. By adjusting for these variables, the study can more effectively distinguish between investment behaviors driven by tax policy changes and those influenced by broader economic factors. Without these controls, we might mistakenly attribute any observed changes in investment to tax reform, even if they stem from other economic dynamics. The inclusion of the base rate as a control variable also highlights the interplay between fiscal and monetary policy, which together influences the cost of financing for both domestic and foreign investors. Since the central bank's base rate affects loan and credit costs, it can either facilitate or hinder investment independent of tax reform policies.

In Ghana, businesses, particularly small- and medium-sized enterprises, prioritize borrowing costs, and the inclusion of the base rate prevents confusion between changes in investment and interest rate shifts. By addressing these key economic factors, the study achieves a more nuanced analysis, revealing the distinct impact of tax reform on investment while controlling for confounding variables that might otherwise skew the findings. Enhancing the methodology with a clear explanation of the chosen variables and addressing data limitations strengthens the study's transparency and reliability. We explicitly acknowledge data availability limitations, particularly the absence of pre-1985 data, to ensure readers understand that our conclusions are based on available historical records. It is crucial to acknowledge this limitation, as it sets the context for the study's temporal scope and underscores the possibility of factors beyond the current data set influencing the observed trends. Additionally, the study accounts for external influences, such as global economic conditions, which can indirectly impact Ghana's investment environment and interact with domestic tax policies. The study, by acknowledging these contextual factors, offers a more realistic interpretation of the findings, assisting policymakers in understanding that external conditions may also shape tax reform outcomes.

Moreover, the inclusion of alternative methodologies in the discussion enhances methodological rigor and demonstrates an openness to further validation. By briefly outlining methods that could also be applicable, such as panel data analysis or time-series cross-sectional studies, the research not only justifies the chosen approach but also opens avenues for future research to build upon or verify the study's results. This transparency in methodology not only bolsters the credibility of the findings but also supports the development of a more robust understanding of tax policy impacts in emerging economies. These methodological enhancements ensure the study's conclusions are not only well-substantiated but also broadly relevant and replicable, thus contributing a valuable framework for future research on taxation and investment in similar economic contexts. In exploring the effects of tax reform on investment decisions, alternative research methods such as qualitative case studies or panel data analysis could provide valuable supplementary insights. Qualitative case studies, for example, allow an in-depth examination of specific companies, industries, or time periods, focusing on how individual firms or sectors perceive and respond to tax policies in Ghana. This approach captures unique insights into decision-making processes that aggregate quantitative data might overlook, especially in capturing qualitative variables like investor sentiment, regulatory compliance costs, or the adaptability of firms.

By studying a targeted selection of firms, qualitative case studies could reveal more nuanced patterns in how various economic agents interpret and react to tax reforms, enriching our understanding of the relationship between tax policy and investment behavior. Another promising alternative is panel data analysis, which could leverage both cross-sectional and time-series data to capture more complex dynamics over time. This approach could account for individual heterogeneity among different sectors or firms, providing a broader and more flexible analytical framework than a purely time-series or cross-sectional design. For instance, panel data analysis could control firm-specific characteristics or industry-specific shocks, which might affect how tax policies impact investment decisions across various contexts. Additionally, it could help in distinguishing short-term reactions from long-term adjustments to tax reforms, a valuable perspective in understanding the temporal impact of policy changes. While the current study did not use these methods, their consideration highlights a comprehensive approach to research design, providing potential avenues for future research that could enhance the findings.

## 2.2 Study Variables

The variables used in this study were grouped into three dependent variables, independent variables, and control variables, as follows:

Table 2. Variables used in this study

| Components | Specific Variables | Description/ measurement | Source |
|---|---|---|---|
| Dependent variable | Investment decision | Gross domestic investment comprising investment made by both local and foreign firms in Ghana | World Development Indicators, 2021 |
| Independent variable | Tax reform | The effective tax rate represents the percentage of income that a corporation pays in taxes after taking into account various deductions, credits, and exemptions | Callihan, 1994 |
| Control variables | Inflation | Customer price index | Marques, *et al.* (2003) |
| | Interest rate | Base rate from Bank of Ghana | Churchill, Kwaning & Ababio, 2014 |
| | Business confidence | Business Confidence Index (BCI). The Business Confidence Index is a quantitative measure that reflects the sentiment and outlook of businesses regarding current and future economic conditions. | Khan and Upadhayaya (2020). |

## 2.3 Model Specification

This analysis used VAR and Granger causality models to investigate the effects of the tax reform on investment decisions in Ghana. Time-series analysis uses vector auto-regressive (VAR) to capture the dynamic relationships among multiple variables over time. The VAR model is an extension of the univariate autoregressive model (AR model) to multiple time series. The study used VAR because it captures multiple time series variables as vectors and can analyse the response of variables to a shock. Additionally, we can test Granger causality between variables using VAR models. Granger causality tests help assess whether past values of one variable provide information about future values of another variable. Given the important features of VAR, it has been used in many previous time series studies (Büyükakin *et al.* 2009). This study relied on a model by Hann and Cook (1988) to specify the impact of tax reform on investment decisions, as shown in Equation 1. Where INVDEC is investment decision-making, TaxREF is tax reform, INFL is the inflation rate, INTR is the interest rate, and BUSENVI is the business environment index. When $\alpha 2 = 0$, it means that tax reform has no impact on investment decisions; $\alpha 2 = 1$, it means that tax reform has a complete impact on investment decisions; $\alpha 2$, $<1$, it means that tax reform has an incomplete impact on investment decision-making; and $\alpha 2$, $> 1$, it means that tax reform has an overly complete impact on investment decisions. Also, following Granger (1969), the study tested the causal relationships between tax reform and investment decisions using Equations 2 and 3. The study used time series procedures to estimate Equations 1, 2, and 3. These included the unit root test, lag selection, the Lagrange-multiplier test, and the Jarque Bera normality test. We entered the collected data into an e-view (9 x 64) to conduct preliminary tests and estimate Equations 1, 2, and 3.

## 3. Results

### 3.1. Summary Statistics

Table 3 displays the summary statistics of all the study variables, including domestic investment, effective tax rate, inflation, interest rate, and business environment index.

Table 3. Summary Statistics of the Study Variable

| | Effective tax rate | Domestic investment | Inflation | Base Rate | Business Environment Index |
|---|---|---|---|---|---|
| Mean | 34.375 | 19.096 | 23.562 | 34.964 | 45.342 |
| Maximum | 50.000 | 31.785 | 80.751 | 47.750 | 61.238 |
| Minimum | 25.000 | -7.219 | 7.112 | 22.346 | 27.759 |
| Std. Dev. | 10.042 | 8.370 | 13.896 | 9.182 | 10.647 |
| Skewness | 0.585 | -1.087 | 2.072 | 0.189 | 1.425 |
| Kurtosis | 1.787 | 4.106 | 8.964 | 1.472 | 6.836 |
| Jarque-Bera | 4.260 | 8.932 | 79.112 | 3.715 | 11.563 |
| Probability | 0.119 | 0.011 | 0.000 | 0.1560 | 0.000 |

*Source*: World Development Index 2021

Table 3 shows that the effective tax rate has a mean value of 34.375, with minimum and maximum figures of 50 and 25, respectively. This shows little resemblance to the effective global tax rate, which had a maximum of 43% and a minimum of 24% between 1980 and 2015 (ActionAid, 2019). The mean, minimum, and maximum values of domestic investment were about 134000000000, 43000000, and 349000000000, respectively. The mean values of inflation, interest rates, and the business environment index over the period were 23.6%, 35%, and 45.342%, respectively.

### 3.2. Unit Root Test

The study used the augmented Dickey-Fully and Phillip-Perron tests for the unit root of all the study variables, as shown in Table 4.

Table 4. Augmented Dickey-Fully and Phillip-Perron tests for the unit root of all the study variables

| Study Variables | Augmented Dickey-Fuller Test | | | | Phillip-Perron Test | | | |
|---|---|---|---|---|---|---|---|---|
| | At level | p-value | At first difference | p-value | At level | p-value | At first difference | p-value |
| Effective Tax rate | -1.2737 | 0.663 | -5.8927* | 0.000** | -1032 | 0.625 | -6.325 | 0.000** |
| Domestic investment | -2.170 | 0.217 | -7.6854 | 0.000** | -2.129 | 0.219 | -6.6726 | 0.000** |
| Business Environment Index | -4.946 | 0.001* | - | - | -4.930 | 0.001* | - | - |
| Inflation | -5.500 | -0.000** | - | - | -5.641 | 0.000* | - | - |
| Base Rate | -1.3475 | 0.370 | -4.1958 | 0.004* | -1.306 | 0.348 | -4.439 | 0.001* |

*Source*: World Development Index, 2020; World Bank, 2021; **=statistical significance at 1%;
s*= statistical significance at 5%.

According to the augmented Dickey-Fuller and Philip-Perron tests for unit-root in Table 4, the effective tax rate, domestic investment, and base rate were stationary at the first difference. At this level, however, the business environment index and inflation were stationary. This implies that the vector autoregressive (VAR) model is most suitable for the estimation; hence, the study used VAR for the estimations.

### 3.3. Lag Selection

The results of this section's consideration of appropriate lags for the model of the impact of tax reform on investment decisions in Ghana are presented in Table 5. The criteria used include Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hanna-Quinn Information Criterion (HQ). This study relied on AIC as one of the criteria.

Table 5. Maximum Lag Length

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -62.98066 | NA | 3.75e-05 | 3.998862 | 4.223327 | 4.075411 |
| 1 | 61.59111 | 205.1770* | 1.09e-07* | -1.858301* | -0.511512* | -1.399007* |
| 2 | 83.67829 | 29.88265 | 1.44e-07 | -1.686958 | 0.782154 | -0.844920 |
| * Indicates lag order selected by the criterion | | | | | | |
| LR: sequential modified LR test statistic (each test at 5%level) | | | | | | |
| FPE: Final prediction error | | | | | | |
| AIC: Akaike information criterion | | | | | | |
| SC: Schwarz information criterion | | | | | | |
| HQ: Hannan-Quinn information criterion | | | | | | |

From Table 5, all the criteria (LR, FPE, AIC, HQ, and SC) gave a maximum lag length of 1. Therefore, in this study, the appropriate lag for the impact of tax reforms on investment decisions in Ghana is 1.

### 3.4 Cointegration Test

Tables 6a and 6b display the co-integration test result for the impact of bank deposits on GDP growth.

Table 6. Unrestricted Cointegration Rank Test

| Table 6a:Trace Test | | | | |
|---|---|---|---|---|
| Hypothesized | | Trace | 0.05 | |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None * | 0.493856 | 105.0624 | 95.75366 | 0.0098 |
| At most 1 | 0.421328 | 68.29194 | 69.81889 | 0.0658 |
| At most 2 | 0.257250 | 38.75286 | 47.85613 | 0.2702 |
| At most 3 | 0.229767 | 22.69347 | 29.79707 | 0.2614 |
| At most 4 | 0.146766 | 8.596134 | 15.49471 | 0.4040 |
| At most 5 | 0.000466 | 0.025154 | 3.841466 | 0.8739 |
| Trace test indicates 1 cointegrating eqn(s) at the 0.05 level | | | | |
| * Denotes rejection of the hypothesis at the 0.05 level | | | | |
| **MacKinnon-Haug-Michelis (1999) p-values | | | | |
| Table 6b: Maximum Eigenvalue | | | | |
| Hypothesized | | Max-Eigen | 0.05 | |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None | 0.493856 | 36.77049 | 40.07757 | 0.1126 |
| At most 1 | 0.421328 | 29.53909 | 33.87687 | 0.1511 |
| At most 2 | 0.257250 | 16.05938 | 27.58434 | 0.6607 |
| At most 3 | 0.229767 | 14.09734 | 21.13162 | 0.3571 |
| At most 4 | 0.146766 | 8.570981 | 14.26460 | 0.3236 |
| At most 5 | 0.000466 | 0.025154 | 3.841466 | 0.8739 |
| Max-eigenvalue test indicates no cointegration at the 0.05 level | | | | |
| * Denotes rejection of the hypothesis at the 0.05 level | | | | |
| **MacKinnon-Haug-Michelis (1999) p-values | | | | |

*Source*: Field Data (2021)

Table 6a rejects the null hypothesis. The null hypothesis states that there is no co-integration. This study rejects the null hypothesis because the trace test statistics are higher than the critical values at a 5% significance level. This suggests that Order 1 co-integrates tax reforms and investment decisions. Therefore, we use the Vector Error Correction (VEC) model to estimate both the short-run and long-run relationship between tax reforms and investment decisions in Ghana.

### 3.5 Long-Run Impact of Tax Reforms on Investment Decisions

Table 7 presents the results of this section of the study, which focused on estimating the impact of tax reforms on investment decisions in Ghana using VECM.

Table 7. VECM MODEL

| VARIABLES | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| ECT | -0.140903 | 0.01464 | -9.624521 | 0.0000 |
| D(INVDEC)(-1) | 0.124253 | 0.207487 | 0.598848 | 0.5543 |
| D(TAXREF)(-1) | -0.120775 | 0.019044 | -6.341892 | 0.0000 |
| D(INFLATION)(-1) | -0.037268 | 0.267018 | -0.139569 | 0.8900 |
| D(GROSS CAP.) (-1) | 0.175717 | 0.365243 | 0.481097 | 0.6343 |
| D(BASERATE)(-1) | -0.050395 | 0.012892 | -3.909013 | 0.0080 |
| CONSTANT | 0.167160 | 0.112059 | 1.491717 | 0.1474 |
| R-squared | 0.595687 | | | |
| Adjusted R-squared | 0.405271 | | | |
| S.E. of regression | 0.565858 | | | |
| Sum squared resid | 8.645271 | | | |
| Log likelihood | -24.96499 | | | |
| F-statistic | 17.476155 | | | |
| Prob(F-statistic) | 0.000993 | | | |

*Source*: World Development Indicators (1985-2020)

The result in Table 7 shows that there is a long-run relationship between investment decisions and the study variables. This is because the error correction terms (ECT) are negative and significant at a 1% significance level; hence, tax reforms and investment decisions have a long-run relationship.

### 3.6 Short-Run Impact

The study further tested the short-run impact of tax reforms on investment decisions in Ghana using the Wald Chi-Square test, as shown in Table 8.

Table 8. Wald Test on the Short-Run Impact of Tax Reforms on Investment Decision

| Test Statistic | Value | Df | Probability |
|---|---|---|---|
| F-statistic | 9.396739 | (2, 33) | 0.0000 |
| Chi-square | 10.793478 | 2 | 0.0000 |

The study further tested the short-run impact of tax reforms on investment decisions in Ghana using the Wald Chi-Square test, as shown in Table 8. Based on data from 1985 to 2020, Table 8 shows that Wald Chi-square has a test score of 9.39539 and a p-value of 0.0000, which means that tax reforms have a significant short-term effect on investment decisions in Ghana. The findings from this study are consistent with some previous studies. For example, Alves (2019) analyzed the percentage of tax revenues in GDP and investment results in a study exploring the effects of tax structures on investment dynamics, using gross fixed capital formation as a proxy for investment. We conducted empirical research for all OECD nations between 1980 and 2015 to analyze the short- and long-term implications of tax system composition. The findings indicate that income taxation has a maximum impact on investment growth when receipts from this tax source are about 10.7%. Similarly, Muhammad *et al.* (2012) found a significant negative relationship between tax reforms, particularly corporate taxes, and investment decisions. Also, Braunerhjelm and Eklund (2014) investigated the administrative costs associated with taxes and their influence on new company creation and discovered that the tax administrative burden significantly reduces the entry rate, thus reducing investment. Vergara (2010) examined the empirical relationship between Chile's tax overhaul and its subsequent investment performance. The author analyzed data from 87 publicly traded firms in the nation from 1975 to 2003 and found that the tax change accounted for a three-point increase in private investment as a proportion of GDP.

### 3.7. Granger Causality Test

This study conducted the Granger causality test for all study variables. However, the analysis concentrated primarily on tax reforms and investment decision-making, as these were the primary variables of interest. Table 9 presents the results of the study.

Table 9. Granger Causality Test

| Null Hypothesis: | Obs. | F-Statistic | Prob. |
|---|---|---|---|
| TAXREF does not Granger Cause INVDEC | 35 | 6.71339 | 0.000 |
| INVDEC does not Granger Cause TAXREF | | 2.45110 | 0.1273 |
| INFLATION does not Granger Cause INVDEC | 35 | 0.13858 | 0.7122 |
| INVDEC does not Granger Cause INFLATION | | 7.03615 | 0.0123 |
| GCFORM does not Granger Cause INVDEC | 35 | 0.26247 | 0.6119 |
| INVDEC does not Granger Cause GCFORM | | 3.65450 | 0.0649 |
| BASERATE does not Granger Cause INVDEC | 35 | 7.51843 | 0.0099 |
| INVDEC does not Granger Cause BASERATE | | 0.00813 | 0.9287 |
| INFLATION does not Granger Cause TAXREF | 35 | 0.62829 | 0.4338 |
| TAXREF does not Granger Cause INFLATION | | 8.06339 | 0.0078 |
| GCFORM does not Granger Cause TAXREF | 35 | 3.39158 | 0.0748 |
| TAXREF does not Granger Cause GCFORM | | 4.15540 | 0.0498 |
| BASERATE does not Granger Cause TAXREF | 35 | 2.14843 | 0.1525 |
| TAXREF does not Granger Cause BASERATE | | 0.87248 | 0.3573 |
| GCFORM does not Granger Cause INFLATION | 35 | 0.06302 | 0.8034 |
| INFLATION does not Granger Cause GCFORM | | 1.66359 | 0.2064 |
| BASERATE does not Granger Cause INFLATION | 35 | 5.46106 | 0.0259 |
| INFLATION does not Granger Cause BASERATE | | 0.00377 | 0.9514 |
| BASERATE does not Granger Cause GCFORM | 35 | 3.85572 | 0.0583 |
| GCFORM does not Granger Cause BASERATE | | 0.11207 | 0.7400 |

*Source*: Field Data (2024)

Table 9 indicates that tax reform influences investment decisions, not the other way around. This implies that any change in tax reform, especially those in corporations, has a direct and significant effect on investment decisions. However, changes in investment decisions do have a direct effect on tax reform. Therefore, the relationship between tax reforms and investment decisions is not bidirectional. This section discusses alternate courses of action for dealing with the above-mentioned managerial problems, as well as suggestions for implementation. We identified the issues related to tax reforms, investment choices, and other primary management concerns.

## 4. Discussion

According to the World Bank's 2020 Doing Business Report, Ghana is ranked 118th out of 190 countries in terms of ease of doing business, with a score of 60.0. Ghana's best rankings are in "protecting minority investors," "getting electricity," and "getting credit"; in these areas, Ghana's position is 72, 79, and 80, respectively (World Bank, 2020). The worst rankings, on the other hand, are in "paying taxes," "trading across borders," and "resolving insolvency," where Ghana's position is 152, 158, and 161, respectively (World Bank, 2020). Globally, the study is essential for positioning the findings within a broader framework of tax reform and investment decision-making in emerging economies. We can better understand the universality or uniqueness of Ghana's experience by comparing the results of this study with similar research in other developing nations, particularly those with comparable economic structures or investment climates. For instance, examining how other African countries or emerging economies in Asia and Latin America have responded to tax reforms could reveal whether Ghana's investment behavior aligns with broader regional or global trends. This comparison can highlight common challenges faced by emerging markets, such as capital flight, investor confidence, or the complexity of implementing tax policies. It provides valuable insights into how global economic forces influence national investment decisions.

Moreover, sitting in the findings in the global context allows for a more robust discussion of the external factors that may have influenced investment decisions, such as global economic conditions, trade relationships, and international capital flows.

The impact of global economic crises shifts in international investment trends, or foreign direct investment patterns could provide critical background for interpreting the study results. By considering these global dynamics, the study can reflect on how international market forces, global tax competition, or cross-border capital mobility might shape domestic investment decisions in Ghana. This global perspective not only strengthens the relevance of the findings but also opens avenues for future research into how international economic interactions affect tax policy outcomes in emerging markets. Furthermore, studies like those by Barro (1990) and Tanzi (2012), which suggest mixed or limited effects of tax reform on investment, can contrast with the findings of this study. Barro (1990) argued that tax reforms may not always lead to an immediate increase in investment, especially in countries with weak institutional frameworks or high political instability. Tanzi (2012) observed that factors such as poor enforcement of tax laws or a lack of investor trust in the economy can muzzle the impact of tax policy on investment in developing countries. Our study indicates a significant positive impact of tax reforms in Ghana, but it's crucial to acknowledge the potential influence of Ghana's enhanced institutional framework and recent macroeconomic stability advancements, factors that Barro (1990) and Tanzi (2012) may have overlooked. Thus, the study extends the existing body of research by providing empirical evidence from Ghana, where tax reforms have been relatively successful in stimulating investment, particularly when paired with improvements in governance and economic stability.

## Conclusion

The final chapter summarizes the study's goal and objectives, as well as the primary findings and conclusions. It also discusses the implications of tax reforms' impact on investment decisions and presents research recommendations. This study focused on the effects of tax reforms on investment decisions in Ghana. The study employed time-series data from 1985 to 2020. Tax reform was a proxy for corporate income tax, while investment decisions were a proxy for aggregate investment. The study employed control variables such as inflation, gross capital formation, and the base rate. We gathered the data from reputable sources such as the World Development Indicator and the Bank of Ghana website, and we thoroughly cleaned them before estimating the model. The study had objectives, namely, to perform trend analysis on tax reforms and investment decisions and to estimate both the long-run and short-run impacts of tax reforms on investment decisions. The study employed a line graph for the trend analysis. To estimate the model, the study conducted unit root tests and cointegration tests, which revealed a con integration of order in the variables. Therefore, VECM was used. The study also performed the Granger Causality Test. The study found that tax reforms and investment decisions exhibited opposite behavior, particularly between 2005 and 2010, but maintained some form of relationship throughout consideration. The VECM showed that tax reforms and investment decisions had a significant long-run relationship. According to the Wald Test, tax reforms had a significant short-run impact on investment decisions. The Granger causality test showed that tax reforms caused investment decisions, but investment decisions did not cause tax reforms.

## Implications of the Findings

This thesis has three types of implications: theoretical, managerial, and implications for further research. In emerging countries, concerns about domestic taxation have made tax administration reform a prominent problem. Addressing tax issues, on the other hand, is a complex process that entails overhauling the tax administration system to broaden the revenue base, as well as establishing administrative institutions with adequate autonomy and a professional attitude to manage the tax system. Ghana's tax administrative system aims to help them broaden the tax net, create better tax policies, improve the effectiveness and efficiency of tax collection, and root out corruption among tax officers. The study investigated the long-run and short-run impact of tax reforms on investment decisions in Ghana using VECM and Granger causality models. Based on the models, this study concludes that tax reforms, measured as corporate income tax, have a significant long-run and short-run impact on investment decisions in Ghana. Moreover, tax reforms stimulate investment, but investment decisions do not trigger tax reforms. These findings are consistent with prior criteria and theories, as lower corporate tax serves as an incentive for both local and foreign direct investment.

## Policy Recommendations

This study recommends intensifying and sustaining tax reforms based on its estimated results and findings. We must investigate two significant areas: the variety of taxes and the high cost of living. We should carefully target the corporate income tax and tax reform toward stimulating Ghanaian investment. To begin, the research indicates that the volume of credit sought by the private sector is independent of the present interest rate. This could result from nonmarket pricing strategies, such as credit rationing, which discriminates against specific groups of people based on allowed traits, allowing banks to sidestep the issue of adverse selection. Therefore, policymakers should enact laws that promote competitive pricing mechanisms, allowing market forces to determine loan demand and supply. This can reduce credit rationing while also increasing competition for loanable funds. Second, the availability of financing affects long-term decisions in the private sector. As a result, central banks should lower interest rates to boost private-sector investment through increased borrowing. This would provide commercial banks with sufficient loanable funds. The central government should routinely implement legislation requiring banking institutions to meet certain basic standards, improving banks' ability to make loanable funds available. The stringent minimum requirement, on the other hand, has the potential to disturb market efficiency. We limited this assessment of financial sector reforms to one country (Ghana) and concentrated on loan demand.

## Recommendations for Additional Research

The study recommends conducting more research in different countries to examine the impact of financial liberalisation on private investment, credit mobilisation, and interest rates in deregulated financial markets where some degree of government control and credit restriction remains. Furthermore, we should conduct extensive research to analyze the relationship between the riskiness of investment projects and the degree of inflation. We greatly appreciate more studies that aim to quantify the impact of the accounting information system on investment responses to tax policy.

## Limitations

During the study, the researcher experienced several constraints, including time constraints. This prevented the researcher from broadening his population base and conducting specific inquiries into regions that could have been relevant to the study. Due to a lack of sufficient records, it was initially impossible to gain access to certain crucial information on primary data. Finally, because target respondents may be unwilling to provide meaningful and timely feedback on surveys, the study must rely on secondary data sources.

## Institutional Review Board Statement

Ethical review and approval were waived for this study due to its less sensitivity.


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## Credit Authorship Contribution Statement

**Michael Yeboah:** Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition.

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**Jonas Bawuah**: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Funding acquisition.

**Agyeiwaa Owusu Nkwatabisa:** Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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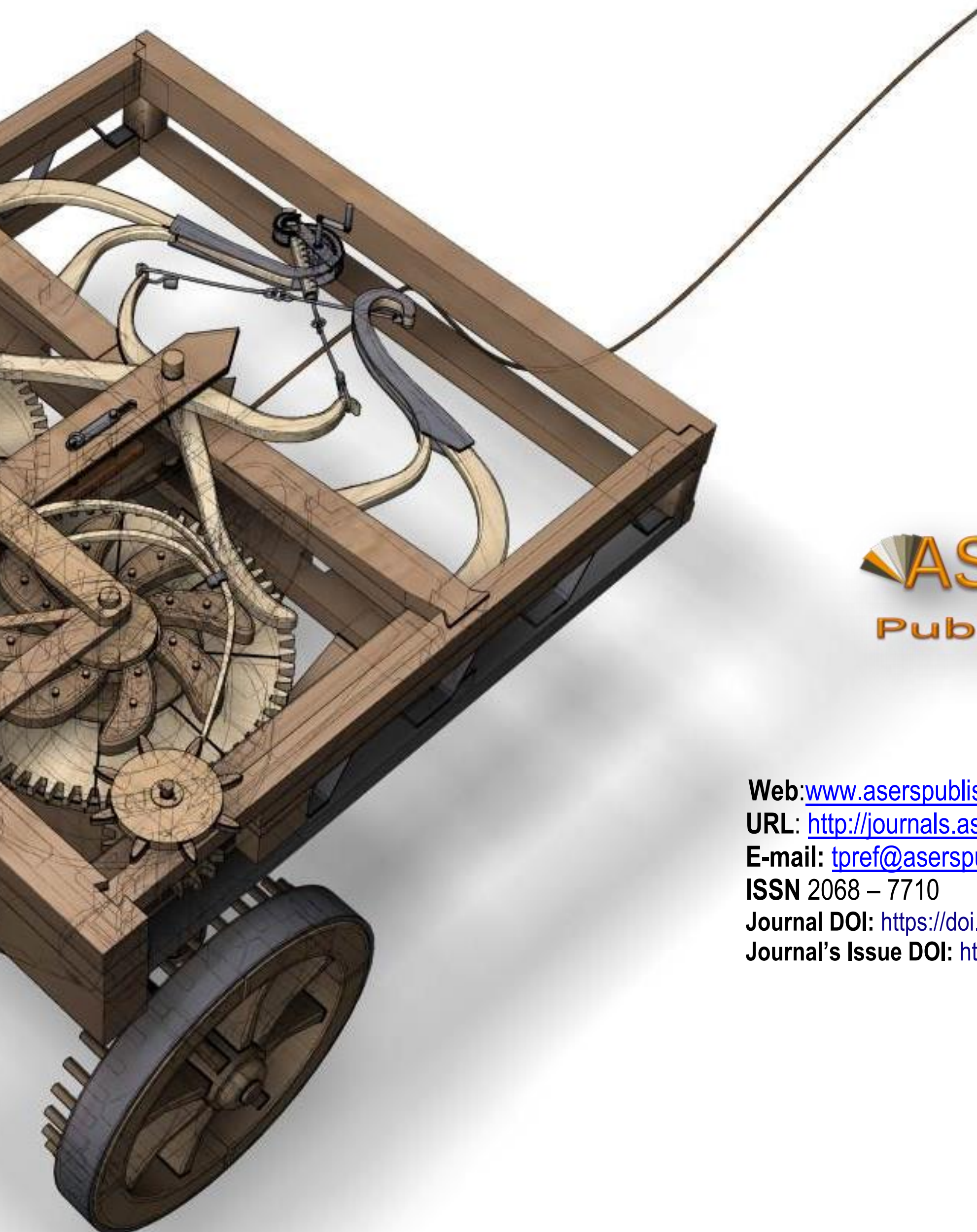

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