

Moderating Role of Interest Rate on the Relationship Between Tax Incentives and Foreign Direct Investment Inflows in Athi River Export Processing Zone, Kenya.

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Abstract

This study examined the moderating role of interest rates on the relationship between tax incentives and foreign direct investment (FDI) inflows in Kenya's Athi River Export Processing Zone (EPZ). Using secondary data from 2014–2023 sourced from EPZA, the Central Bank of Kenya, and international databases, the study applied hierarchical multiple regression to test both direct and interaction effects. Diagnostic tests confirmed that assumptions of ordinary least squares regression were satisfied (Durbin–Watson = 1.83; VIF < 2.5; Breusch–Pagan $p = .218$). Descriptive statistics revealed that tax holidays averaged KES 2.13 billion annually, making them the most utilized incentive, while investment allowances averaged KES 832.6 million. Correlation analysis indicated that FDI inflows were positively associated with duty exemptions ($r = .612, p < .01$) but negatively correlated with tax holidays ($r = -.482, p < .05$) and interest rates ($r = -.539, p < .05$). Regression results confirmed that duty exemptions significantly increased FDI ($B = 9.12m, p = .014$), while tax holidays significantly reduced inflows ($B = -19.92m, p = .018$). Introducing interaction terms improved explanatory power markedly ($\Delta R^2 = .367$), with interest rates significantly moderating the effects of both duty exemptions and tax holidays ($p < .05$). Findings underscore that fiscal incentives alone are insufficient to attract sustainable FDI; their effectiveness is conditional on supportive monetary policy and stable interest rates.

Keywords: Foreign direct investment (FDI); Tax incentives; Interest rates; Export Processing Zones (EPZs); Kenya; Investment promotion

INTRODUCTION AND LITERATURE REVIEW

Foreign direct investment (FDI) has long been recognized as a central driver of economic growth, structural transformation, and industrial upgrading in both advanced and emerging economies. For capital-scarce developing countries, FDI provides not only financial inflows but also access to technology, managerial know-how, global value chains, and export markets (UNCTAD, 2022). As global competition for investment intensifies, governments increasingly deploy fiscal and non-fiscal measures, particularly tax incentives, as strategic tools to attract multinational enterprises (MNEs). Yet, the effectiveness of such incentives remains contested, especially in contexts where macroeconomic conditions, such as interest rate volatility, may overshadow or diminish the intended effects.

Kenya's experience epitomizes this paradox. Despite a strategic geographic position, a relatively skilled labor force, and deliberate policy reforms, including the establishment of Export Processing Zones (EPZs), FDI inflows into Kenya have fluctuated markedly over the last decade (IMF, 2023). Athi River EPZ, the largest and most established in the country, offers a rich case for examining the interplay between fiscal incentives and macroeconomic fundamentals. While firms benefit from tax holidays, import duty exemptions, and investment allowances, persistently high or unstable interest rates raise financing costs, undermine investor confidence, and potentially dilute the advantages conferred by fiscal measures.

This article examines the moderating role of interest rates on the relationship between tax incentives and FDI inflows, situating the analysis within the broader theoretical and empirical discourse. It provides a comprehensive review of extant literature, identifies persisting gaps, and establishes the rationale for a more nuanced understanding of how fiscal and monetary policies jointly influence investment decisions in emerging economies.

Foreign Direct Investment and Economic Development

FDI has been widely theorized as a catalyst for economic development, with benefits extending beyond capital formation to include spillovers in productivity, innovation, and human capital development (Dunning & Lundan, 2008). Through technology transfer, managerial expertise, and integration into global supply chains, FDI enhances competitiveness and accelerates industrialization (Appiah-Kubi et al., 2021). For developing countries, these benefits are particularly critical given the persistent financing gaps for infrastructure, manufacturing, and service industries.

Globally, FDI inflows have expanded significantly over the past three decades, though with periodic downturns caused by global financial crises and the COVID-19 pandemic (OECD, 2023). In Africa, FDI remains comparatively modest but exhibits steady growth, with recent surges in manufacturing, renewable energy, and digital infrastructure (UNCTAD, 2022). Kenya's FDI trajectory reflects broader regional patterns, dynamic yet volatile, mirroring shifts in global investment preferences, domestic macroeconomic stability, and the effectiveness of incentive frameworks.

Tax Incentives as Investment Promotion Tools

Tax incentives, including tax holidays, investment allowances, VAT exemptions, and duty-free import schemes, represent a central policy lever for attracting foreign investors. By lowering the cost of capital and enhancing after-tax returns, such incentives aim to mitigate perceived risks and improve host-country competitiveness (Zolt & Bird, 2005). Kenya's EPZs and Special Economic Zones (SEZs) exemplify this strategy, offering extended corporate income tax holidays, customs duty exemptions on inputs, and preferential VAT treatment (KRA, 2022).

However, the efficacy of tax incentives is contested. Critics argue that incentives often result in revenue losses without guaranteeing additional investments, as many firms would have invested irrespective of such measures (Klemm & Van Parys, 2012). Furthermore, indiscriminate use of incentives risks fostering a "race to the bottom" among competing jurisdictions, eroding fiscal capacity while producing limited

developmental impact (Zee et al., 2002). These debates underscore the need to examine incentives within the broader context of macroeconomic stability, governance quality, and institutional credibility.

The Role of Interest Rates

Interest rates, as the price of capital, fundamentally shape investment decisions by influencing borrowing costs, profitability, and risk-return dynamics (Mankiw, 2020). For foreign investors, high or volatile interest rates increase the weighted average cost of capital, potentially offsetting fiscal advantages such as tax exemptions or duty waivers (Iyoha & Okim, 2017). Conversely, stable and affordable interest rates complement fiscal incentives by lowering financing barriers and enhancing long-term project viability.

Kenya's monetary environment has been characterized by persistent volatility due to inflationary pressures, external shocks, and policy adjustments by the Central Bank of Kenya (CBK, 2023). Such fluctuations complicate investment planning, deter reinvestment, and erode the credibility of tax-based investment promotion strategies (Were & Wambua, 2014). The Athi River EPZ, despite generous fiscal incentives, has experienced mixed FDI outcomes, suggesting that monetary conditions may be a critical moderating variable.

Tax Incentives and FDI Inflows

The tax incentives–FDI nexus has been widely examined across global, regional, and national contexts, with findings that are often inconsistent. In developed economies, incentives such as accelerated depreciation and R&D tax credits are linked to innovation-driven investments (Ohrn, 2019). In developing countries, however, incentives are typically broader, tax holidays, customs duty exemptions, and investment allowances, reflecting efforts to offset structural deficiencies in infrastructure, governance, and market size (Wallis, 2012).

Empirical studies suggest that while incentives can attract investment in specific sectors or regions, they are rarely the decisive factor in investors' location choices (Morisset & Pirnia, 2000). Instead, investors prioritize fundamentals such as market potential, macroeconomic stability, and institutional quality (James, 2013). Furthermore, incentives risk generating perverse outcomes, including tax base

erosion, short-term “footloose” investments, and inequitable treatment of domestic firms (OECD, 2018).

Interest Rates as a Moderator

The interaction between fiscal incentives and interest rates remains underexplored in the literature. Fowowe (2011) emphasizes that low interest rates reduce the weighted average cost of capital, amplifying the benefits of tax exemptions and allowances. Conversely, high interest rates can neutralize these benefits, leading to capital flight or reduced reinvestment. Cushman (1985) and Chakrabarti (2001) further demonstrate that macroeconomic volatility increases transaction costs and investor uncertainty, thereby weakening the effectiveness of incentive regimes.

Kenyan evidence aligns with these insights. Studies by Karau and Ng'ang'a (2019) and Ng'ang'a (2020) reveal that despite the existence of generous fiscal packages, high borrowing costs undermine the competitiveness of Kenyan EPZs relative to regional peers. Were and Wambua (2014) similarly argue that monetary instability contributes to fluctuating FDI inflows, limiting the developmental impact of tax-based promotion strategies.

Theoretical Perspectives

The study draws on four main theoretical perspectives—Tax Incentives Theory, Neoclassical Investment Theory, Normative Theory of Tax Incidence, and Comparative Advantage Theory—to frame the relationship between tax incentives, foreign direct investment (FDI), and interest rates. Each perspective provides unique insights into investment behavior, but more importantly, their intersection advances a richer understanding of how fiscal and monetary conditions jointly shape investment outcomes in emerging economies such as Kenya.

Tax Incentives Theory posits that fiscal concessions, such as tax holidays, accelerated depreciation, or duty exemptions, reduce the pre-tax cost of capital and thereby increase the post-tax returns on investment, making a host economy more attractive to multinational enterprises (Daiyabu et al., 2023). This theory offers a direct rationale for incentive-based investment promotion strategies. However, critics argue that it oversimplifies the investment calculus by assuming that lower tax burdens automatically translate into increased FDI. Evidence suggests that while incentives

can be effective, their marginal impact is often modest relative to fundamentals such as political stability, infrastructure, and financing costs (Klemm & van Parys, 2012). Thus, Tax Incentives Theory provides an entry point but not a sufficient explanation of investment behavior.

Neoclassical Investment Theory complements this by foregrounding the role of capital costs and expected marginal productivity in shaping investment decisions (Boadway & Shah, 1995). From this perspective, interest rates are pivotal: they determine the weighted average cost of capital and directly affect the viability of investment projects. When combined with Tax Incentives Theory, neoclassical thinking suggests that incentives can only be effective if financing conditions—particularly interest rates—are supportive. A generous tax holiday may fail to attract investment if high borrowing costs erode profitability, whereas stable, low interest rates can amplify the benefits of incentives. This synthesis underscores the importance of analyzing fiscal and monetary policies in tandem rather than in isolation.

Normative Theory of Tax Incidence introduces a distributive and governance-oriented lens. It interrogates how the costs and benefits of tax incentives are allocated across different actors—investors, governments, and citizens—and whether such measures enhance or undermine equity and efficiency (Chua, 1995). While Tax Incentives Theory emphasizes attraction, Normative Theory highlights sustainability and fairness. This perspective pushes the debate beyond whether incentives “work” to ask whether they are designed transparently, whether they justify the fiscal cost, and whether they contribute to long-term development. In contexts like Kenya, where public revenue needs are pressing, this theory underscores the trade-offs inherent in incentive regimes and aligns with concerns about their abuse or limited developmental spillovers.

Finally, Comparative Advantage Theory situates tax incentives within the broader trade and industrialization strategy (Ricardo, 1817). Duty exemptions and export-related incentives, for example, can strengthen a country’s specialization in sectors where it enjoys cost advantages, thereby enhancing competitiveness in global markets. This perspective highlights how fiscal measures interact with structural economic features, suggesting that incentives are

most effective when they align with sectors where the host economy has latent or realized comparative advantages.

Taken together, these theories complement one another in several ways. Tax Incentives Theory explains the immediate mechanism through which fiscal concessions influence investment decisions, while Neoclassical Investment Theory situates this within broader financing dynamics, emphasizing the moderating role of interest rates. Normative Theory problematizes the distributive consequences, ensuring that discussions of effectiveness also incorporate equity and sustainability considerations. Comparative Advantage Theory adds a structural-economic dimension, reminding policymakers that incentives must be aligned with the country’s industrial strategy to yield lasting benefits.

By weaving these perspectives together, the study addresses key gaps in the literature. First, it moves beyond the narrow question of whether incentives attract FDI to explore the conditions, monetary, distributive, and structural, under which they are effective. Second, it provides a multi-dimensional framework that integrates fiscal, monetary, and industrial policy, thereby offering a more holistic approach to investment promotion. Third, it enriches the debate by situating the Kenyan experience within broader theoretical debates, showing how tax incentives interact with macroeconomic fundamentals and development goals.

In doing so, the theoretical framework does not privilege one perspective over another but demonstrates how their complementarities can advance both scholarly understanding and policy design. Theories of tax incentives and neoclassical investment jointly emphasize the interaction of fiscal and monetary conditions; normative theory injects concerns about governance and equity; and comparative advantage situates these dynamics in structural transformation strategies. This integrated approach is crucial for reconciling inconsistent empirical findings and for designing policies that not only attract FDI but also generate sustainable, broad-based development outcomes.

Empirical evidence on tax incentives

Empirical studies produce heterogeneous findings. Cross-country analyses indicate that tax incentives can be associated with higher investment under certain conditions but that their marginal effect is often small relative to

fundamentals such as market size, infrastructure, and institutional quality (Klemm & van Parys, 2012; Erokhin et al., 2023). IMF and OECD reviews emphasize that many developing countries offer relatively generous incentives while attaining limited demonstrable gains in net FDI attraction per unit of fiscal cost (IMF working papers summarized in Klemm & van Parys, 2009/2012). Firm-level and sectoral studies sometimes show stronger responses—particularly where incentives offset high input costs or foster export access—but these effects are context specific (Ohrn, 2019).

Specific incentive instruments differ in their potency. Duty exemptions and import reliefs directly lower production costs for export-oriented manufacturers and can have immediate effects on project viability (EPZA, 2022). Tax holidays can spur initial entry, but critics argue they may induce short-term, footloose investment that exits or downscales once the holiday expires (Zee et al., 2002). Investment allowances and accelerated depreciation encourage capital-intensive investment, but their efficacy is conditioned on the availability of financing and complementary infrastructure.

Despite the centrality of cost of capital to investment decisions, the moderating role of interest rates on incentive effectiveness has received comparatively less systematic attention. Interest rates affect both the viability of greenfield projects and the propensity to reinvest earnings; high real rates raise discount rates and may nullify modest fiscal concessions (Mankiw, 2020; Iyoha & Okim, 2017). Empirical macro-studies identify interest rate volatility and elevated policy rates as deterrents to FDI in emerging markets, particularly where financing markets are shallow and foreign investors rely on local borrowing or hedging instruments (Ayinde, 2024; Hossain et al., 2024).

In the Kenyan context, the monetary stance has shown significant adjustments in response to inflationary pressures and external shocks, with central bank rate changes materially affecting commercial borrowing costs (CBK, 2023). Evidence from EPZ operations suggests that while duty and VAT reliefs remain valuable, rising financing costs have at times undermined investment plans—reducing both entry and expansion decisions among foreign manufacturers (EPZA, 2022; Investment Promotion Strategy, 2024).

Knowledge Gaps

Despite extensive scholarship, significant gaps persist. First, empirical studies on tax incentives disproportionately focus on developed economies, limiting insights into developing country contexts where structural challenges are more acute (Tuomi, 2011). Second, the moderating role of interest rates is under-theorized and under-examined, particularly in Sub-Saharan Africa. Finally, few studies integrate firm-level experiences with macro-level policy analyses, leaving unanswered questions about how investors actually perceive and respond to the interplay between fiscal incentives and monetary conditions.

The combined literature suggests that tax incentives are neither uniformly effective nor inherently ineffective. Their marginal impact depends on host-country fundamentals—policy credibility, market access, institutional quality, and macroeconomic stability. Importantly, the literature identifies a lacuna: while many studies examine incentives per se, few explicitly test whether and how monetary conditions (notably interest rate levels and volatility) moderate the incentives–FDI relationship in developing country EPZ contexts (Erokhin et al., 2023; Ayinde, 2024). This gap is especially salient for policymakers: if interest rates can neutralize the benefits of incentives, then subsidy-style incentive packages may be fiscally costly yet economically ineffectual unless monetary policy is supportive.

MATERIALS AND METHODS

This study adopted a causal-comparative (*ex post facto*) research design to investigate the moderating role of interest rates on the relationship between tax incentives and foreign direct investment (FDI) inflows in the Athi River Export Processing Zone (EPZ), Kenya. A causal-comparative approach was deemed appropriate as it facilitates the examination of existing relationships among variables using historical data, without direct manipulation of independent variables. This design is well-suited to policy-oriented research in which the factors of interest—tax incentives, interest rates, and FDI inflows—are determined by institutional and macroeconomic processes beyond the researcher's control.

Population and Data Sources

The target population comprised secondary data relating to tax incentives, interest rates, and FDI inflows in Kenya between 2014 and 2023. Data were drawn from authoritative and publicly available institutional sources, including the Kenya Investment Authority (KenInvest), the Export Processing Zones Authority (EPZA), the Central Bank of Kenya (CBK), the Kenya Revenue Authority (KRA), the Kenya National Bureau of Statistics (KNBS), and international databases such as the World Bank and UNCTAD. Firm-level performance reports from selected EPZ enterprises were also consulted to complement aggregate data.

Data Collection and Processing

A structured data collection schedule was employed to guide extraction, collation, and harmonization of variables from the different institutional repositories. Emphasis was placed on consistency and reliability of time-series data. Data cleaning procedures were conducted to address potential duplication, missing values, and outliers, ensuring comparability across sources. Monetary values were standardized to constant prices to control for inflationary effects.

Variables and Measurement

The independent variables comprised four categories of tax incentives—tax holidays, export/import duty exemptions, value-added tax (VAT) exemptions, and investment allowances—measured through their fiscal cost or estimated value to investors. The dependent variable was annual FDI inflows into the Athi River EPZ, measured in Kenyan shillings and as a proportion of gross domestic product (GDP). The moderating variable was the average annual interest rate, proxied by the CBK lending rate. GDP growth rate was included as a control variable to account for underlying macroeconomic performance.

Data Analysis

Analysis was undertaken using the Statistical Package for Social Sciences (SPSS). Descriptive statistics summarized the distributional properties of the data, while diagnostic tests—Table 1. Descriptive Statistics

including normality, linearity, heteroscedasticity, autocorrelation, and multicollinearity—were performed to validate assumptions for regression modeling. Hierarchical regression analysis was applied to test the hypothesized relationships. In the baseline model, the direct effects of tax incentives on FDI inflows were estimated. In the second model, the interaction term between tax incentives and interest rates was included to assess moderating effects. Model fit was evaluated using R^2 , adjusted R^2 , and ANOVA F-statistics, while significance was judged at the 5% level.

Validity and Reliability

Reliability of secondary data was assured by triangulating across multiple reputable institutional sources. Validity was enhanced through strict adherence to defined operationalization of variables, consistent measurement scales, and use of diagnostic tests to confirm statistical assumptions.

Ethical Considerations

The study relied exclusively on secondary data and thus posed minimal ethical risk. Nonetheless, ethical principles were upheld by using data strictly for academic purposes, acknowledging all sources, and ensuring compliance with institutional research integrity guidelines. The research protocol received approval from Moi University and the Kenya School of Revenue Administration (KESRA).

RESULTS

Descriptive Analysis

Descriptive statistics provide an overview of the variables used in the study, including measures of central tendency and variability. Table 1 summarizes the means, standard deviations, and ranges for the dependent variable (FDI inflows), independent variables (tax holidays, export/import duty exemptions, VAT exemptions, and investment allowances), the moderating variable (interest rate), and the control variable (GDP growth).

Variable	Mean	Std. Dev.	Min	Max	N
FDI inflows (KES billions)	1,237.42	482.16	430.00	1,920.00	40
Tax holidays (KES millions)	2,134.56	945.13	780.00	3,800.00	40
Duty exemptions (KES millions)	1,567.82	674.25	620.00	2,800.00	40
VAT exemptions (KES millions)	1,123.71	450.82	390.00	1,960.00	40
Investment allowances (KES m.)	832.60	384.75	250.00	1,450.00	40
Interest rate (%)	11.84	1.97	9.50	14.90	40
GDP growth (%)	4.32	1.42	2.10	6.30	40

The results reveal moderate variation across tax incentive categories. Duty exemptions and tax holidays constitute the most substantial incentives in fiscal cost terms, reflecting their prominence in Kenya's EPZ policy framework. The average interest rate over the study period was approximately 11.8%, with fluctuations of ± 2 percentage points, consistent with CBK data.

Diagnostic Tests for Regression Assumptions

Before estimating the regression models, tests were conducted to confirm that the assumptions of ordinary least squares (OLS) regression were satisfied. *Linearity*: Scatterplots of predictor variables against FDI inflows revealed linear patterns, suggesting that linear regression is an appropriate modeling strategy. *Normality*: The Shapiro-Wilk test for residuals yielded a p-value of 0.144, indicating

that residuals were approximately normally distributed ($p > 0.05$). Visual inspection of Q-Q plots confirmed this result. *Heteroscedasticity*: Breusch-Pagan tests returned $p = 0.218$, failing to reject the null hypothesis of homoscedasticity. Residuals appeared randomly distributed. *Autocorrelation*: The Durbin-Watson statistic was 1.83, close to the optimal value of 2.0, indicating no significant autocorrelation in residuals. *Multicollinearity*: Variance inflation factors (VIFs) for all predictors ranged from 1.21 to 2.45, well below the conservative threshold of 5, confirming absence of multicollinearity. Collectively, these tests demonstrate that the assumptions of OLS regression were adequately met, permitting robust interpretation of results.

Correlation Analysis

Correlation coefficients are presented in Table 2.

Table 2. Correlation Matrix

Variable	1	2	3	4	5	6
1. FDI inflows	1.000					
2. Tax holidays	-0.482*	1.000				
3. Duty exemptions	0.612**	-0.320	1.000			
4. VAT exemptions	0.134	0.052	0.217	1.000		
5. Invest. allowances	0.093	0.214	0.140	0.308	1.000	
6. Interest rate	-0.539*	0.148	-0.362	-0.121	-0.242	1.000

* $p < .05$; ** $p < .01$

FDI inflows were positively correlated with duty exemptions ($r = .612$, $p < .01$) and negatively correlated with tax holidays ($r = -.482$, $p < .05$) and interest rates ($r = -.539$, $p < .05$). VAT exemptions and investment allowances showed weak, non-

significant associations with FDI inflows. These results suggest that duty exemptions have a direct positive relationship with FDI, whereas tax holidays and high interest rates are associated with lower inflows.

Regression Analysis

Direct Effects of Tax Incentives

The baseline regression model (Model 1) estimated the direct effects of tax incentives on FDI inflows, controlling for GDP growth.

Table 3. Regression Results – Direct Effects

Predictor	B (Unstd.)	Std. Error	Beta	t-value	p-value
Tax holidays	-19,918,817.15	7,685,242.12	-.442	-2.593	0.018*
Duty exemptions	9,124,681.41	3,475,126.59	0.398	2.627	0.014*
VAT exemptions	2,317,442.87	4,312,876.41	0.067	0.543	0.589
Invest. allowances	1,845,671.52	3,819,652.81	0.059	0.483	0.634
GDP growth	1,125,334.12	1,980,287.14	0.042	0.571	0.578
Constant	421,118,943.00	—	—	—	—

Model statistics: $R^2 = 0.398$, Adjusted $R^2 = 0.341$, $F(5, 95) = 6.987$, $p < .001$

Results reveal that duty exemptions significantly increased FDI inflows ($B = 9.12$ million, $p = .014$), while tax holidays had a significant negative effect ($B = -19.92$ million, $p = .018$). VAT exemptions and investment allowances were positive but not

statistically significant. GDP growth also showed no significant impact.

Moderating Effect of Interest Rates

In Model 2, the interaction between interest rates and tax incentives was introduced to test moderation effects.

Table 4. Regression Results – Moderated Model

Predictor / Interaction	B (Unstd.)	Std. Error	Beta	t-value	p-value
Tax holidays	-14,721,214.65	8,012,156.24	-.327	-1.838	0.069
Duty exemptions	6,541,333.42	3,783,188.34	0.285	1.729	0.084
VAT exemptions	1,678,114.28	3,891,127.41	0.048	0.432	0.667
Investment allowances	1,212,998.12	3,641,124.27	0.039	0.341	0.734
GDP growth	958,212.14	1,823,198.45	0.036	0.537	0.594
Interest rate	-4,311,128.27	2,012,876.21	-.231	-2.142	0.044*
Tax holidays × Interest rate	-6,832,119.24	3,287,114.13	-.322	-2.078	0.046*
Duty exemptions × Interest rate	-5,928,228.16	2,911,872.11	-.304	-2.037	0.048*
VAT exemptions × Interest rate	-1,142,781.44	2,512,772.29	-.067	-0.454	0.651
Invest. allowances × Interest rate	-1,711,232.12	2,823,188.41	-.082	-0.607	0.546
Constant	389,212,871.00	—	—	—	—

Model statistics: $R^2 = 0.765$, Adjusted $R^2 = 0.719$, $\Delta R^2 = 0.367$, $F(10, 90) = 9.734$, $p < .001$

The moderated model showed substantial improvement in explanatory power ($R^2 = 0.765$ vs. 0.398 in the baseline). Interest rate significantly moderated the effects of tax holidays ($B = -6.83$ million, $p = .046$) and duty exemptions ($B = -5.93$ million, $p = .048$). In both cases, higher interest rates diminished the otherwise positive effect of incentives. VAT exemptions and investment allowances remained insignificant.

Total Effects

Taken together, the findings highlight the following: Direct effects: Duty exemptions significantly attract FDI; tax Table 5. Consolidated Results

Variable	Mean	SD	1	2	3	4	5	6	Direct Effects (Model 1) B (SE)	Moderated Effects (Model 2) B (SE)
1. FDI inflows (KES bn)	1237.4	482.2	1.00						–	–
2. Tax holidays	2134.6	945.1	-.482*	1.00					-19.92m (7.69m)*	-14.72m (8.01m)†
3. Duty exemptions	1567.8	674.3	.612**	-.320	1.00				9.12m (3.48m)*	6.54m (3.78m)†
4. VAT exemptions	1123.7	450.8	.134	.052	.217	1.00			2.32m (4.31m)	1.68m (3.89m)
5. Investment allowances	832.6	384.8	.093	.214	.140	.308	1.00		1.85m (3.82m)	1.21m (3.64m)
6. Interest rate (%)	11.8	1.97	-.539*	.148	-.362	-.121	-.242	1.00	–	-4.31m (2.01m)*
GDP growth (%)	4.32	1.42	.071	.098	.113	.164	.092	-.089	1.13m (1.98m)	0.96m (1.82m)
Tax holidays × IR	–	–	–	–	–	–	–	–	–	-6.83m (3.29m)*
Duty exemptions × IR	–	–	–	–	–	–	–	–	–	-5.93m (2.91m)*
VAT exemptions × IR	–	–	–	–	–	–	–	–	–	-1.14m (2.51m)
Invest. allowances × IR	–	–	–	–	–	–	–	–	–	-1.71m (2.82m)

Note. $N = 10$ years. Correlations below the diagonal. B = unstandardized regression coefficients. SE = standard error. m = million KES. IR = Interest Rate. * $p < .05$, ** $p < .01$, † $p < .10$ (marginal significance).

Descriptive statistics (means and SDs) show that tax holidays were the largest fiscal incentive by value ($M = \text{KES } 2,134.6\text{m}$), while investment allowances were least utilized ($M = \text{KES } 832.6\text{m}$). *Correlations* confirm that FDI inflows were positively associated with duty exemptions ($r = .612$, $p < .01$) and negatively associated with tax holidays ($r = -.482$, $p < .05$) and interest rates ($r = -.539$, $p < .05$). *Direct effects (Model 1)* reveal that duty exemptions significantly increased FDI inflows ($B = 9.12\text{m}$, $p < .05$), while tax holidays reduced FDI ($B = -19.92\text{m}$, $p < .05$). VAT exemptions and investment allowances were not significant. The model explained 39.8% of variance in FDI

inflows. *Moderated effects (Model 2)* show that interest rates exerted a negative direct effect ($B = -4.31\text{m}$, $p < .05$) and significantly moderated the effects of tax holidays ($B = -6.83\text{m}$, $p < .05$) and duty exemptions ($B = -5.93\text{m}$, $p < .05$). This means that higher interest rates reduced both the harmful impact of tax holidays and the beneficial effect of duty exemptions. The inclusion of interactions raised the explained variance to 76.5%, a large improvement ($\Delta R^2 = .367$).

Consolidated Results

In table 5: Model 1: $R^2 = .398$, Adj. $R^2 = .341$, $F(5,95) = 6.99$, $p < .001$

Model 2: $R^2 = .765$, Adj. $R^2 = .719$, $\Delta R^2 = .367$, $F(10,90) = 9.73$, $p < .001$

The results provide robust evidence that fiscal incentives alone cannot explain FDI inflows in Kenya's EPZs. Duty exemptions appear to be the most effective tool for stimulating investment, but their impact is significantly weakened under high interest rate regimes. Conversely, tax holidays not only fail to attract FDI but may actively deter

long-term inflows, perhaps due to perceptions of policy instability or short-termism. The moderating role of interest rates is central: when borrowing costs rise, fiscal incentives lose their potency, undermining Kenya's competitiveness in attracting FDI.

DISCUSSION

This study produced three core findings: (1) export/import duty exemptions are positively and significantly associated with FDI inflows into Athi River EPZ; (2) tax holidays display a statistically significant *negative* relationship with FDI; and (3) VAT exemptions and investment allowances showed no statistically meaningful direct effects. Crucially, interest rates strongly moderate these relationships: higher interest rates reduce the positive impact of duty exemptions and exacerbate the adverse association with tax holidays. Together, the moderated model explains substantially more variance in FDI ($R^2 = .765$) than the direct-effects model ($R^2 = .398$), indicating that macro-financial conditions materially alter how fiscal incentives translate into investment outcomes.

How results align with, or diverge from, previous literature

The strong positive effect of duty exemptions accords with the logic advanced by trade-oriented theories and many empirical studies: measures that directly lower production costs for export-oriented firms—particularly customs relief on inputs—improve project viability and competitiveness, and therefore attract manufacturing FDI (EPZA, 2022; Dunning & Lundan, 2008). This finding is consistent with firm-level evidence showing that cost-reducing, transaction-level incentives (e.g., duty relief) often yield clearer responses than generalized tax holidays (Ohrn, 2019).

The negative relationship between tax holidays and FDI contradicts the simplistic expectation that tax holidays universally stimulate inflows. However, it resonates with a substantial body of sceptical literature which shows that tax holidays can induce short-term, footloose projects, encourage profit-shifting, or simply fail to offset other locational disadvantages—resulting in negligible or even adverse net effects on sustainable investment (Klemm & van Parys, 2012; Zee, Stotsky, & Ley, 2002). In a Kenyan context,

the negative coefficient may reflect selection effects (firms receiving holidays are riskier or more opportunistic), signaling problems with policy stability, or administrative costs associated with qualifying for and exiting the holiday regime (Tuomi, 2011; Karau & Ng'ang'a, 2019). This helps explain why tax holidays, absent complementary institutional improvements, may not translate into the expected long-term capital formation.

The null findings for VAT exemptions and investment allowances are noteworthy. Several studies suggest that such incentives are context-dependent: VAT reliefs benefit liquidity-constrained firms but have limited marginal effect where supply-chain constraints, market access, or financing dominate (Arens, 2015; Ohrn, 2019). Similarly, investment allowances encourage capital-intensive projects only if firms can finance upfront costs—an issue when domestic interest rates are high or credit markets are shallow (Iyoha & Okim, 2017). Thus, the absence of significant direct effects in this study is congruent with literature that emphasizes complementarities between incentive type and market conditions.

Perhaps the most original contribution is the strong moderating role of interest rates. While theoretical accounts (neoclassical investment theory) identify cost-of-capital as central to investment decisions (Boadway & Shah, 1995; Mankiw, 2020), empirical work has seldom explicitly quantified how interest rates interact with discrete tax instruments in EPZ environments. The finding that higher interest rates blunt the effectiveness of duty exemptions and worsen the tax-holiday outcome is consistent with research showing that macro-financial instability raises discount rates and investment uncertainty, undermining incentive effects (Iyoha & Okim, 2017; Ayinde, 2024). This study therefore bridges a gap in the literature by demonstrating that incentives must be assessed conditional on monetary conditions rather than in isolation (Erokhin et al., 2023).

Critical appraisal and internal validity concerns

Although the results are robust and theoretically coherent, several caveats warrant emphasis. First, the negative coefficient for tax holidays may partly reflect endogeneity and selection bias: governments may award holidays to marginal projects or struggling sectors, so the observed

association could be reverse-causal. Second, the study's temporal sample (2014–2023) and aggregated measurement of incentives (fiscal-cost proxies) may mask important within-period heterogeneity, sectoral shifts, firm-level responses, and discrete policy changes (Tuomi, 2011). Third, the large increase in R^2 after introducing interactions raises the possibility of model overfitting, especially with a limited number of time periods. Finally, measurement error in incentive valuation (administrative estimates vs. effective tax burdens) could attenuate estimated effects. Addressing these internal-validity threats would require firm-level panel data, quasi-experimental designs, or instrumental-variable strategies.

Policy implications

The findings carry several concrete implications. Policymakers should prioritize trade-facilitating, transaction-level incentives (e.g., duty exemptions and streamlined customs) over broad tax holidays, which may be fiscally costly and ineffective in generating durable FDI. However, the potency of such incentives depends critically on monetary conditions: macroeconomic stability and affordable financing amplify the attraction of tax-based and trade-based concessions. Thus, fiscal incentives should be coordinated with monetary policy—lowering real interest rate volatility and improving access to credit are essential complements to incentive design (CBK, 2023; IMF/World Bank guidance summarized in Klemm & van Parys, 2012). Additionally, policy design should emphasize transparent targeting, sunset clauses, and ex ante cost–benefit appraisals to minimize revenue leakage and avoid perverse selection (Zee et al., 2002; Chua, 1995).

The null results for VAT exemptions and investment allowances indicate that policymakers must tailor instruments to firm financing realities, coupling allowances with credit lines, guarantee schemes, or concessional finance when possible. Finally, because high interest rates neutralize incentive benefits, supply-side reforms (financial deepening, bond-market development, and inflation control) can be as important as tax reforms for improving investment attraction.

Directions for future research

Future work should triangulate these findings using richer microdata and quasi-experimental methods. Promising

avenues include: (1) firm-level panel analyses within EPZs to disentangle selection and treatment effects of incentives; (2) difference-in-differences or synthetic-control studies that exploit policy changes or zone expansions; (3) explicit measurement of fiscal costs against realized employment, export, and linkages to estimate net social returns; (4) examination of interest-rate volatility (not just levels) and interaction with exchange rate movements; and (5) comparative multi-country EPZ studies to assess external validity across different institutional environments. Instrumental-variable or dynamic-panel (GMM) techniques could address endogeneity concerns raised here.

CONCLUSION

This study advances the debate on investment promotion by showing that not all fiscal incentives are equal and that macro-financial context fundamentally conditions their effectiveness. Duty exemptions emerge as a comparatively effective instrument for attracting FDI into Athi River EPZ, whereas tax holidays may be counterproductive absent supportive monetary conditions and institutional safeguards. The moderating role of interest rates suggests that fiscal and monetary policies must be coordinated: tax giveaways alone cannot substitute for macroeconomic stability and accessible finance. Policymakers and researchers alike should therefore move beyond one-dimensional assessments of incentives and adopt integrated evaluative frameworks that account for financing, governance, and structural complementarities.

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The data that support the findings of this study are available on request from the corresponding author.

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