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Original Paper

Tax Incentives Policy, Firm Investment, Firm exports, and Gross Output: Panel Econometric Modelling

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Abstract

A panel econometric model consisting of 118,380 firms, spanning 2014 to 2019 was used to determine the impact of tax incentive policy on firm investment, firm gross output, and exports. A two-stage modelling approach was used, first the decision to invest or export was modelled using a binary logit model. In the second phase, the impact of the tax incentives policy was estimated. The decisions to export and invest are marginally driven by tax incentive policy. A shilling given as tax expenditure increases the probability of investing and exporting by 0.018% and 0.48% respectively. The results from the study imply that export and investment-related tax incentives are either redundant or have a negligible impact on their respective target variables.

Keywords

tax incentives, panel econometric model, Kenya

1. Introduction

Tax expenditure or tax incentive is a collective term referring to tax revenue foregone through tax deductions, tax exclusions, tax credits, and reduced tax rates for certain activities, industries, or taxpayers (see for instance: Burman, Toder, Berger, & Rohaly, 2017). Tax incentives are commonly geared towards certain economic goals such as attracting and retaining investment and social goals such as cushioning households in low-income segments from the excessive tax burden (Chetty & Hendren, 2013). Since independence, Kenya has incentivized trade and investment specifically to promote domestic investment, exports, and attract Foreign Direct Investment (FDI) (e.g. Institute of Economic Affairs, 2012; Kenya Revenue Authority, n.d. and Kenya Investment Authority, n.d.).

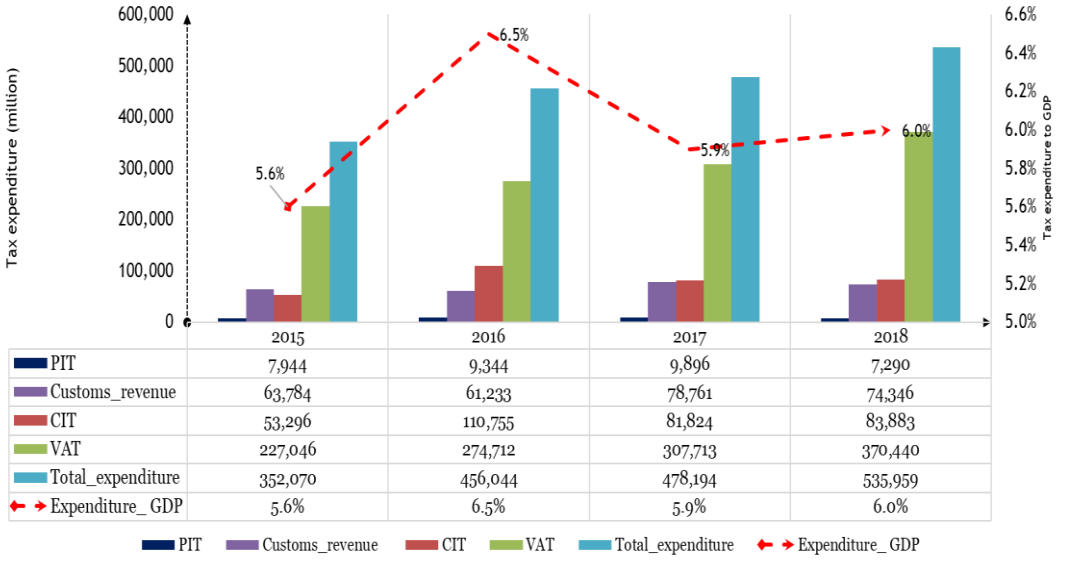
In the post-independence period, investment and export promotion policy metamorphosed from the Import Substitution strategy (ISI) to the export-oriented industrial strategy and trade liberation policy by the 1990s. ISI sought to drive industrialization by offering a raft of protective trade barriers. However, the strategy failed to achieve its objectives despite the laid down incentive structure. This was succeeded by the export-oriented strategy. Export promotion strategy encompassed the initiation of Export Processing Zone (EPZ), Manufacturing Under Bond (MUB), Tax Remissions Export Office (TREO) among other export promotion schemes. Even though empirical research had questioned the effectiveness of such measures in attaining the intended objectives by early 2000, they still exist today (Glenday & Ndii, 2000).

The Special Economic Zones (SEZ) Act, 2015 established SEZ as a designated geographical area where business-enabling policies are implemented and sector-appropriate on-site and off-site infrastructure and utilities are provided for by the Kenyan Government. SEZs are aimed at increasing domestic investment and Foreign Direct Investments (FDIs). Enshrined in these exports and investment policies are tax incentives that can be classified into two groups: investment-related incentives (Note 1) and trade-related (export promotion) (Note 2) incentives. A summary of each tax incentive is discussed in Appendix 1. An additional comparison of incentives in SEZ and EPZ is covered too under Appendix 2.

Some features of tax incentives are discernible from prior studies. For instance, whereas the foregone revenue is quantifiable, the gains in employment, social welfare, additional investment, exports, foreign exchange earnings, and economic growth are hardly quantified. Additionally, although the advantages of tax incentives are known, they are not discussed in the literature as extensively as their respective disadvantages. Beginning with the positives, tax incentives may lead to an increase in private sector output (Kosonen & Harju, 2018), attract foreign direct investment (Klemm & Van Parys, 2012), and increase real domestic investment (Nallareddy, Rouen, & Serrato, 2018). Conversely, tax incentives counter initiatives aimed at raising more tax revenue through tax base expansion (see for instance Poterba, 2011; and Klemm, 2009). They also violate the optimal tax principles of simplicity, efficiency, transparency, predictability, and equity which exacerbates the cost of tax incentives. Besides, they have the potential to create abusive tax avoidance schemes. Hence, the direct and indirect costs associated with tax incentives seem to overshadow the envisaged economic benefits.

1.1 The Cost of Tax Incentives in Kenya

The foregone revenue or the cost of tax incentives in Kenya is enormous. Kenya loses Kshs. 100 billion annually due to tax incentives (Curtis, Kambuni, Daniels, Mosioma, Mshana, Ambrose, & Ngowi, 2012). Recent estimates by KRA show that the revenue foregone due to tax incentives has grown three-fold to Kshs. 352 Billion in 2015, Kshs.456 billion in 2016, Kshs. 478 billion in 2017 and Ksh. 536 billion in 2018 (Figure 1). These represent 5.6%, 6.5%, 5.9%, and 6.0% of the GDP for the respective years. While the cost of tax incentives is not with a relative degree of precision, the benefits are hardly quantified.



	2015	2016	2017	2018
PIT	7,944	9,344	9,896	7,290
Customs_revenue	63,784	61,233	78,761	74,346
CIT	53,296	110,755	81,824	83,883
VAT	227,046	274,712	307,713	370,440
Total_expenditure	352,070	456,044	478,194	535,959
Expenditure_ GDP	5.6%	6.5%	5.9%	6.0%

Figure 1. Tax Expenditure in Ksh Million and % of GDP

Source: KRA, 2020

A detailed breakdown shows that VAT and income tax exemptions account for most of the revenue lost. Table 1 presents tax expenditure under the corporate income tax. Tax deduction under CIT includes mining deductions, industrial deductions, farm-works deductions, plant, and machinery investment deductions, building investment deductions, and wear and tear. The values of tax expenditure under CIT are estimated at Ksh.83.8billion (0.94 % of GDP) in 2018.

Table 1. CIT Tax Expenditure Items

	2015	**2016**	**2017**	**2018**
	Ksh. Million	Ksh. Million	Ksh. Million	Ksh. Million
Exempt Income (30% of exempt income) (LTO & MTO)	26,548	47,096	45,669	51,221
Investment-related deductions				
i. Mining deductions	7,194	19,687	7,939	-
ii. Industrial deductions	1,089	4,179	5,305	-
iii. Farm-works deductions	72	1,154	1,619	2,667
iv. Plant/machinery investment deduction	10,929	16,810	9,246	17,662
v. Building investment Deduction	270	2,200	4,116	3,952
vi. Wear and tear	7,194	19,629	7,930	8,381
SUBTOTAL	53,296	110,755	81,824	83,883
GROSS DOMESTIC PRODUCT	6,284,185	7,022,963	8,144,373	8,904,984
TAX EXPENDITURES TO GDP	0.85%	1.58%	1.00%	0.94%

Source: KRA, 2020

Tax expenditure under VAT is the largest. This represents revenue foregone due to exemptions and zero-rating of certain goods and services as well as exemptions from payment by certain bodies or persons (Table 2). It is estimated at Ksh. 370.4 billion (or 4.2% of GDP) in 2018.

Table 2. VAT Tax Expenditure Items

	2015	**2016**	**2017**	**2018**
	Ksh. Million	Ksh. Million	Ksh. Million	Ksh. Million
Zero-rating excluding exports	90,351	106,166	155,268	180,847
Exemption	136,695	168,546	152,445	189,593
SUB TOTAL	227,046	274,712	307,713	370,440
GROSS DOMESTIC PRODUCT	6,284,185	7,022,963	8,144,373	8,904,984
TAX EXPENDITURES TO GDP	3.61%	3.91%	3.78%	4.16%

Source: KRA, 2020

Tax expenditure under personal income tax (PIT) is minimal but largely benefits higher-income households. This contains tax forgone due to personal relief, insurance relief, relief related to persons with disability (PWD), and mortgage relief among others (Table 3).

Table 3. PIT VAT Tax Expenditure Items

	2015	**2016**	**2017**	**2018**
	Ksh. Million	Ksh. Million	Ksh. Million	Ksh. Million
Pension contribution employees	7,237	8,288	8,417	6,498
Contribution to individual home ownership scheme	4	4	5	3
Insurance relief	55	69	78	122
Double taxation relief	362	650	758	200
Mortgage interest relief	287	332	638	467
SUB TOTAL	7,944	9,344	9,896	7,290
GROSS DOMESTIC PRODUCT	6,284,185	7,022,963	8,144,373	8,904,984
TAX EXPENDITURES TO GDP	0.13%	0.13%	0.12%	0.08%

Source: KRA, 2020

Tax expenditure under custom taxes is in the form of exemptions and zero-rated items under import duty, excise, and VAT on ordinary imports and petroleum imports. It also includes Road development levy (RDL) and Import Declaration Fee (IDF) exemptions.

Table 4. Tax Expenditure Items under Custom Duty

	2015	2016	2017	2018
	Ksh. Million	Ksh. Million	Ksh. Million	Ksh. Million
Other aid-funded project goods	16,877	17,058	22,548	19,148
E.G.S.P.	16,666	15,735	21,566	20,547
Diplomatic Privileges: Motor vehicles	4,660	3,664	3,653	4,128
Project goods (government Ministries)	4,512	3,153	635	66
Commonwealth & Other Government: Goods for use by allied power	2,105	1,373	1,343	848
Capital goods, plant, and machinery for investment	1,657	957	1,067	269
Other	17,307	19,293	27,949	29,340
SUB TOTAL	63,784	61,233	78,761	74,346
GROSS DOMESTIC PRODUCT	6,284,185	7,022,963	8,144,373	8,904,984
TAX EXPENDITURES TO GDP	1.01%	0.87%	0.97%	0.83%

Source: KRA,2020

1.2 Research Problem

Kenya has tax expenditure programs predominantly aimed at inducing investment and promoting exports. The revenue foregone annually due to these incentives has grown five times from Ksh 100 billion in 2012 to Ksh. 536 billion in 2018. The benefits derived by the country are however not comprehensively quantified. Often, the fiscal cost of tax incentive policy may outweigh the envisaged benefits; ultimately undermining the much-needed revenue for public spending on infrastructure, public services, or/and social safety nets. As a rule of thumb, only those tax incentive programs that can have net benefits, in terms of, the economy and revenue should be granted. This study sought to determine the impact and net revenue effect of investment and export tax incentives in Kenya focusing on corporate income tax. The general objective of the study was to determine the impact and efficiency of investment-oriented tax incentives in Kenya. The specific objectives of the study were;

1. To determine the impact of tax incentives on investment
2. To determine the impact of tax incentives on export values
3. To determine the impact of tax incentives on economic growth
4. Determine the net effect of tax incentives policy

2. Literature Review

Several theoretical frameworks link tax incentives to investment. These include the capital arbitrage theory, the neoclassical investment theory, and the neoclassical ownership, location, and Internalization (OLI) theory as summarised in (Munongo, Akanbi, & Robinson, 2017). The capital arbitrage theory argues that capital movement responds to the differentials in rates of return predominantly linking foreign firm investments in domestic markets to tax incentives. The theory established that capital will move from capital-rich countries to capital-scarce countries in search of higher returns and the process will continue until the returns on capital are equalized between jurisdictions. This theory explains the location of Multinational Corporations (MNCs) in developing countries where capital is scarce.

The neoclassical investment theory postulates that firms accumulate capital as long as the costs of doing so are less than the benefits. Since firms' investments are subject to decreasing returns, the optimal investment is at the point where the present value of returns from capital equals the present value of costs. lower tax rates reduce the cost of capital and increase the investment in more capital stock (Van Parys & James, 2010). The neoclassical investment theory thus suggests that tax incentives encourage the growth of established firms through reinvestments and also lures new investments since it reduces the cost of capital (Munongo, Akanbi, & Robinson, 2017).

In analyzing investment behavior at the firm level, the accelerator theory and the Euler model have yielded empirically testable investment equations (Bigsten, Collier, Dercon, Gauthier, Gunning, Isaksson, & Sylvain, 1999). The basic assumption is that firms seek to maximize profit. The accelerator equation is based on Clark's (1923) accelerator theory which asserts that investment levels can fluctuate with consumer demand. Accelerator models emphasize the role of expectations and convention where there is a link between the expectation of profits in the next period, given output growth in the current and earlier periods. The accelerator model assumes a fixed capital to output ratio, which implies that prices, wages, tax rates, and interest rates have an indirect impact on investments in capital stock. Koyck (1954) introduced the flexible accelerator model to allow for capital stock adjustment in several periods other than instantaneously. On the other hand, the Euler equation model seeks to address uncertainty by explicitly including dynamic elements and expectations in the optimization problem.

Firm ability to export is predominantly captured in the old international trade theory of comparative advantage (see Heckscher–Ohlin comparative advantage), Bernard, Jensen, Redding, and Schott (2007). However, recent trade patterns lean more towards firm heterogeneity models. Firm heterogeneity models point out that there are significant differences between international trading and non-trading firms. In deciding to export or the magnitude of export propensity (exports to total sales ratio), firm heterogeneity matters (Roberts & Tybout, 1997; Bernard & Jensen, 1997; Niringiye & Tuyiragize, 2010; Kahia, 2017). Empirical work on tax incentives is increasing gradually (James, 2009; Klemm & VanParys, 2009). Several facts emerge: First, tax incentives work for certain kinds of investments, in specific situations, and specific sectors, such as export-oriented investments. They may also be used to effectively target public goods in sectors that have high returns. In countries where the level of public goods is very low,

the marginal benefit from an additional amount of public good is more than the marginal cost justifying the use of incentives. Secondly, tax incentives are very useful when targeting investment programs with positive externalities. They include investments in Research and Development or High-tech industries that upgrade worker skills, infrastructure projects that encourage business growth, among others.

Nonetheless, due to scarcity in the capital, some countries and economic blocs are caught up in incentives competition against each other to offer more generous incentives. There is evidence that tax competition is occurring between developing countries and is successful in attracting mobile investments. Tax competition leads to a race to the bottom phenomena-a scenario where effective tax rates fall drastically as countries incentivize foreign direct investments (Abbas & Klemm, 2013). Consequently, tax revenue declines as firms employ advanced tax planning, taking advantage of the complicated interactions of international tax systems. The effect is more notable in Africa, to the extent of creating effectively a parallel tax system where rates have fallen to almost zero.

Political economy exerts a powerful influence on incentives too. Governments' behavior is not always driven by economic rationality, and, political rather than economic considerations often tip the balance in favor of incentives (James, 2009). Several factors have been highlighted as political drivers of tax incentives. First, due to political interests, and the need for the government to reward voters, elites can influence and direct policymaking or even control the tax administration and therefore increase tax incentives. This is known as elite influence. Second, the business sector is habitually organized into formal organizations that lobby for the interests of their members. Such groups sustain a certain level of tax incentives by effectively exerting pressure on the government. Thirdly, lack of transparency in the tax system and discretion of social planners in issuing tax incentives facilitate exploitations by organized groups and make lobbying easier. Fourth, for political survival reasons, the government may find it attractive to offer tax incentives (Santos de Souza, 2013).

Empirical evidence at both macro-level (aggregated variables) and micro-level (firm-specific level) point at select cases of successful use of tax incentives to attract foreign direct investment and to crowd in private sector participation in economic and social programs (see Kosonen & Harju, 2018 (Finland); Llambi, Rius, Carbajal, Carrasco, & Ca zulo, 2018 (Uruguay); Zhang, Chen, & He, 2018 China). This paper applied a difference-in-differences strategy to estimate the causal impact of tax incentives on the economic activity in Finland Uruguay, and China respectively. In Finland, the study revealed that decreasing both marginal and average tax rates resulted in a 5% increase in turnover in the treatment group than in the control group. In Uruguay, the effect of tax incentives on investment is found to be positive and significant while that on unemployment is ambiguous. In China, tax credit raises significantly the fixed investment of eligible firms by 28 percent on average during 2004-2007 relative to 2001-2003.

Likewise, using dynamic panel data econometrics from over 40 Latin American, Caribbean, and African countries, including Kenya (Klemm & Van Parys, 2012) found evidence that lower corporate income tax rates and longer tax holidays are effective in attracting foreign direct investment, but not in boosting

gross private fixed capital formation or growth. Also, Nallareddy, Rouen, and Serrato (2018) show that corporate tax cuts increase both income inequality as well as a real investment. The implication is that corporate tax cuts increase investment but the gains from this investment are concentrated on top earners. Employing panel data consisting of 51 countries including Kenya, Stausholm (2017) finds a negligible and decreasing effect of tax holidays on FDI. Contrary, Cleeve (2008) finds a significant impact of tax holidays on FDI in 16 Sub-Saharan Africa. Essentially, the tax holiday is found to impact negatively on public finance but does not translate into real capital accumulation nor economic growth. IMF (2015), UN (2015) and World Bank (2015) studies find that tax incentives are lowly ranked in investment climate surveys, mostly redundant and most investments would have taken place without them (see James, 2009; and James, 2013). Andersen et al. (2017) reveal that the impact of incentives on FDI depends on the nature of the investment in the first place. Tax incentives are more effective in attracting efficiency-seeking FDI focusing on lowering production cost but not for those investments attracted by domestic markets and natural resources.

Turning to the cost-benefit analysis of tax incentives, various methods have been applied in the literature. Andersen et al. (2017) suggest the use of a survey to know the motivation behind a certain investment. Based on the survey data, the proportion of investment that would have occurred without the incentive is interpreted as an incentive redundancy rate across firms and sectors. Together with tax expenditure, investment, and employment rates, cost-benefit ratios are generated for comparison. This method requires samples large enough to disaggregate the resultant redundancy rates by sector, which is costly. The second and more reliable method is the user cost of capital (UCC) method. UCC is the pre-tax minimum rate of return required for an investment to be considered profitable. Comparing UCC with and without tax incentives permits an estimation of the change in fixed assets that is due to existing tax incentives. This methodology has produced rigorous measures of the net fiscal costs per job created, or unit of investment, for different sectors and incentive instruments in the Dominican Republic, Malaysia, and South Africa. But its heavy data needs make this approach difficult to replicate in many lower-middle-income countries.

A social accounting method (SAM) has also been used to analyze the cost-benefits of tax incentive policy (see Calitz, Wallace, & Burrows, 2013). Similarly, the United Nations (2018) guidelines on assessment and design of tax incentives show input-output models and computable general equilibrium (CGE) models as very effective in assessing tax incentive cost-effectiveness. However, such models are hardly available in developing countries due to resource constraints. Alternately, United nations (2018) has developed a prototype model for assessing the cost and benefit of any given tax incentive program. The data requirement here is a combination of firm-based financial and tax data, which are assumed accessible by the revenue authorities.

A study by World Bank Group, James (2009) suggested a simplified method that does not entirely cover all the costs as well as all the benefits but provides a ballpark figure that can help policymakers decide if the incentive was worthwhile. Key metrics suggested include the Percentage of Jobs created by marginal

investors [Benefits] versus the percentage of the marginal investors as compared to the total investors [Costs]. This approach requires a survey to determine the redundancy ratios; Jobs created by all the investors benefiting from tax incentives [Benefits] versus the total tax expenditures [Costs]; and jobs created by the marginal investors [Benefits] versus the revenue cost as measured by the percentage of non-marginal investors multiplied by the total tax expenditures [Costs]. A survey on marginal investors is required.

In conclusion, although past studies have partially addressed the impact of tax incentives on a group of countries, there are no country-specific studies on Kenya. The studies touching on Kenya are either based on a redundancy survey for firms in EPZ or a panel of countries studies where most of the incentives are treated as binary variables. This study will use firm-level tax returns data to gauge the impact of various tax incentives on investment.

3. Method

3.1 Empirical Methodology

A regression technique was used to determine the impact of tax incentive instruments on outcome variables. The estimation equation (1) is specified as follows:

$$(i/k_t) = \lambda_0 + \lambda_1 (i/k)_{it-1} + \lambda_2 (i/k)^2_{it-1} + \lambda_3 (c/k)_{it-1} + \lambda_4 (b/k)^2_{it-1} + \lambda_5 (s/k)_{it-1} + d_t + \lambda_6 x_{it-1} + u_i + v_{it} \quad (1)$$

where K_t is capital stock, i_t is investment (motor vehicle, purchase of plant and equipment), b is debt, c is profit, dt is a time dummy, μi is an unobserved firm-specific effect, and v_{it} is an error term. i_t is a vector of tax incentive instruments including if a firm is benefiting from the tax holiday, location (EPZ and SEZ), concessional tax rates, investment deduction, or capital allowance. The vector also includes firm-specific attributes like business subtype, sector, and firm size. Explicitly, (I/k)t-1 is lagged investment in plant and equipment to the capital stock, c/k profit rate, b/k is indebtedness (defined as past formal borrowing) to capital ratio while s/k is sale to capital ratio. λ_1 to λ_6 parameters to be estimated. Ideally, λ_1 should be positive and greater than 1, λ_2 is negative and greater than one in absolute, λ_3 is negative while λ_5 is positive under imperfect competition and is zero under perfect competition. Parameter λ_4 is controlled for non-separability between borrowing and investment decisions and is zero if financing and investment decisions are independent (Kirui, 2018).

To determine the impact of tax incentives on exports, the study employed a decision to export model borrowed from Bernard and Jensen (1997). The model was estimated using the logit approach.

$$y_{it} = \beta\ x_{it} + \lambda\ z_{it} + \varepsilon_{it} \quad (2)$$

where y is a binary variable on whether a firm exports or not, X_{it} is a vector of tax incentives while Z_{it} is a vector of firm-specific attributes including size, wage expenditure, and capital intensity. The tax incentives under consideration are; investment deduction, industrial building deduction, wear and tear allowance, and location in SEZ or EPZ.

Lastly, to determine the impact of incentives on output, the study linearized a simple Cobb-Douglas production function where the proxy for output is value addition (total sales minus purchases).

Table 5. Computing Tax Expenditure

Tax expenditure	calculation
Tax exemption e.g. tax holiday	Gross Income of companies that qualify for tax holiday * effective tax rate (T).
Investment Allowance (%)	The investment that qualifies for allowance *Allowance*T
Investment tax credit (%)	The investment that qualifies for credit *Credit
Reduced tax rate R	Gross income of companies that qualify for the reduced tax rate *(T-R)
Accelerated depreciation	Deduction of the current year –income inclusion from previous deferrals for the current year
Import tax exemptions	Value of imports qualifying for the import tax exemption * import tax

Source: The World Bank Group (2009).

3.2 Data and Data Sources

The raw data set consisted of 264,810 firms however only 118,380 firms' data were reliable after data cleaning. Data was obtained from KRA. Corporate income tax returns from 2015-2018, which cover 151 EPZs and 8 SEZs, were used to retrieve information on the nature of investments and firm turnover.

4. Empirical Results

This section covers descriptive statistics and the results of the analysis.

4.1 Descriptive Results

The descriptive statistics (mean and standard deviation) are in Table 6. The average investment rate for the period of the analysis is 0.1473 while the sales to capital ratio is high on average at 11.5408.

Table 6. Measure of Central Tendency and Deviation

Variable	Obs	Mean	Std. Dev.	Min	Max
Investment rate	1,866	0.1473	0.4784	0.0000	12.0669
Profit rate	118,380	2.6914	15.1296	-826.5638	3246.2590
Debt to capital	118,380	2.5151	21.4484	0.0000	2255.5130
Sale to capital	118,380	11.5408	56.5750	0.0000	5611.1480
Expenditure to Capital	118,380	0.1210	1.0939	0.0000	322.3151
Age	118,380	16.2865	21.6096	0.2765	1813.5440

Profit rate, debt, and expenditure to capital ratios are 2.6914, 2.5151, and 0.1210 respectively. The firms in the sample are relatively old, with an average age of 22 years.

4.2 The Decision to Invest and Export

In this section, we used a logit model to determine if investment incentives determine the decision of a firm to invest and export. The dependent variable is binary with 1 for firms that have an investment rate greater than zero and zero otherwise for any given return period. Capital expenditure (a sum of the respective investment-related deductions) is used as a control variable. The results show that a shilling deduction towards capital expenditure positively and significantly increases odd ratios in favour of investment. Controlling for both time and sector-specific fixed effects reveals consistent results regarding the odd ratios. A marginal analysis at means reveals that a shilling given as tax expenditure increases the probability of investing by 0.018%. Detailed results are in Table 7 below.

Table 7. Decision to Invest Estimated Results

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Logit	Logit	OLS Time_Sector FE	OLS TimeFE	Margins
Profit_capital			-0.0278	-0.0278	-0.00001
			(0.0394)	(0.0394)	(0.00001)
Debt_capital sqr			0.0000	0.0000	0.000000001
			(0.0000)	(0.0000)	(0.00000001)
Sales_capital			0.0340	0.0340	0.0000119*
			(0.0221)	(0.0221)	(0.00001)
Deduction_capital	0.4530*	0.4530*	0.5227*	0.5227*	0.000184*
	(0.2379)	(0.2379)	(0.2677)	(0.2677)	(0.0000996)
Age	-0.0028	-0.0028	-0.0026	-0.0026	-0.0000009
	(0.0037)	(0.0037)	(0.0049)	(0.0049)	(0.000002)
			(1.4200)	(1.4200)	
Constant	13.4730***	13.4730***	14.5353***	14.5353***	
	(0.4747)	(0.4747)	(0.9507)	(0.9507)	
Observations	119,107	119,107	119,107	119,107	
TimeFE	NO	NO	YES	YES	
sector	NO	NO	NO	YES	
Cluster_se	NO	NO	YES	YES	
cons	1	1	1	1	

To determine the effect of capital deduction expenditure on firm export performance, we estimated a panel logit model controlling for firm characteristic variables. The dependent variable is a dummy with 1 if a firm exports and zero otherwise. The firm-specific measures include capital intensity measured as the value of fixed assets scaled to sales revenue and firm size, which is measured as a logarithm of total sales.

The total expenditure per employee is used proxy for quality of labour force, assuming that the higher the labour cost per head, the higher the wage that corresponds largely, educated, and skilled workforce. The age of the firm is computed as the difference between the registration date and the date of analysis. A log of short-term liabilities is used as a proxy for financial availability through borrowing. According to theory and empirical findings, the factors are expected to influence exports of a firm positively (Papadogonas, Voulgaris, & Agiomirgianakis, 2007).

The analysis reveals that an exporter is likely to be large, old, accessing credit, labor-intensive, seeking cheap labour, and enjoying some capital expenditure deductions. Firm size, age, credit, and capital deduction significantly increase firms' odds in favour of exporting. The signs are consistent with empirical expectations. The effect of these factors is consistent even after controlling for business subtype, time and sector fixed effects apart from the capital intensity. The positive and significant coefficient in firm size implies that large firms have economies of scale to enter and compete in foreign markets. Similarly, the age effects imply that mature firms may have accumulated considerable knowledge stocks and capabilities that allow them to better penetrate foreign markets. The effect of labour quality is significantly negative while capital intensity is insignificant. This can be attributed to the fact that large export values for the period of analysis are in the Agricultural sector (33%) and manufacturing sector (30%) which are mainly labor-intensive, low-technology firms, and may not need skilled or highly educated labor force. A shilling allowed as capital expenditure increases the probability of exporting by 0.48%.

Table 8. Decision to Export Estimated Results

VARIABLES	(1) logit	(2) logit	(3) logit	(5) OLS Subtype_Sector _Time_FE	(6) OLS Subtype_Sector _Time_FE	(7) Margins
Firm_size		1.0930***	1.0930***	0.9487***	0.9487***	0.0338***
		(0.0520)	(0.0520)	(0.0602)	(0.0602)	(0.0020)
Age		0.0170***	0.0170***	0.0150***	0.0150***	0.0005***
		(0.0022)	(0.0022)	(0.0026)	(0.0026)	(0.0001)
in borrowing		0.0657**	0.0657**	0.1547***	0.1547***	0.0055***
		(0.0298)	(0.0298)	(0.0376)	(0.0376)	(0.0013)
lncapital_intensity		-0.0096	-0.0096	-0.0337	-0.0337	-0.0012
		(0.0384)	(0.0384)	(0.0473)	(0.0473)	(0.0017)
lnquality		-0.1855***	-0.1855***	0.2316***	0.2316***	0.00827***
		(0.0465)	(0.0465)	(0.0503)	(0.0503)	(0.0018)
lncapital_deduction	0.8152***	0.2073***	0.2073***	0.1371***	0.1371***	0.0048***

	(0.0200)	(0.0359)	(0.0359)	(0.0421)	(0.0421)	(0.0015)
				(0.3215)	(0.3215)	
Constant	-17.7944***	-27.5404***	-27.5404***	-20.0792***	-20.0792***	
	(0.3016)	(0.9420)	(0.9420)	(1.5107)	(1.5107)	
Observations	80,388	32,719	32,719	32,296	32,296	
Number of ID	30,753	14,069	14,069	14,001	14,001	
TimeFE	NO	NO	NO	YES	YES	
Business_subtypeFE	NO	NO	NO	YES	YES	
SectorFE	NO	NO	NO	YES	YES	
Cluster_se	NO	NO	NO	YES	YES	
N_clust				14001	14001	
N_robust				32296	32296	

4.3 Impact of Tax Incentive on the Intensity of Investment and Firm's Value-added

The coefficient of sales to capital ratio and debt to capital squire are positive and significant after controlling for time, business subtype, and sector fixed effects. The positive and significant debt to capital squire implies that financing and investment decisions are dependent. In other words, firms tend to borrow for investment. The coefficient of lagged profit to the capital ratio used as a proxy for cash flow is negative and significant as theoretically expected in a non-financially constrained market. It further implies that a firm can raise as many finances as it desires at a given cost, (Hall, 1991). Detailed results are presented in Table 9.

Table 9. Impact of Tax Incentive on the Intensity of Investment

VARIABLES	(1) OLS	(2) OLS_Time _FE	(3) Time_Subtype _Sector_FE	(4) OLS	(5) OLS_Sector _FE	(6) Time_Subtype_Sector_FE	(7) Time_Subtype_Sector_FE
Inves_rate _sqr(-1)		0.0975***	0.0976***		0.1055	0.1192	0.1284
		(0.0309)	(0.0311)		(0.0782)	(0.0780)	(0.1090)
Profit_capital (-1)		-0.0259**	-0.0261**		-0.0258**	-0.0258**	-0.0134
		(0.0106)	(0.0110)		(0.0106)	(0.0110)	(0.0090)
Debt_capital sqr(-1)		0.0025	0.0024		0.0025	0.0025	0.0051**
		(0.0016)	(0.0016)		(0.0016)	(0.0016)	(0.0023)
Sales_capital (-1)		0.0059	0.0060		0.0059	0.0059	0.0083**
		(0.0036)	(0.0038)		(0.0036)	(0.0038)	(0.0041)

Deductions_capital	0.4080***	0.4427***	0.4406***	0.4410***	0.4428***	0.4409***	
	(0.0428)	(0.0522)	(0.0531)	(0.0207)	(0.0522)	(0.0532)	
Inves_rate _sqr	0.0764***						
	(0.0145)						
Profit _capital	-0.0351***						
	(0.0131)						
Debt_capital sqr	0.0015						
	(0.0009)						
Sales_capital	0.0016						
	(0.0037)						
inv_rate(-1)				0.0877***	-0.0086	-0.0225	-0.0008
				(0.0166)	(0.0713)	(0.0715)	(0.1068)
Deduction capital(-1)							0.0226
							(0.0311)
Constant	0.0901***	-0.0076	-0.0083	-0.0080	-0.0073	-0.0087	0.0035
	(0.0201)	(0.0076)	(0.0411)	(0.0051)	(0.0078)	(0.0408)	(0.0376)
Observations	1,808	765	765	765	765	765	765
Number of ID	884	400	400	400	400	400	400
TimeFE	NO	NO	YES	NO	NO	YES	YES
Business_subtypeFE	NO	NO	YES	NO	NO	YES	YES
SectorFE	NO	NO	YES	NO	NO	YES	YES
Cluster_se	NO	YES	YES	NO	YES	YES	YES
r2_o	0.825	0.446	0.447	0.428	0.445	0.445	0.150
r2_b	0.853	0.521	0.522	0.507	0.520	0.519	0.254
r2_w	0.520	0.344	0.349	0.311	0.345	0.354	6.49e-05
N_clust	884	400	400		400	400	400

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The study sought to determine the effect of tax incentives on the firm's value-added. Since firm-level data was used, value addition suffices as a proxy for economic growth. Value addition is computed as the difference between firm output at market price and intermediate consumption. In estimation, the study mimics a simple but log linearized Cobb-Douglas production function where output is a function of capital and labor. The total number of employees and total fixed assets are used as labor and capital proxies respectively. The results are shown in Table 10. Labour and capital elasticity coefficients are 0.56% and 0.19% respectively. The analysis shows that a 1 percent increase in capital expenditure is associated with an increase in the firm's value-added by between 0.15% and 0.36%.

Table 9. Impact of Tax Incentives on Firm Value-added

	(1)	(2)	(3)
VARIABLES	OLS	OLS	Time_Sector_FE
lncapital		0.1963***	0.1929***
		(0.0080)	(0.0089)
lnlabour		0.5540***	0.5810***
		(0.0083)	(0.0084)
lncapital_deduction	0.3666***	0.1541***	0.1575***
	(0.0036)	(0.0113)	(0.0119)
			(0.0528)
Constant	11.2161***	10.0932***	9.6286***
	(0.0500)	(0.1124)	(0.1220)
Observations	68,198	46,480	46,479
Number of ID	27,902	18,614	18,613
TimeFE	NO	NO	YES
SectorFE	NO	NO	YES
Cluster_se	NO	YES	YES
r2_w	0.0197	0.0713	0.0764
r2_b	0.321	0.533	0.577
r2_o	0.337	0.546	0.590
N_clust		18614	18613

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.

4.4 Cost-benefit Analysis

In this section, the study aggregates the benefits and costs associated with tax incentives and matches them to determine the net benefits.

Table 10. Cost-benefit Analysis of Incentives from a Revenue Perspective

Tax return period	Cost/Tax forgone (30% of total capital expenditure)	Induced _Investment (0.5 of the value of the investment)	Induced Gross value added (0.33% (Note 3) of gross value added)	Induced exports values (0.05% of exports)	Total Benefits (column 2+3+4)	Net effect (column 5-1)
2014	7,641	2,399	882		3,281	-4,360
2015	77,468	20,639	8910	2083	31,632	-45,836

2016	73,989	21,972	11550	2049	35,571	-38,418
2017	85,430	27,388	11550	2305	41,243	-44,187
2018	94,370	16,688	12540	2296	31,524	-62,846
2019	23,305	8,775	2958	560	12,293	-11,012
Total (Kshs. m)	**360,000**	**97,861**	**48,391**	**9,293**	**155,545**	**-206,658**
Average	**60,367**	**16,310**	**13,826**	**3,098**		**-34,443**

The profound rationale for offering tax incentives is to rejuvenate the economy, increase investment, and export values. The study computed revenue cost as the value of revenue forgone due to capital expenditure-related deductions. The induced gross value addition, investment, and exports were used as benefits. The respective multipliers were obtained from the econometric model estimates from the study. Based on the analysis in Table 11, the net revenue effect on tax incentives for the period (2014 to 2019) of the analysis is a loss of Kshs. 206,658 million. The revenue foregone through tax incentives out weights the sum of induced gross value added, induced exports, and investments across all the tax return periods. Annually, the average foregone CIT revenue due to capital expenditure deductions is Kshs. 60,367 million. Similarly, the cost outweighs the benefits of kshs. 34,443 million on average.

5. Summary of Findings and Policy Recommendations

This study sought to determine the impact of tax incentives on investment, export values, and economic growth. It also sought to determine the net effect of investment and export tax incentives on the economy and give policy recommendations and guidelines on tax incentives in Kenya. To achieve the objectives of this study, we employed a two-stage approach. In the first stage, we model the effect of tax incentives on the firm's decisions to invest and export using a logistic model. In stage two, we modelled the effects of tax incentives on the rate of investment and export values for those firms who invested. Investment Euler equation was used to analyze the effect of tax incentives on investment levels while log-linearized Cobb-Douglas production function was used to analyse the effects of tax incentives on the firm's output – proxied by gross value added. These methods were applied to 118,380 firm-level panel data generated from tax returns for the period 2014 to 2019.

Regarding the impact of tax incentives affects the decision to invest and to export, the results show that the probability of capital deduction expenditure influencing the decision to invest is 0.018%. This implies that a hundred shilling increase in investment deduction increases the propensity of investing by 0.018. The estimates of Euler coefficients show that financing and investment decisions are dependent. In other words, firms tend to borrow for investment. Based on the sample studied, there is no evidence for financial constraints in the market implying that a firm can raise as much finances as it desires at a given cost (Hall, 1991). Concerning exports, doubling capital expenditure deduction (100% increase) only increases the propensity to export by 0.5.

The impact of tax incentives on investment rate and firms' gross value added is small. For each Ksh 10 of total capital deduction expenditure, about Ksh 5 is realized as an investment. Based on the value-added production function, a 10% increase in capital expenditure deduction increases growth in the firm's gross value added by between 0.15% and 0.36%, depending on the model assumptions. We used the sum of investment, export, and gross value added values induced by tax incentives policy as benefits and compared this to the average foregone tax revenue (cost) due to capital deductions. The cost on average outweighs the benefits of Ksh.34.4 billion every year.

6. Policy Recommendations

These results imply that export and investment-related tax incentives are either redundant or have a trivial impact on their respective targets. The study, therefore, recommends a review of the second and the third schedules of the Income Tax Act to:

1. Discontinuing further issuance of redundant tax incentives to newly registered firms.
2. Gradually phasing-out out the existing redundant tax incentives.
3. Develop national guidelines on provisions of tax incentives to guide evaluation and enactments so as to ensure that only beneficial incentives are provided for in law

References

Abbas, S. A., & Klemm, A. (2013). A partial race to the bottom: corporate tax developments in emerging and developing economies. *International Tax and Public Finance*, *20*(4), 596-617. https://doi.org/10.1007/s10797-013-9286-8

Andersen, M. R., Kett, B. R., & von Uexkull, E. (2017). Corporate tax incentives and FDI in developing countries. *Global Investment Competitiveness Report* 2017/2018, 73. https://doi.org/10.1596/978-1-4648-1175-3_ch3

Bernard, A. B., & Jensen, J. B. (1997). Exporters, skill upgrading, and the wage gap. *Journal of International Economics*, *42*(1-2), 3-31. https://doi.org/10.1016/S0022-1996(96)01431-6

Bernard, A. B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2007). Firms in international trade. *Journal of Economic Perspectives*, *21*(3), 105-130. https://doi.org/10.1257/jep.21.3.105

Bigsten, A., Collier, P., Dercon, S., Gauthier, B., Gunning, J. W., Isaksson, A., ... Sylvain, M. (1999). Investment in Africa's manufacturing sector: a four-country panel data analysis. *Oxford bulletin of economics and statistics*, *61*(4), 489-512. https://doi.org/10.1111/1468-0084.00140

Burman, L. E., Toder, E. J., Berger, D., & Rohaly, J. (2017). Economic and Distributional Effects of Tax Expenditure Limits. *The Economics of Tax Policy*, 109-144. https://doi.org/10.1093/acprof:oso/9780190619725.003.0008

Calitz, E., Wallace, S., & Burrows, L. R. (2013). *The impact of tax incentives to stimulate investment in South Africa*.

Chen, D. (2015). *The Framework for Assessing Tax Incentives: A Cost-Benefit Analysis Approach*. UN.

Chetty, R., & Hendren, N. (2013). *The economic impacts of tax expenditures: evidence from spatial variation across US 1*.

Cleeve, E. (2008). How effective are fiscal incentives to attract FDI to Sub-Saharan Africa? *The Journal of Developing Areas*, 135-153. https://doi.org/10.1353/jda.0.0015

Curtis, M., Kambuni, L., Daniels, J., Mosioma, A., Mshana, V., Ambrose, S., ... Ngowi, H. (2012). *Tax competition in East Africa: A race to the bottom*. Tax incentives and revenue losses in Tanzania, Tax Justice Network-Africa and ActionAid International.

Glenday, G., & Ndii, D. (2000). *Export platforms in Kenya*. African Economic Policy Discussion Paper Number 43.

Hall, B. H. (1991). *Firm-Level Investment with Liquidity Constraints: What Can the Euler Equations Tell Us*? University of California at Berkeley and the National Bureau of Economic Research. Photocopied.

Harju, J., & Kosonen, T. (2012). *The impact of tax incentives on the economic activity of entrepreneurs* (No. w18442). *National Bureau of Economic Research*. https://doi.org/10.3386/w18442

IMF, O. UN and World Bank. (2015). Options for Low-Income Countries' Effective and Efficient Use of Tax Incentives for Investment. Report to the G-20 Development Working Group. *IMF Policy Papers*.

Institute of Economic affairs. (2012). *Tax Incentives and exemption regime in Kenya: Is it working*? A Publication of the IEA Budget Information Programme.

James, S. (2009). *Tax and non-tax incentives and investments: evidence and policy implications*. FIAS, The World Bank Group.

Kahia, M. (2017). *The key factors of export intensity in Tunisia: A Logistic regression with the random-effect model*.

Kenya Investment Authority. (n.d). *Investment incentives*. Retrieved from http://www.invest.go.ke/starting-a-business-in-Kenya/investment-incentives

Kenya Revenue Authority. (n.d.) *Tax incentives Businesses*. Retrieved from https://www.kra.go.ke/en/business/companies-partnerships/companies

Kirui, B. K. (2018). *Financial constraints, capital structure, and investment: Evidence from listed manufacturing firms in Kenya*.

Klemm, A., & Van Parys, S. (2012). Empirical evidence on the effects of tax incentives. *International Tax and Public Finance, 19*(3), 393-423. https://doi.org/10.1007/s10797-011-9194-8

Klemm, M. A. (2009). Causes, benefits, and risks of business tax incentives (No. 9-21). *International Monetary Fund*. https://doi.org/10.2139/ssrn.1356449

Kosonen, T., & Harju, J. (2013). *The impact of tax incentives on the economic activity of entrepreneurs.*

Koyck, L. M. (1954). *Distributed lags and investment analysis* (Vol. 4). North-Holland Publishing Company.

Llambi, C., Rius, A., Carbajal, F., Carrasco, P., & Cazulo, P. (2018). Are tax credits effective in developing countries?: The recent Uruguayan experience. *Econom á*, *18*(2), 25-58.

Munongo, S., Akanbi, O. A., & Robinson, Z. (2017). Do tax incentives matter for investment? A literature review. *Business and Economic Horizons* (BEH), *13*(1232-2017-2411), 152-168. https://doi.org/10.15208/beh.2017.12

Nallareddy, S., Rouen, E., & Su árez Serrato, J. C. (2018). Corporate tax cuts increase income inequality (No. w24598). *National Bureau of Economic Research*. https://doi.org/10.3386/w24598

Niringiye, A. (2014). *Determinants of private investment behavior in Ugandan manufacturing firms*. AERC.

Papadogonas, T., Voulgaris, F., & Agiomirgianakis, G. (2007). Determinants of export behavior in the Greek manufacturing sector. *Operational Research*, *7*(1), 121-135. https://doi.org/10.1007/BF02941189

Poterba, J. M. (2011). Introduction: Economic analysis of tax expenditures. *National Tax Journal*, *64*(2), 451-458. https://doi.org/10.17310/ntj.2011.2S.01

Roberts, M. J., & Tybout, J. R. (1997). The decision to export in Colombia: An empirical model of entry with sunk costs. *The American Economic Review*, 545-564.

Santos-Paulino, Amelia U. (2000). *Trade liberalization and export performance in selected developing countries*. Department of Economics Discussion Paper, No.00,12, University of Kent, Department of Economics, Canterbury.

Stausholm, S. N. (2017). *Rise of ineffective incentives: New empirical evidence on tax holidays in developing countries*. https://doi.org/10.31235/osf.io/4sn3k

Zhang, L., Chen, Y., & He, Z. (2018). The effect of investment tax incentives: evidence from China's value-added tax reform. *International Tax and Public Finance*, *25*(4), 913-945. https://doi.org/10.1007/s10797-017-9475-y

Notes

Note 1. Investment-related incentives mainly consist of Investment Deduction Allowance (IDA), Industrial Building Allowances (IBA), Mining Deductions Allowance, Capital Deductions on Agricultural Land, Import Duty Set-Off and Unit Trusts Investment Vehicles.

Note 2. Trade-related incentives mainly consist of deductions, exclusions, exemptions or preferential tax rates granted to firms operating in Export Processing Zones (EPZ), Manufacture-Under-Bond (MUB) program, and Tax Remissions Export Office (TREO) program. See details https://www.kra.go.ke/en/business/companies-partnerships/companies-partnerships-pin-taxes/companies-partnerships-incentives-exemptions

Note 3. 0.33 is the average impact at 0.15 and 0.36

Appendixes

Appendix 1. Description of Exports and Investment Tax Incentives

Name of incentive	Description
1. Investment Allowances	• These are tax incentives offered for capital expenditures. • They include Investment: Deduction Allowance (IDA), Industrial Building Allowances (IBA), Mining Deductions Allowance, Capital, deductions on Agricultural Land, Import Duty Set-Off and Unit Trusts Investment Vehicles
i. Investment Deductions Allowance (IDA)	• To incentivize investment in physical capital for manufacturing • Rates are 150% for investment outside the municipalities of Nairobi, Mombasa and Kisumu and 100% within the three municipalities
ii. Industrial Building Allowance (IBA)	• Allowance granted on the cost of construction of buildings that are used for manufacturing purposes and use as hotel premises • IBA is 2.5% for Manufacturing and 10% for Hotels
iii. Capital Expenditure on Agricultural Land/ Farm Works Deductions	• Meant to encourage capital accumulation and encourage equipment modernization
iv. Mining Deduction Allowance	• Granted to mining to companies who incur costs on exploration, testing, machinery and other works that would be of little or no value if the mining operation ceased • It is computed at a rate of 40% in the first year and 10% for the remainder 6 years which totals to 100% on a straight-line basis
v. Import Duty Set-Off	• Import duty paid on importation of capital equipment is offset from the income tax payable at the end of the year.
2. Exports related incentives	• Incentive seeks to promote export growth. They include Manufacture-Under Bond (MUB), Tax Remissions Export Office (TREO), Export Processing Zones (EPZ) and Special Economic Zones (SEZ).
i. Export Processing Zones (EPZ)	• The single largest bulk of incentive stipulated under the Export Processing Zones Act, 1990
ii. Special Economic Zones (SEZ)	• Investment incentives for specific geographical areas as stipulated in Special Economic Zones (SEZ) Act, 2015
iii. Manufacturing Under Bond (MUB)	• Initiated in 1986 and is similar to an EPZ. However, the firms pay corporate tax and can sell in domestic markets
iv. Tax Remissions Export Office (TREO)	• Manufacture under TREO are refunded VAT they incur as they import inputs to enable them to produce the exportable output

Appendix 2. Comparison of Incentives between SEZ and EPZ

Tax aspect	**EPZ**	**SEZ**
Value Added Tax (VAT) – 16%	-EPZ enterprises are exempt from VAT registration. -The supply of taxable goods and services to EPZs is zero-rated from VAT.	-The supply of taxable good and services to SEZs is zero-rated from VAT
Excise Duty varying rates	-Importation of goods and services exempt from excise duty	-Importation of goods and services exempt from excise duty.
Income Tax – 30%	-Exempt for the first 10 years from the date of the first sale and at a rate of 25% for the next 10 years thereafter. 30% rate from the 21st year.	-10% for the first 10 years of operation, and thereafter 15% subsequent years.
Withholding Tax – 5% to 20%	-Dividends and other payments to non-residents during the 10-year tax holiday. withholding tax for non-residents applies as follows: Interest: 15% ,Dividend 10% , Management & Professional Fees: 20% and Royalties: 20%	Payments to non-residents: Interest: 5% , Dividend: 0% , Management & Professional Fees: 5% and Royalties: 5%*
Investment Deductions	-100% of the capital expenditure on building and machinery in the first year of use.	100% of capital expenditure on building and machinery in the first year of use.
Import Declaration Fee – 2%	-Goods destined to EPZs are exempt from Import Declaration Fees	Goods destined to SEZs are exempt from Import Declaration Fees
Stamp Duty – Nominal to 4%	-Execution of any instrument relating to the EPZ business.	Execution of in of any instrument relating to the SEZ business.
Railway Development Levy – 1.5%	-Applicable on importation	Applicable on importation
Export Levy – ad valorem	Exports to EPZs are exempt from Export Levy	Exports to SEZs are exempt from Export Levy