The Impact of Tax Reform on Economic Growth in Sudan

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Abstract: - Tax reform is an important policy tool for governments to promote economic growth. It is an important aspect of economic policy as it can have a significant impact on the overall health of the economy. Furthermore, tax reform, foreign direct investment, population growth, and economic activity are all closely related. This study aims to examine the impact of tax reform on economic growth in Sudan from 1961 to 2021. For this purpose, the study used the gross domestic product as the dependent variable representing economic growth (Y), while the explanatory variables represented tax reform (X1), population growth (X2), and foreign direct investment (X3). The data were collected from the World Bank database. The study applied the ordinary least squares technique, and the obtained results showed that while population growth and foreign direct investment play a significant role in economic growth, tax reform has a little bite impact on Sudan's economic growth during the period under study. So that by reforming the tax system, governments can create a more efficient and fair system that encourages economic growth and investment.

Key-Words: - tax reform, population growth, foreign direct investment, GDP, Economic Activity, and economic growth

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1 Introduction

Tax reform is an important policy tool for governments to use to promote economic growth. Tax reform can be used to reduce the burden of taxation on businesses and individuals, stimulate investment, and encourage economic activity. It can also be used to redistribute income and wealth and provide incentives for certain types of activities. Tax reform has been a major topic of debate in recent years, as governments around the world have sought to adjust their tax systems to promote economic growth.

Tax reform can have a significant impact on economic growth, as it can affect the incentives for businesses and individuals to invest and consume. research carried out by [1], analyzed the impact of tax reforms on the economic growth of Nigerians between 1986 and 2012. The results showed that tax reforms are positively, and significantly associated with economic growth. They concluded that favorable tax reforms improve the government's ability to generate revenue to engage in socially desirable activities that lead to absolute and per capita economic growth. Therefore, [2], used a cross-generational endogenous growth model and showed that the homeownership tax in China increases the accumulation of physical and human capital and the growth rate of output in the long run, that tax revenues are used regardless of spending and government debt, personal income or capital taxes, or reduce an increase government spending on education. To ensure progress in the field of sustainable development and counter threats to national security, the development of instruments to balance the ecological, economic, and energy aspects of the economy is of particular importance. Moreover, [3], examined the impact of selecting different functional elements of transportation taxation on their effectiveness in ensuring national security. The results obtained did not allow unequivocally determine the impact of transport taxes on efficiency.

The current paper aims to explore the impact of the tax reform on economic growth in Sudan during

the period (1961- 2021). For this purpose, the study used the gross domestic product as a dependent variable to represent economic growth (Y). Tax reform (X1), population growth (X2), and foreign direct investment (X3) represent explanatory variables. The study applied the ordinary least square technique to data collected from the World Bank database.

The rest of the paper is organized as follows: section two reviews the literature. Section three presents the methodology and model specification. Results discussion and conclusion provide in sections four and five, respectively.

2 Literature Review

Tax reform is a broad term that encompasses a variety of changes to taxation systems, including changes in rates, exemptions, deductions, credits, and other features. Tax reforms can be designed to increase revenue or reduce government spending, but they can also affect economic growth. For example, reducing marginal tax rates can encourage investment and entrepreneurship by providing incentives for individuals to invest in productive activities. Similarly, eliminating certain deductions or credits can reduce distortions in the economy and lead to more efficient resource allocation. The empirical evidence on the impact of tax reform on economic growth is mixed. Studies from developed countries generally find that reductions in marginal tax rates are associated with higher levels of economic growth, [4], [5]. However, these results are not universal; some studies found no significant effect, [6].

In developing countries, some studies suggested that reductions in marginal tax rates may have a positive effect on economic growth, [7]. In [8], author described an economy with overlapping generations, endogenous growth, and an unfunded pension system financed by capital and labor income taxes. The study found that a rise in worker income and capital taxation leads to a decline in the elderly labor supply. The result suggested that, under some circumstances, a capital income tax and growth have an inverted U-shaped connection. Although, it is widely believed that capital should not be taxed in the long run. In addition to examining the direct effects of tax reforms on economic growth, it is also important to consider their indirect effects. For example, reducing taxes may lead to increased government spending which could have a positive effect on economic growth, [9]. Similarly, reducing taxes may lead to increased investment which could also have a positive effect, [4]. Considering India's experience of economic growth, [10], analyzed annual government revenue, development, and gross domestic product data from 1990 to 2017. The study revealed a positive association between tax revenues and GDP; a relationship was also found between tax revenues and development costs. They concluded that to increase GDP and growth, it is necessary to accelerate spending on the development of investment projects. Government revenue is the main source of funding for the public.

The authors in [11], determined the influence of tax revenues on economic growth in Nigeria. They said tax revenue didn't matter for Nigeria's inflation rate and interest rate at a significant level of 5%. Given the favorable relationship between taxes on oil profits and economic development, they recommended that the federal government support the management of public finances, promote audit and transparency measures, streamline tax administration, and fight tax evasion. It is tough to predict how tax reform will affect economic development because of several issues. First, it is difficult to isolate the effects of any particular policy change from other factors that may be influencing economic performance at any given time. Second, many policies are implemented as part of the broader package which makes it difficult to isolate their individual effects, [6]. Thirdly, there may be lags between policy implementation and its effects which further complicates the analysis, [9]. Empirically, [12], analyzed the effect of tax reforms on income distribution in developing countries. They applied the local basic method to a new database, tax reform, and narrative database covering 45 emerging and low-income countries. The results revealed that Personal income reform reduced the disposable Gini and increase the bottom income share. In the same regard, [13], noted that taxation has four main functions: revenue, redistribution, revaluation, and representation.

According to different theories and empirical evidence, the issue of population and economic growth is controversial. Therefore, [14], analyzed the impact of population growth on economic growth in the Ethiopian economy. They used ARDL methods, whose empirical results showed that population growth, export growth, and import growth had significant positive effects on Ethiopia's economic growth in both the short and long term.
Furthermore, [15], analyzed the impact of population growth rate, economic growth and index of human development, distribution of income, and rate of unemployment on poverty in all provinces of Indonesia. They found that population growth rate,

economic growth, human development index, income distribution, and unemployment rate affected poverty in all provinces of Indonesia simultaneously. Moreover, [16], conducted a sizable study to specifically investigate the relationship between urban population growth and GDP in impacting (ULE) for various areas, degrees of economic development, and governmental structures in more than 300 cities. They demonstrated that, between 1970 and 2014, population growth rather than GDP consistently served as the primary predictor of (ULE). Thus, [17], discussed the causal relationship between foreign direct investment (FDI) and economic growth in Kenya between 1980 and 2018. To solve the problem of omitted variables, two variables, namely money supply, and trade, were examined as intermittent variables, which is a system of multivariate equations of Granger causality. Accordingly, [18], argued the relationship between FDI and economic development in host countries. They examined the non-linear link between economic growth, foreign direct investment, domestic investment, and financial development. They used the cointegration technique (NARDL). The results showed that the positive effects of FDI and ID are more significant than the negative effects and have a non-linear direction. Similarly, [19], suggested that the tax burden in the future will have to fall increasingly on labor as the less mobile factor of production.

Sudan is a country located in Africa Continental that has been plagued by civil war and economic instability for many years. Despite this, the economy of Sudan has seen some improvement in recent years, due to several factors. The primary driver of Sudan's economic growth has been the oil sector. Oil production in Sudan began in the late 1990s and has since become the country's primary source of revenue, [20]. In 2018, oil accounted for nearly 70% of Sudan's total exports and more than 50% of its GDP. This has helped to stabilize the economy and reduce poverty levels. In addition to oil, agriculture is another important sector of the Sudanese economy. Agriculture accounts for around 20% of the GDP and employs approximately 40% of the population, [21]. The main crops grown in Sudan are sorghum, millet, wheat, cotton, sesame, peanuts, gum Arabic, and sugarcane. The government is also investing heavily in infrastructure projects such as roads, railways, and ports which will help to improve connectivity between different parts of the country and increase access to markets for agricultural products. This should help to further boost economic growth in the future. Sudan also has a large informal economy which accounts for around 40% of the GDP. This includes small-scale trading, subsistence farming, and informal services such as transportation or construction work. The informal sector provides employment opportunities for many people who would otherwise be unemployed or underemployed due to a lack of formal job opportunities. Despite these positive developments, there are still many challenges facing Sudan's economy including high levels of inflation (currently at over 60%), high unemployment (estimated at around 25%), and a large public debt (estimated at over $50 billion).

Generally, tax reform policies can have a significant impact on economic growth in less developed countries. Tax reform can help to create an environment that encourages investment and entrepreneurship, which are essential for economic growth. Tax reform can also help to reduce the burden of taxation on businesses, allowing them to reinvest their profits into expanding their operations and creating new jobs.

3 The Model and Methodology

In this section, we specify the model and methodology. Our model takes the following form:

$$LNY = \beta 1X1 + \beta 2X2 + \beta 3X3 + \varepsilon \quad (1)$$

$$Fi > 0, \ i= 1,2, 3 \quad (2)$$

where:

Y = Economic Growth (measured by GDP Growth).

X1 = is a dummy variable that takes on a value of 1 if tax reform has been implemented and 0 otherwise.

X2 = Population Growth (annual %).

X3 = Foreign direct investment, net inflows (% of GDP)

β1, β2, and β3 are parameters to be estimated.

ε = an error term.

Equation (1) supposes that (tax reform, population growth, and foreign direct investment) had a positive impact on economic growth.

According to economic theory, tax reform policies can have a significant impact on economic growth in less developed countries. Tax reform can help to create an environment that encourages investment and entrepreneurship, which are

essential for economic growth. It can also help to reduce the burden of taxation on businesses, allowing them to reinvest their profits into expanding their operations and creating new jobs. likewise, population growth and foreign direct investment accelerate the growth of the economy based on the economic literature. Table 1 shows the secondary data of the study which was collected from World Bank data (in millions $). Because the effect of economic growth policy may take time to materialize, the dependent variable will estimate with one period lag (lnY).

The above table includes the study variables, namely the growth rate of the gross domestic product as a dependent variable, and the independent variables represented in tax reform, population growth rate, and foreign direct investment. Where the logarithmic GDP growth rate was equal to 1.56, the tax reform average was 0.18, while the average population growth and the average foreign direct investment indicated 2.76 and 1.56, respectively. The data were collected from the World Bank database for the period from 1961-2021.

4 Results and Discussion

The study applied the OLS technique to the data covering the period (1961- 2021) on the above-mentioned variables, we estimate equation (1). The regression results are given in Table 2 and Table 3 below, where the estimated equation given in equation (3). Based on the above Table 2 and Table 3, the following equation represents regression variables:

$$LNY = -0.420\ X1 + 0.482\ X2 + 0.125\ X3 \qquad (3)$$

$R^2 = 0.74$ DW = 1.38

Table 1. Economic Growth (Y), Tax Reform (X1), Population Growth (X2), and Foreign Direct Investment (X3) in Sudan (1961-2021).

Year	Y	X1	X2	X3	Ln Y
1961	0.02	0	8.54	2.97	-3.8
1962	6.92	0	1.59	3.03	1.93
1963	-2.85	0	4.71	3.05	-
1964	-1.12	0	3.91	3.15	-
1965	6.78	0	-2.39	3.2	1.91
1966	-3.58	0	6.4	3.06	-
1967	1.42	0	6.76	3.01	0.35
1968	1.96	0	2.37	3.04	0.67
1969	1.39	0	8.61	3.03	0.33
1970	5.93	0	7.32	3.05	1.78
1971	2.25	0	6.56	3.17	0.81
1972	-5.07	0	14.31	3.27	-
1973	0.63	0	23.15	3.36	-0.46
1974	11.45	0	15.44	3.79	2.44
1975	15.71	0	5.28	4.13	2.75
1976	16.67	0	6.87	4.13	2.81
1977	6.22	0	17.4	4.19	1.83
1978	-5.93	0	24.91	4.26	-
1979	-5.02	0	23.97	4.27	-
1980	1.52	0	22.03	4.29	0.42
1981	7.44	0	24.98	4.29	2.01
1982	5.96	0	30.59	4.08	1.78
1983	2.06	0	26.06	3.28	0.72
1984	-5.01	0	33.64	2.28	-
1985	-6.28	0	46.17	1.82	-
1986	5.41	0	28.64	1.88	1.69
1987	14.22	0	25.89	1.71	2.65
1988	-0.33	0	78.86	1.1	-
1989	8.93	0	36.74	1.29	2.19
1990	-5.47	0	66.24	1.78	-
1991	7.51	0	88.77	1.71	2.02
1992	6.58	0	109.23	1.51	1.88
1993	4.57	0	97.49	1.74	1.52
1994	1.01	0	159.27	2.41	0.01
1995	6	0	104.56	2.55	1.79
1996	5.92	0	32.56	2.42	1.78
1997	18.31	0	37.92	2.45	2.91
1998	4.31	1	17.66	2.32	1.46
1999	3.1	1	15.82	2.39	1.13
2000	6.35	0	9.85	2.56	1.85
2001	6.5	0	21.13	2.44	1.87
2002	6.01	0	10.8	2.29	1.79
2003	6.29	0	9.8	2.22	1.84
2004	5.14	0	17.27	2.25	1.64
2005	5.64	0	18.05	2.43	1.73
2006	6.53	0	7.65	2.65	1.88
2007	5.74	0	15.31	2.79	1.75
2008	3.85	0	8.89	2.76	1.35
2009	-2.77	1	1.86	2.72	-
2010	3.86	1	22.67	2.37	1.35
2011	-3.21	1	26.33	1.99	-
2012	-17	1	30.13	2.13	-

2013	1.96	1	36.43	2.34	0.67
2014	4.66	1	34.07	2.77	1.54
2015	1.91	1	14.02	3.11	0.65
2016	3.47	1	20.69	3.11	1.24
2017	0.71	0	34.62	3.25	-0.34
2018	-2.68	0	55.98	3.19	-
2019	-2.18	0	51.98	2.89	-
2020	-3.63	0	115.65	2.76	-
2021	-1.87	0	235.52	2.7	-

Table 2. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	83.806	3	27.935	32.274	.000c
Residual	29.430	34	.866		
Total	113.235d	37			

Table 3. Coefficients

Variables	B	Standard Error	t	Sig
X1	-0.420	0.400	-1.051	.301
X2	0.482	0.065	7.377	.000
X3	0.125	0.081	1.537	.134

Equation three is statistically significant at 0.05 level as indicated by F statistics (32.274). Value of the R^2 suggests that 74% of the variation in economic growth is explained by variations in variables of tax reform, population growth, and foreign direct investment.

The statistic of DW indicates the absence of serial correlation in the model at 0.05 level. The expected sign of tax reform is negative and this means that tax reform policy plays lite bite role to enhance economic growth in Sudan during the period (1961-2021). Meanwhile, reforming taxation can help to reduce income inequality by ensuring that everyone pays their fair share of tax. Thus, tax reform is an essential tool for promoting economic growth and ensuring that the benefits of that growth are shared fairly among all members of society. These results differed from what was mentioned by [11], [7], [22]. So that tax reform can also reduce the cost of doing business in a country, making it more attractive for foreign investors and businesses.

The expected signs of population growth and foreign direct investment are positive as the study hypothesized. This means that as the population grows, there is an increased demand for goods and services, which can lead to increased economic activity, on the other hand, rapid population growth can also put a strain on resources and infrastructure, leading to higher costs of living and slower economic growth. This finding is similar to what was mentioned by [14], [16].

Foreign direct investment has a positive effect on economic growth as reported in equation (3). So that it increases the productivity of domestic firms, creating new jobs, and increasing the demand for local goods and services. in Sudan during the period (1961- 2021). Our findings are similar to those of, [17], [18].

The economic growth of less developed nations in general and Sudan's economy particularly can be significantly impacted by tax reform, population growth, and foreign direct investment. Tax reform can assist in earning more money for the government, which can then be spent on promoting social and infrastructure initiatives that stimulate the economy. Foreign direct investment can be attracted by economic growth itself, and new capital and technology can be introduced to boost and increase productivity and generate jobs. Foreign direct investment can also result in knowledge and skills transfer that can encourage the growth of the regional industry. Overall, these variables can work together to create a virtuous cycle of economic growth in LDCs that helps to lift people out of poverty and improve their standard of living.

5 Conclusion

This study looks at how tax reform affected the Republic of Sudan's economy during the period (1961-2021). In this regard, the study examined data collected from the World Bank for research variables (tax reform, population growth, FDI, and economic growth). The findings revealed that:

tax reform policy plays lite bite role to enhance economic growth in Sudan during the period (1961-2021). Tax reform policies are likely to have a significant impact on fostering economic growth in less developed nations. However, any reforms must be accompanied by other measures such as improved access to finance and better governance structures for them to have a lasting impact on economic development.

Population growth impacts positively economic growth, so as the population grows there is an increased demand for goods and services.

The FDI had a beneficial effect on the economy by boosting domestic companies' productivity, generating new jobs, and raising demand for regional goods and services.

The study concluded that tax reform can affect the level of economic growth in Sudan. Foreign direct investment can also lead to increased economic growth, as it brings capital into the country that can be used for business expansion and job creation. Population growth can also lead to increased economic growth as more people enter the workforce and consume goods and services. Hence all of these factors together contribute to a country's overall economic performance.

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Appendices

Appendix (1): Coefficients

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	X1	-.420	.400	-.104	-1.051	.301
	X2	.482	.065	.795	7.377	.000
	X3	.125	.081	.169	1.537	.134
a. Dependent Variable: logy						
b. Linear Regression through the Origin						

Appendix (2): Correlations

		logy	X1	X2	X3
Std. Cross-product	logy	1.000	.286	.848	.568
	X1	.286	1.000	.397	.441
	X2	.848	.397	1.000	.560
	X3	.568	.441	.560	1.000
Sig. (1-tailed)	logy	.	.043	.000	.000
	X1	.043	.	.007	.003
	X2	.000	.007	.	.000
	X3	.000	.003	.000	.
N	logy	37	37	37	37
	X1	37	37	37	37
	2	37	37	37	37
	X3	37	37	37	37

Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

The authors equally contributed in the present research, at all stages from the formulation of the problem to the final findings and solution.

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The authors have no conflict of interest to declare.