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Investigating the Potential Effects of Implementation of Value Added Tax in Iran

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A B S T R A C T

Objective: The present study investigates the potential effects of the implementation of Value Added Tax (VAT) on inflation in Iran, focusing on companies listed on the Tehran Stock Exchange.

Methodology: The time frame for this data pertains to the financial statements of manufacturing companies listed on the Tehran Stock Exchange over a 6-year period from the beginning of April 2014 to the March 2020. The data obtained includes manufacturing and service companies and institutions, excluding leasing companies, financial institutions, insurance, and banks, and the information was uploaded based on the CODAL website. The base year for examining liquidity growth was derived from 2014.

Findings: The collected data were evaluated in two sections: descriptive statistics and inferential statistics. In the descriptive analysis of information, descriptive statistical indicators include frequency, relative frequency percentage, mean, and standard deviation. In the inferential section, the research hypotheses were examined by using independent variables on the dependent variable. Furthermore, to investigate direct and indirect effects, statistical equations were utilized, and software such as Eviews10 and Excel were employed.

Conclusion: The results indicated that there is a direct relationship between Value Added Tax and Gross National Product, liquidity growth, money supply, the amount of tax revenues, and ultimately inflation in Iran.

Keywords: *Value Added Tax, inflation, Tehran Stock Exchange, Tehran*.

1 Introduction

Value Added Tax (VAT) is a multi-stage tax that is levied at various stages of production and distribution based on a percentage of the value added to goods produced or services provided (Oladipupo & Izedonmi, 2013; Omodero, 2022). Value added is equal to the sum of payments a firm makes to the factors of production used in the production of goods. These payments form the base on which Value Added Tax is imposed (Tayebnia et al., 2005). VAT is collected step by step during the production process, from the factory to the point of sale. Unlike sales tax, there is no accumulation of tax at each stage, and the tax is calculated separately from the original price of goods and services (Ulbrich, 2003). Also, in the VAT system, purchases of intermediate goods and services are exempt

from tax. A tax credit for intermediate purchases of the firm is considered in this tax system, which eliminates the phenomenon of double taxation (Schenk & Oldman, 2007). With the onset of economic reforms after World War II in developing countries, many countries saw changes and transformations in their tax systems. Reducing the number of rates and tax exemptions, expanding the tax base, and introducing new taxes were among the factors considered in the tax reforms of countries (Aghaei & Kamijani, 2001; Aghaei & Nahid, 2004). Among these, VAT, due to its flexibility, has been at the center of attention in various countries. A look at the experience of different countries and the extent of their use of this tax shows that this tax system can be applied from wholesale levels to the final chain of production and retail activities, and therefore, due to this flexibility, it brings more advantages and benefits for governments compared to other taxes. The revenue from VAT depends on the rate and breadth of the tax base. If there are no tax exemptions and VAT is implemented based on consumption, the tax base will be equivalent to the total private consumption.

However, the presence of tax exemptions reduces the base and, therefore, the revenue generated from it (Ziaei Bigdeli, 2004). The impact of VAT depends on its design, especially in substitution for other taxes, and is not predictable in advance (Keen & Lockwood, 2010; Omodero, 2022; Tayebnia et al., 2005). In other words, the effects of implementing this tax depend on the corresponding tax legislation. One of the negative effects of incorrect implementation of VAT is inflation. Aminrashti and Milani (2011) believe that the effect of this tax on inflation is temporary and will disappear within less than a year, provided that the government implements complementary policies simultaneously with the VAT system and timely communicates preventive measures (Aminrashti & Rafatmilani, 2011). Therefore, the present study investigates the potential effects of the implementation of Value Added Tax on inflation in Iran, focusing on companies listed on the Tehran Stock Exchange.

2 Methods and Materials

The present study aims to investigate the potential effects of the implementation of VAT on inflation in Iran, focusing on companies listed on the Tehran Stock Exchange. The temporal scope of this information relates to the financial statements of manufacturing companies listed on the Tehran Stock Exchange over a 6-year period from the beginning of 2014 to the end of 2019.

The statistical population of this research includes information related to the financial statements of 217 companies listed on the Tehran Stock Exchange in a 6-year period from the beginning of 2014 to the end of 2019. The data utilized pertain to companies that simultaneously possess the following four characteristics:

Companies that have been members of the stock exchange from the beginning of 2014 to the end of 2018 and have continued operations.

Not among investment, leasing, banking, financial institutions, and insurance companies.

The required data is accessible.

Companies have adjusted or accepted audit reports.

Regarding the collection of information related to the literature and the history of the research, library methods were used, and for gathering information to confirm or reject the research hypotheses, a field method was employed. The obtained data includes manufacturing and service companies and institutions, excluding leasing companies, financial institutions, insurance, and banks, and the information was uploaded based on the CODAL website. The base year for examining liquidity growth was derived from 2014. The assumption of homogeneity was tested using the Levin, Lin, Chu test. For the analysis of information, software such as Eviews10 and Excel was used.

3 Findings and Results

Table 1 pertains to the findings related to liquidity and the cost of products in companies listed on the Tehran Stock Exchange. The mean, standard deviation, and coefficients of skewness and kurtosis are observable.

Table 1

Descriptive Statistics Related to Liquidity and Money Supply in Manufacturing Companies on the Tehran Stock Exchange

Variable	Year	Mean	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum	Range
Liquidity								
	2014	8,419.148155	4,581.542766	8.028	75.775	89.00	6,071,775	6,071,686
	2015	5,581.132660	2,043.392323	6.014	45.585	203.00	3,862,279	3,862,279
	2016	8,186.119921	4,383.360512	5.508	34.259	227.00	3,097,854	3,097,854

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	2017	3,372.209479	2,703.882580	8.226	78.470	109.00	9,896,004	9,895,895
	2018	6,651.324096	1,371.973515	5.290	32.696	285.00	8,439,539	8,439,254
	2019	6,465.686541	931.2644312	7.019	57.130	9.00	26,659,685	26,659,676
Domestic Product Cost								
	2014	8,419.148158	4,824.388912	5.586	38.427	0.0	3,677,277	3,677,277
	2015	5,209.162307	6,017.404669	5.006	29.833	631.00	3,502,302	3,501,671
	2016	2,279.178797	3,688.494714	7.186	67.739	3,203.00	5,555,601	5,552,398
	2017	4,930.211523	4,845.564013	6.324	52.486	2,033.00	5,915,866	5,913,833
	2018	884.320280	1,485.928134	5.672	37.889	2,687.00	8,173,947	8,171,260
	2019	8,512.544775	773.2076040	7.778	69.191	2,459.00	21,721,029	21,718,570

Table 2 presents descriptive findings related to the financial indicators of companies listed on the Tehran Stock Exchange, examining overall company metrics in terms of money circulation, VAT on income, liquidity, demand, and cost of products, etc. This includes a time series of audited financial statements from 2014 to 2019.

Table 2

Descriptive Findings Related to Financial Indicators of Manufacturing Companies on the Tehran Stock Exchange (Based on Million Rials)

Maximum	Minimum	Kurtosis	Skewness	Standard Deviation	Mean	Observations	Variable
61,503,539	4,000.000	60.66164	7.423566	6,904,704	1,480,566	205	Money Circulation
2,355,771	0.000	57.44009	7.170680	253,339.9	62,504.33	205	VAT on Income
1,927,377	9.000	39.60434	5.979228	237,303.8	67,052.62	205	Liquidity
5,218,585	967.000	56.75982	6.933270	525,957.6	141,093.3	205	Demand
5,218,585	967.000	57.88130	7.038109	524,256.0	133,944.8	205	Cost of Products

Table 3

Dickey-Fuller Test for the Stationarity of Gross National Product

Null Hypothesis:	Unit root (individual unit root process)
Series:	D(MDAR)
Sample:	2004 - 2009
Exogenous Variables:	Individual effects
Automatic Selection of Maximum Lags:	Yes
Automatic Lag Length Selection:	Asymptotic t-statistic (p=0.1): 0
Total (Balanced) Observations:	116
Cross-Sections Included:	29 (6 dropped)
Im Pesaran and Shin W-stat	-4.31052
Im Pesaran and Shin t-bar	-2.41142
T-bar Critical Values ***:	1% Level
	5% Level
	10% Level

Table 4

Redundant Fixed Effects Tests for Panel Data Estimation

Test	Statistic	d.f.	Prob.
Cross-section F	2970.278414	(34163)	0.0000
Cross-section Chi-square	1318.279974	34	0.0000
Period F	2616.451338	(5163)	0.0000
Period Chi-square	901.517139	5	0.0000
Cross-Section/Period F	1136.150082	(39163)	0.0000
Cross-Section/Period Chi-square	1149.821228	39	0.0000

Table 5

Regression Model Related to the Implementation of VAT, Gross National Product, and Inflation Rate (1)

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
Inflation	0.054849	0.004837	11.33902	0.0000
Gross National Product	0.034201	0.006234	5.485844	0.0000
C	2659.712	1108.412	2.399570	0.0178
AR(1)	-0.595851	0.073326	-8.126093	0.0000
R-squared	0.938712			
Adjusted R-squared	0.922122			
F-statistic	56.58519			0.000000
Durbin-Watson stat	2.127310			

Hypothesis 1: There exists a direct relationship between VAT and Gross National Product, and ultimately inflation.

The obtained results, with the statistic (Pesaran & Shin W) (-31052.4) and a p-value of 0.000, indicate that the tests are stationary. The table shows that, based on the data, they are considered as panel data, with the F-statistic (F=2970.278414) and a significance level of p<0.000 in the Period Chi-square section, indicating their use for estimating time series in the data. The coefficients obtained for Gross National Product (β=0.034201) with a T-value of 5.485844 and Prob=0.000, and for inflation (β=0.054849) with a T-value of 11.33902 and Prob=0.000, with an R^2=0.93, demonstrate the variance related to changes in inflation and Gross National Product due to VAT.

Table 6

Regression Model Related to the Implementation of VAT, Liquidity, and Inflation Rate (2)

Model Component	Detail
Dependent Variable	VAT
Method	Panel Least Squares
Sample (Adjusted)	2005-2009
Periods Included	5
Cross-sections Included	205
Total Panel (Balanced) Observations	1025
Convergence	Achieved after 11 iterations
Variables	Coefficient
Liquidity	21,861.28
Inflation	1,064.333
Intercept	-137,608.3
AR(1)	0.907388
Effects Specification	Cross-section fixed (dummy variables)
Model Statistics	
R-squared	0.646331
Adjusted R-squared	0.556724
S.E. of regression	127,564.8
Sum squared resid	1.33E+13
Log likelihood	-13,388.46
F-statistic	7.212911
Durbin-Watson stat	1.828334
Prob(F-statistic)	< .0001
Descriptive Statistics	
Mean dependent var	47,046.39
S.D. dependent var	191,599.2
Information Criteria	
Akaike info criterion	26.52968
Schwarz criterion	27.53061
Hannan-Quinn criterion	26.90965
Inverted AR Roots	.91

Table 7

Levin, Lin, & Chu Panel Unit Root Test Summary for Panel Data Variables

Test	Statistic	Probability	Cross-sections	Observations

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Levin Lin & Chu t*	-21.4432	< .0001	34	136
Im Pesaran and Shin W-stat	-6.29815	< .0001	34	136
ADF - Fisher Chi-square	138.451	< .0001	34	136
PP - Fisher Chi-square	156.505	< .0001	34	136

Table 8

Dickey-Fuller Test for Data Homogeneity

Test	Statistic	Probability	Critical Values (1% Level)	Critical Values (5% Level)	Critical Values (10% Level)
Im Pesaran and Shin W-stat	-6.29815	< .0001	4.89587	5.23091	5.41029
Im Pesaran and Shin t-bar	-2.81849				

Table 9

Vector Autoregression Estimates for Internal Variables

Variable	Coefficient	Standard Error (SE)	t-Statistic [t]
VAT(-1)	1.151335	(0.07345)	[15.6755]
VAT(-2)	0.307847	(0.09565)	[3.21847]
Liquidity(-1)	-2280.455	(4659.70)	[-0.48940]
Liquidity(-2)	7036.032	(4729.49)	[1.48769]
Inflation(-1)	1093.684	(652.648)	[1.67576]
Inflation(-2)	-4231.248	(1733.04)	[-2.44152]
Intercept	-10512.07	(38595.9)	[-0.27236]

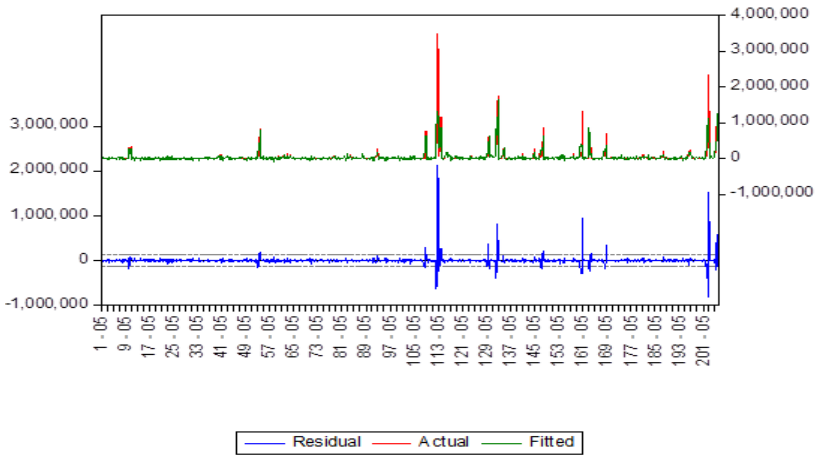
Table 10

Optimal Lag Determination Based on Selection Criteria

Lag	Log Likelihood (LogL)	LR	Final Prediction Error (FPE)	Akaike Information Criterion (AIC)	Schwarz Criterion (SC)	Hannan-Quinn (HQ)
0	-16029.78	NA	1.93e+13	39.10433	39.12156	39.11094
1	-15043.91	1962.119	1.78e+12	36.72172	36.79064	36.74817
2	-13961.07	2147.192	1.30e+11	34.10260	34.22321	34.14888

Figure 1

Estimation of the Effect of Tax Revenues and Inflation on VAT (1)



Hypothesis 2: There exists a direct relationship between VAT, liquidity growth, and ultimately inflation.

Based on the modified model, the results for liquidity coefficient β=28.21861, with a standard error of 153.3714 and a T-value of 885940.5, indicate the significant effect of liquidity variation on increasing VAT, significant at the 99/0 percent level with Prob=0.000. The coefficient β=333.1066, with a standard error of 2310.480 and a T-value of 216293.2

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and significance level of Prob=0.000. An R^2=0.64 indicates that the variables of inflation and liquidity can influence the VAT variable as indicated.

Table 11

Regression Model Related to VAT Implementation, Money Circulation, and Inflation (3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Money Circulation	-0.001454	0.002653	-0.548122	0.5838
Inflation	1785.066	479.6491	3.721608	0.0002
Intercept	98007.11	73778.57	1.328395	0.1844
AR(1)	0.894368	0.064734	13.81613	0.0000

Figure 2

Dynamic Forecast of the Effect of Money Circulation and Inflation on VAT

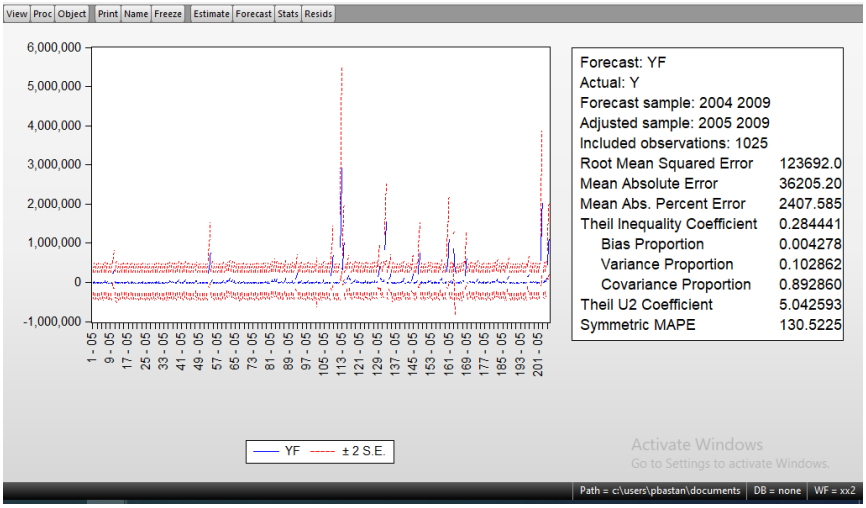
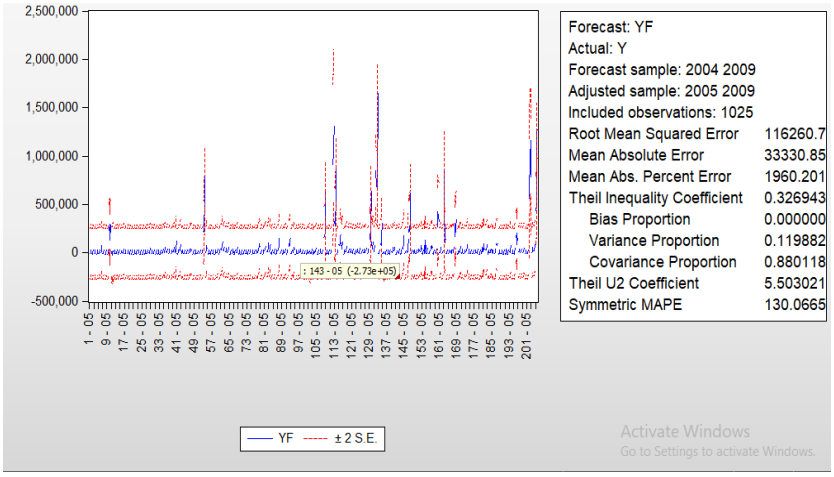


Figure 3

Static Forecast of the Effect of Money Circulation and Inflation on VAT



Hypothesis 3: There exists a direct relationship between VAT, money circulation, and inflation.

The above results examines the effect of money circulation and inflation on VAT. Based on the Ordinary Least Squares (OLS) regression model estimated results, the independent variable of money circulation with a coefficient (β=0.001454) and T-value (0.548122) and Prob=0.000, and inflation with a coefficient (β=0.001454) and T-value

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(1785.066) and Prob=0.0002, with an R^2=0.63, illustrates the variability effect of independent variables on the dependent variable.

Figure 4

Estimation of the Effect of Tax Revenues and Inflation on VAT (2)

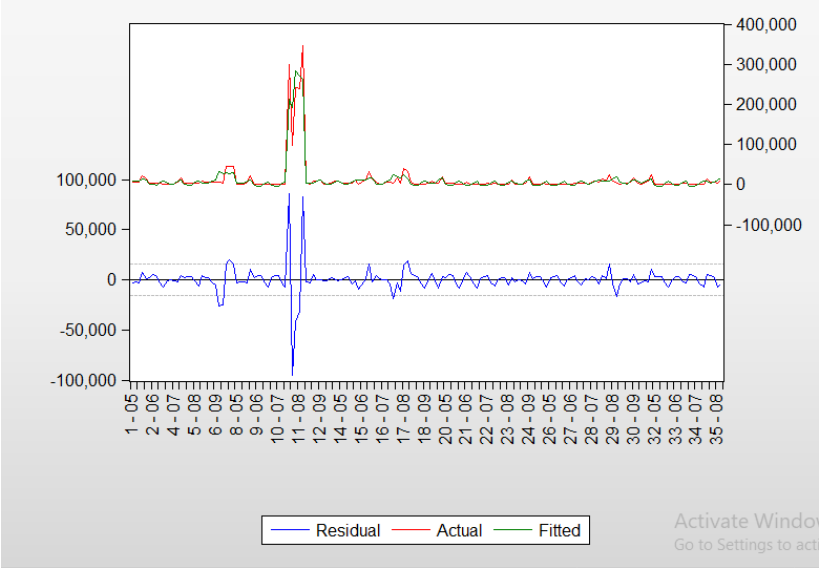

Figure 5

Estimation of the Effect of Tax Revenues and Inflation on VAT (3)

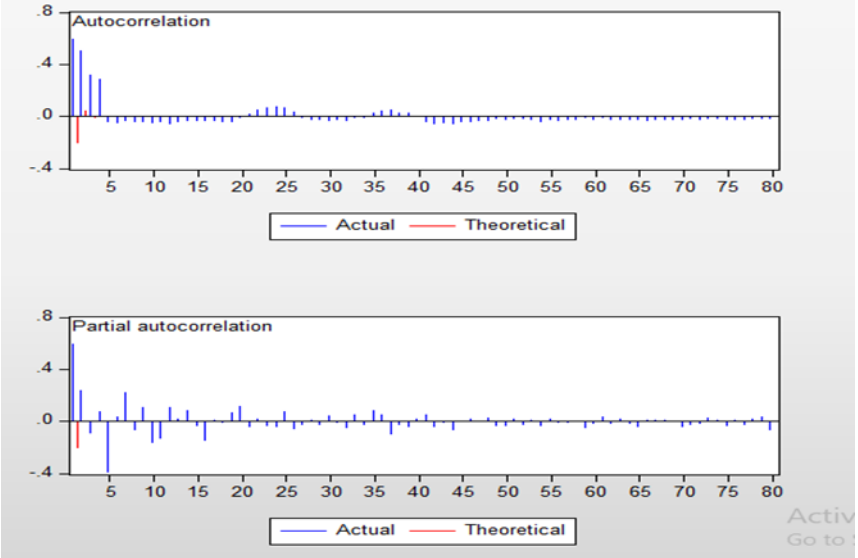

Table 12

Regression Model Related to VAT Implementation, Income Tax, and Inflation (4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.

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C	7827.632	2043.627	3.830265	0.0002
Income Tax	-0.025749	0.010097	-2.550171	0.0119
Inflation	349.7635	98.31481	3.557587	0.0005
AR(1)	-0.204088	0.143609	-1.421135	0.1576

Hypothesis 4: There exists a direct relationship between VAT, tax revenues, and inflation.

In the regression model based on AR(1), the coefficient obtained for income tax (β=-0.025749) with a T-value of -550171.2, which is greater than 2, and Prob=0.0119, indicates the negative impact of income tax on VAT. The coefficient beta obtained for the inflation variable (β=349.7635) with a T-value of 3.557587 and Prob=0.0005. According to the Fisher value (F=33.03505) and a significance level of 99/0 percent, the regression relationship is acceptable.

Conclusion: Overall, based on the Durbin-Watson statistic, which solved multicollinearity using the AR(1) model and estimating time series residuals among variables, the results show that the variables of money circulation and inflation can impact VAT.

4 Discussion and Conclusion

This research has explored the potential effects of implementing VAT on inflation in Iran, focusing on companies listed on the Tehran Stock Exchange. The timeframe for this data pertains to the financial statements of manufacturing companies listed on the Tehran Stock Exchange over a 6-year period from the beginning of 2014 to the end of 2019. The data obtained includes manufacturing and service companies and institutions, excluding leasing companies, financial institutions, insurance, and banks, with the information uploaded based on the CODAL website. The base year for examining liquidity growth was derived from 2014. In this chapter, the collected data were evaluated in two sections: descriptive statistics and inferential statistics. In the descriptive analysis of information, statistical indicators include frequency, relative frequency percentage, mean, and standard deviation. In the inferential section, the research hypotheses were examined by using independent variables on the dependent variable. Furthermore, to investigate direct and indirect effects, statistical equations were utilized, and software such as Eviews10 and Excel were employed.

The findings related to the first hypothesis, suggesting a direct relationship between VAT and Gross National Product and ultimately inflation, are indicated by the statistic (Pesaran and Shin W) (-31052.4) and a p-value of 0.000, demonstrating that the tests are stationary. This shows that, according to the F-statistic (F=2970.278414) and a significance level of p<0.000 in the Period Chi-square section, the data are of panel data type, which is applied for estimating time series in the data. The findings related to the second hypothesis, indicating a direct relationship between VAT, liquidity growth, and ultimately inflation, showed that based on the modified model, the results for liquidity coefficient β=28.21861 and standard error of 153.3714 std=, with a T-value of 885940.5, indicate the significant effect of liquidity variation on increasing VAT, significant at the 99/0 percent level with Prob=0.000. The coefficient β=333.1066, with a standard error of 2310.480 and a T-value of 216293.2 and a significance level of Prob=0.000. An R^2=0.64 indicates that the variables of inflation and liquidity can influence the VAT variable as indicated.

The findings related to the third hypothesis, suggesting a direct relationship between VAT, money circulation, and inflation, showed that based on the Durbin-Watson statistic, which resolved multicollinearity using the AR(1) model and estimating time series residuals among variables, the results indicate that the variables of money circulation and inflation can impact VAT. The findings related to the fourth hypothesis, indicating a direct relationship between VAT, tax revenues, and inflation, showed that based on the Durbin-Watson statistic, which resolved multicollinearity using the AR(1) model and estimating time series residuals among variables, the results indicate that the variables of tax revenues and inflation can impact VAT.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

Not applicable.

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