



## **The Relationship between Budget Revenue - expenditure and Inflation in Vietnam: Viewed from the Results of Quantitative Analysis**

Ph.D. Nguyen Thi Van Anh

University of Labour and Social Affairs Email: nguyenvananh83(at)ulsa.edu.vn

Nguyen Thanh Tu An

Sir Winston Churchill Secondary School Email: nguyenthanhtuan222006(at)gmail.com

Tran Nguyen Anh Mai

Lawrence S. Ting Memorial School Email: trannguyennanhmai(at)gmail.com

### **ABSTRACT**

The research examines the relationship between budget revenue expenditure and inflation in Vietnam, with time series data on budget revenue expenditure and the consumer price index (CPI) (representing the inflation variable in Vietnam). Data were collected from the International Financial Statistics (IFS-IMF), General Statistics Office (GSO) in the period of 2005-2022. The author used Eview software to build a linear relationship log-log of budget revenue - expenditure and CPI in the case of the Vietnamese economy. Quantitative analysis results show that when budget revenue increased by 1%, CPI increased by 0.249674%, when budget expenditure increased by 1%, CPI increased by 0.298316%. Raising budget revenue to raise budget expenditure will result in higher inflation during the research period in Vietnam. From the theoretical basis, research overview, and quantitative analysis results, the research team makes some recommendations for fiscal policy in Vietnam in the current context.

### **KEYWORDS**

Relationship, budget revenue - expenditure, CPI, inflation, Vietnam, quantitative analysis.



## 1. Introduction

In the context of global fluctuations, fiscal policy operation faces more challenges and obstacles, and there is a greater risk of imbalanced budget balance and debt increase.

As a highly open economy, Vietnam cannot avoid strong influences from external fluctuations combined with internal pressures. Therefore, the effective implementation of fiscal and monetary policy solutions with additional support for individuals and businesses to overcome difficulties will be a main contribution to making a stable goal, maintaining recovery momentum, and promoting economic growth (Chinhphu.vn, 2023)

In the recent context in Vietnam, the government budget revenue has suffered many unfavorable impacts from declines in the production and business of individuals and enterprises. Budget revenue reduction is caused by implementing support solutions while, simultaneously, ensuring the need for budget expenditure for regular activities and capital for development investment, especially the increasing demand for spending on social security and epidemic prevention...has created a big challenge for the government budget balance. (Song Tra, 2023)

Fiscal policy is considered a cause of inflation and growth reduction in cases where fiscal policy is overly expansionary, leading the Government to increase domestic and foreign debt. In this research article, we investigate more empirical evidence to show the relationship between budget revenue - expenditure and inflation in Vietnam in the period of 2005 - 2022, from which we propose recommendations to improve the efficiency in operating Vietnamese fiscal policy.

## 2. Theoretical basis and research overview

### 2.1. Theoretical basis

The government budget balance is often considered an indicator of fiscal policy. It is calculated by subtracting all expenditure items made by the government from the total revenue the government received during a certain period. When budget revenue is greater than expenditure, the government has a budget surplus. When government expenditure is greater than revenue, which has been the case for most countries in modern history, the government has a budget deficit. When government revenue and expenditure are exactly equal, the government has a balanced budget. (Nguyen Van Cong, 2012)

In general, there are four ways to finance the budget deficit that the government can choose to use: (i) *Borrowing money from the central bank, or "monetizing the deficit"*, (ii) *Borrowing money from the central commercial banking system*, (iii) *Borrowing money from the domestic non-bank sector*, (iv) *Borrowing money from abroad, or reducing international reserves*. Each financing method has certain risks: overly domestic debt will crowd out private sector investment; overly foreign debt will cause difficulty in paying the debt on time; and issuing too much money will cause inflation. (Nguyen Van Cong, 2012)

High levels of government budget deficit pose the risk of causing inflation. Because when the budget is overspending, it can be compensated by issuing money or borrowing, both posing the risk of increased inflation. (Nam, N.T, 2013)

According to Hoang Thanh Tung, and Luong Xuan Duong (2019), in case the government budget is in deficit, expansionary fiscal policy will face difficulties. So how can we both stimulate aggregate demand and maintain a constant budget balance? The fiscal policy that meets this objective is called budget-constrained fiscal policy. The content of this policy is that the government will compensate for government spending increases by tax increases. To maintain a constant budget

balance, the output expansion effect of increased government spending is outweighed by the output contraction due to increased taxes, so the resulting balanced budget multiplier is only 1. It means that increasing government spending and taxes by 1 unit will lead to an increase in the equilibrium output level by 1 unit. In this case, the purchasing power of the economy and prices increase, so the economy faces inflation.

## **2.2. Research overview**

According to Trung, N.H.C (2016) the increase in money supply causes an increase in Vietnam's budget deficit. From there, there is a more comprehensive view of inflation and budget deficit in particular, as well as macroeconomic indicators in Vietnam in general over more than 30 years since the reform policy. The test results have contributed to the conclusion that budget deficit and inflation have a simultaneous, two-way relationship. Specifically, when the level of budget deficit becomes more serious, it will increase inflation and, vice versa, inflation has amplified the level of deficit by threatening revenue sources of the government.

Research article from Emmanuel Duodu & colleagues (2022) long-term impact of money supply, budget deficit, and inflation in Ghana. The article also verifies classical, monetary, and financial theories of the price level using the VECM model. Data from 1999Q1 - 2019Q4, the article uses the Granger causality law and the VECM model to analyze. Research results from the VECM model show that budget deficit has a positive impact on inflation while money supply has a negative impact on inflation. And vice versa, inflation has a positive impact on the budget deficit and a negative impact on the money supply.

According to research by Kivilcim Metin (2012) analyzed the empirical relationship between inflation and budget deficit for the Turkish economy using multivariate cointegration analysis. The simple regression model shows that increasing budget deficits significantly affect inflation in Turkey.

The article investigates the relationship between budget deficit and inflation in Uganda during the period of 1980 - 2016. The study uses cointegration and ECM models as well as pairwise Granger causality. The results of the Granger causality test show that budget deficit causes inflation in Uganda at the conventionally significant level. The cointegration results show a positive and statistically significant long-term relationship between the series and the ECM results show that budget deficit causes inflation in Uganda only in the short term. Furthermore, in Uganda, budget deficits affect inflation directly and indirectly through fluctuations in the nominal exchange rate and money supply. (Kurayish Ssebulime & Bbaale Edward, 2019)

The article studies the relationship between budget deficit and inflation with data from 54 developed and underdeveloped countries. The hypothesis is that budget deficits cause inflation when the independent central bank and the financial market are not developed enough to restrain inflation. (Bilin Neyapti, 2008)

The article by Munir A.S Choudhary & Amar K. Parai (2006) studies the role of serious budget deficits in Peru from 1973 to 1988. The article uses a rational expectations inflation model to explore the impact of expected budget deficits on the inflation rate using data collected quarterly from 1973Q1 to 1988Q1. Research results show that budget deficit and money supply growth have a great influence on the inflation rate in Peru.

The Tanzanian economy is one of the few countries in the world that has experienced high inflation and fiscal deficits for a long period without hyperinflation. This article studies the relationship between Tanzanian budget deficit and inflation using cointegration analysis from 1967-

2001. Several simulations are performed to evaluate the impact of changes in the budget deficit and gross domestic product on inflation over time. Due to the monetization of the budget deficit, significant inflationary effects are seen when increasing the budget deficit. (M.Solomon & W.A. De Wet, 2004)

The article studies the relationship between budget deficit and inflation. The Granger causality test is conducted to test the relationship between two variables. Research results show that inflation does not affect the budget deficit, but the budget deficit has a significant impact on inflation. The implication is that there exists a one-way relationship between budget deficit and inflation in Nigeria. In addition, the research results also show that the budget deficit has direct and indirect effects through exchange rate fluctuations in Nigeria. (S.O.Oladipo & T.O.Akinbobola, 2011)

The article studies the impact of M2 money supply and budget deficit on inflation in Asian countries, including Bangladesh, Cambodia, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam during the period of 1985 – 2012. Using the Pooled Mean Group (PMG) estimation method based on the ECM model and the panel different GMM (General Method of Moment) Arellano – Bond estimator, the article shows that M2 money supply has a significant impact on inflation in the PMG method, while budget deficit and interest rates have a statistically significant impact on inflation in both estimation methods mentioned above. (Van Bon Nguyen, 2015)

In the research article, the author examines the long-term relationship between budget deficit and inflation in 13 developing countries of Asia, including Indonesia, Malaysia, Philippines, Myanmar, Singapore, Thailand, India, Korea, Pakistan, Sri Lanka, Taiwan, Nepal, and Bangladesh. Using yearly data from 1950 - 1999, test Granger causality with the ECM model. Research results confirm that there exists a long-term relationship between inflation and budget deficit. The research team concluded that budget deficits cause inflation in developing Asian countries. (Muzafar Shah Habibulla, Chee – Kok Cheah, A.H.Baharom, 2011)

Lin and Chu (2013) used a dynamic panel quantile regression (DPQR) model under an autoregressive distributed lag (ARDL) specification and investigated the causal relationship between budget deficit and inflation in 91 countries between 1960 and 2006. Empirical results show that fiscal deficits have a strong impact on inflation during periods of high inflation and a weak impact during periods of low inflation. (Lin, H.Y., & Chu, H.P., 2013)

The main purpose of the study is that the relationship between budget deficit and inflation is generally ambiguous from a theoretical perspective. This article examines the relationship between budget deficit and inflation in Iran using quarterly data from 1990-2008. The study analyzed the sustainability or fragility of this relationship between the definition of inflation and money supply. To do so, the paper used a simultaneous equation model, which includes four structural equations budget deficit, monetary base, money supply, and inflation. The findings of the study show a positive and significant impact of budget deficit on monetary variables and consequently on inflation. The study also found a positive and significant impact of the price index on the budget deficit. Finally, regarding the sensitivity analysis, the study's findings support the robustness of the study's estimates of the definitions of inflation as well as money supply. (Ahmad Jafari Samimi & Sajad Jamshibaygi, 2011)

Maintaining government budget deficit financing through money creation will cause higher inflation. (Sargent, T. and N. Wallace, 1985)

The study examines the relationship between budget deficit and inflation in EU countries and Turkey using annual data from 1990 to 2008. The author concludes that there is no long-term

relationship between deficit and inflation in developed countries, while Turkey has a long-term relationship between inflation and budget deficit during the period of 1990-2008. (Sahan, F., 2010)

Makochekanwa, Albert (2010) examined the deficit-inflation relationship in the Zimbabwean economy and established a causal relationship between the budget deficit and the inflation rate using Johansen's cointegration technique (1991, 1995) over the period 1980 – 2005. Due to the massive monetization of deficit budgets, a significant inflationary impact is found when increasing the budget deficit. (Makochekanwa, Albert, 2010)

Burdekin and Wohar (1990) examine the relationship between budget deficits and money supply growth in eight countries including Canada, France, Italy, Japan, Switzerland, the UK, the US, and West Germany over the period 1960Q1- 1985Q4 and concluded that countries with central banks independent of governments exhibit a poor link between fiscal deficits and the development of the monetary base. In contrast, budget deficits tend to be associated with money growth in countries with low levels of independence from central banks. They argue that less independent central banks are sometimes under pressure to finance government budget deficits while independent central banks aim more at price stability and less at adjustment of the government's budget deficit. This finding is interesting because it suggests that central bank independence determines the impact of deficit budget policy on monetary growth. (Burdekin, C.K.R., & Wohar, E.M., 1990)

Le (2008) main qualitative research analyzed the correlation between budget deficit and inflation in Vietnam. Using descriptive statistics, we show that fiscal deficit is the cause of inflation in Vietnam. They argue that fiscal policy in Vietnam is continuously expansionary, leading to, on average, a budget deficit-to-GDP ratio of 5%. Research further evidences that the Vietnamese Government has issued a large amount of long-term government bonds to mobilize capital to invest in large-scale projects. This expansionary fiscal policy has led to a surge in monetary growth as the majority of government bonds that have not yet matured have been bought back by the State Bank of Vietnam or commercial banks. (Le, L., 2008)

In contrast, Nguyen and Nguyen (2010) conducted an empirical study to examine the determinants of inflation in Vietnam from 2000 to 2010 using the monthly data set interpolation method. They conducted a cointegration test to analyze the long-term impact of the budget deficit due to inflation. In addition, they used the model vector error correction method to analyze the short-term dynamics and movement toward long-term equilibrium. Research results show that budget deficits have no impact on inflation in the short term, and the long-term impact is also unclear. (Nguyen, H., & Nguyen, T., 2010)

The article empirically examines the relationship between budget deficit, money supply, and inflation using a monthly data set from January 1995 to December 2012 and an SVAR Model with five endogenous variables: inflation, currency growth, budget deficit, real GDP growth, and interest rates. Overall, it is revealed that money growth has a positive impact on inflation while budget deficit growth has no impact on money growth and hence inflation. In addition, the budget deficit also depends on shocks to other variables. The estimated results also show that the State Bank of Vietnam has implemented a tightening monetary policy to respond to positive shocks from inflation by reducing money growth but the response is relatively slow because it takes three months for the monetary authority to respond adequately to such shocks. Ultimately, the interest rate is not an effective tool to fight inflation but it has a significant effect and positive effect on inflation. (Hoang Van Khieu, 2021)

The purpose of the study is to evaluate the impact of monetary and fiscal policy on inflation in Vietnam during the period 1997 - 2020. This study applied a vector autoregression (VAR) model along with data collected from the World Bank and the General Statistics Office of Vietnam. Research results show that Vietnam's inflation is positively affected by a fiscal deficit (2,943), money supply (2,672), government spending (8,347), and interest rate (3,187). Among the factors, government spending has the greatest influence on inflation. In addition, trade openness (-0.311) also affects inflation but the impact is negative and insignificant. Finally, policy implications focus on coordinating fiscal and monetary policies to maintain moderate inflation for economic growth. (Trong Tai Nguyen, Thuy Duong Phan and Ngoc Anh Tran, 2022)

For the research of K.P.N. Tharaka Niroshan Devapriya and Masaru Ichihashi (2012) used a vector autoregressive (VAR) model. The results of this study show that budget deficit and inflation have a positive relationship; at the same time, the causal analysis shows a two-way causal structure between budget deficit and inflation in Sri Lanka. Additionally, this analysis shows that the main factors determining the inflation rate are the country's budget deficit, money supply growth, interest rates, and real exchange rates. Furthermore, the results show that domestic loans affect inflation more positively than foreign loans, and show a two-way causal structure between domestic loans and inflation.

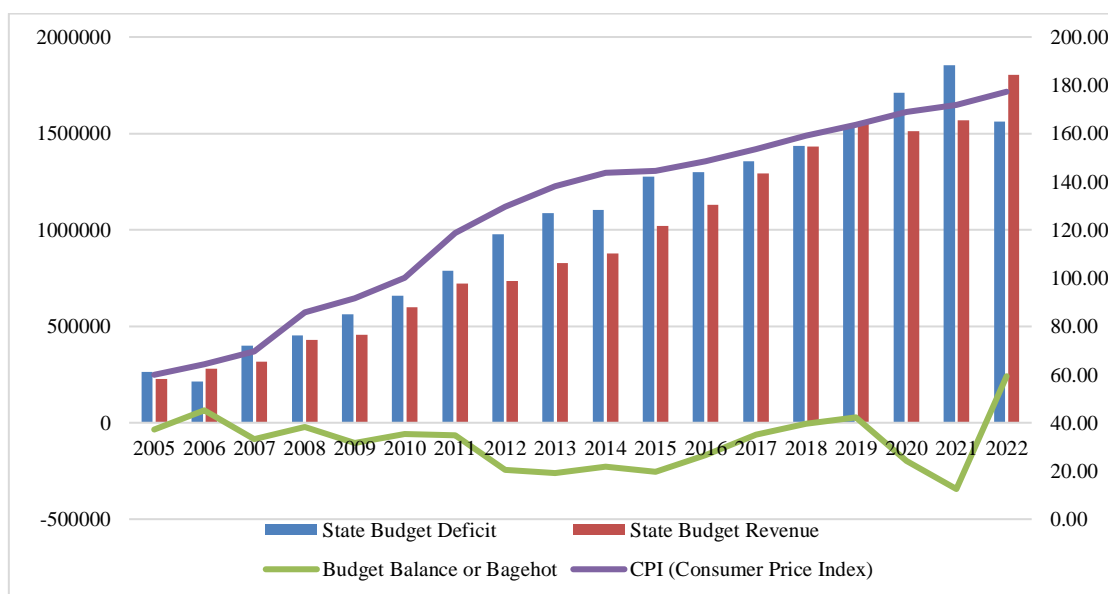
The article by Maio Bulawayo, Francis Chibwe & Venkatesh Seshamani (2018) examines the role of budget deficits as a factor causing inflation in Zambia, where virtually no previous work was done in recent years to address this question. An econometric analysis was performed using the autoregressive distributed lag (ARDL) method. The analysis shows that while budget deficits have a significant short-term impact on inflation, no significant long-term relationship exists.

Minh, N.T.T & Duong, N.T.T, (2017) study the one-way relationship: the impact of budget deficit on the inflation rate in Vietnam. Prolonged budget deficits and overcoming the state budget deficit using different methods have affected the inflation rate differently. This impact is analyzed both qualitatively and quantitatively and includes five approaches: the impact of fiscal policy inflation, the impact of the government budget deficit on inflation, the impact of financing from budget deficit to inflation, independence of monetary policy and its impact on inflation, inflation and the impact of public spending on inflation.

### **3. In the situation of Budget revenues and expenditures, and the Consumer Price Index (CPI) of Vietnam from 2005 to 2022**

The research team collected data on budget revenues and expenditures, as well as the Consumer Price Index (CPI) of Vietnam from 2005 to 2022. This data was obtained from the website of the General Statistics Office of Vietnam (GSO) and the International Financial Statistics (IFS) provided by the International Monetary Fund (IMF).

**Figure 1. Budget Revenues and Expenditures, and CPI of Vietnam from 2005 to 2022**



Source: Compiled from GSO, IFS-IMF

### Period 2005 - 2011

During this period, the state budget revenue tended to increase over the years. Specifically, in 2005, the state budget revenue reached 228,287 billion VND (GSO, 2005) and reached 721,804 billion VND in 2011. The state budget revenue during the research period increased on average by 18.77% per year (Figure1). The state budget expenditure during this period also showed an increasing trend over the years, except for 2006 when state budget expenditure decreased by 48,139 billion VND compared to 2005. It can be observed that both state budget revenue and expenditure tended to increase during the research period. However, the state budget balance during the period of 2005 - 2011 was in a deficit position (except for 2006). In 2005, the state budget deficit was at 34,410 billion VND, and in 2011, it reached 65,750 billion VND. It can be seen that despite the increase in both revenue and expenditure, expenditure increased more rapidly than revenue, leading to a budget deficit. In terms of the level of budget deficit, the research period showed fluctuations, but the dominant trend was an increasing deficit over the years. Regarding the Consumer Price Index (representing the inflation rate), it increased gradually during the period under consideration. In 2005, the CPI reached 59.88, continued to rise, and reached 118.68 in 2011. Inflation tended to increase during this period. Specifically, in 2006, inflation was at 7.4%, increased in the following years, and reached a record high in 2008, before the impact of the economic crisis, with an inflation rate of 23.11%. Subsequently, inflation decreased in 2009 but continued to rise, reaching 18.7% in 2011 (Compiled from GSO and the research team’s calculations).

### Period 2012 - 2019

The period from 2012 to 2019 continued to demonstrate an upward trend in both state revenue and expenditure. In terms of state budget revenue, in 2012, it reached 734.833 trillion VND and increased steadily over the years, reaching 1,553.611 trillion VND in 2019, with an average annual growth rate of 11.6%. Regarding state budget expenditures, the chart shows a similar upward trend over the years. In 2012, state budget expenditures amounted to 978.463 trillion VND, gradually increasing to 1,526.893 trillion VND in 2019. Throughout the period from 2012 to 2019, the state budget remained in a deficit state. The extent of the deficit varied over the years, with a noticeable

increase during the period from 2012 to 2013, followed by a decrease in 2014, and then another increase in 2015. The period from 2016 to 2019 witnessed a positive shift in the state budget balance, with a decreasing budget deficit trend. In particular, in 2019, the state budget achieved a surplus of 26.718 trillion VND. As for the Consumer Price Index (CPI) during the period under consideration, it continued to show an upward trend over the years. In 2012, the CPI was at 129.47 and increased steadily, reaching 163.52 in 2019. However, inflation during this period averaged 4.3% per year, which was significantly lower than the period from 2005 to 2011. In the period from 2012 to 2015, inflation showed a declining trend, but it increased again in the period from 2016 to 2018. In 2019, inflation decreased to 2.79%.

**Period 2020 - 2022**

Moving into the period of 2020 - 2021, the COVID-19 pandemic had adverse effects on all aspects of the socio-economic landscape. Notably, the state budget's revenue and expenditure continued to show an upward trend over the years. Revenue increased from 1,510,579 trillion VND in 2020 to 1,568,453 trillion VND in 2021, while expenditures were higher and grew more rapidly than revenue, going from 1,709,524 trillion VND in 2020 to 1,854,940 trillion VND in 2021. However, when compared to the preceding period, the budget balance displayed a deficit, primarily due to the negative impact of the pandemic. The state allocated more funds to healthcare activities, and the economic slowdown caused by social distancing measures and trade restrictions resulted in lower revenue compared to expenditure. Inflation during this period remained stable, even though it increased in 2020 compared to 2019, it decreased to 1.83% in 2021 from 3.22%. This indicates that between 2020 and 2021, there was a positive correlation between the budget deficit and inflation; as the budget deficit decreased, inflation tended to decrease as well. Moving into 2022, the economy started to recover after the pandemic, with expenditure decreasing by nearly 16% compared to 2021, while revenue increased by 15% compared to 2021, resulting in a budget surplus. Although inflation increased compared to 2021, reaching 3.2%, it remained within the government's target inflation rate.

**4. Research Data and Methodology**

**4.1. Research Data**

To examine the relationship between budget revenue and expenditure and inflation in Vietnam, the research team collected data on budget expenditure (CNS), budget revenue (TNS), and the Consumer Price Index (CPI) as a representative measure of inflation. The data was collected annually from 2005 to 2022, resulting in a total of 18 observations.

In the model, the variables CNS, TNS, and CPI were logarithmically transformed and denoted as LOG(CNS), LOG(TNS), and LOG(CPI), respectively. After collecting and logarithmically transforming the variables using Eview8 software, the research team conducted descriptive statistics on the variables as shown in Table 1.

**Table 1. Descriptive Statistics of Research Data**

	CNS	CPI	TNS	LOG(CNS)	LOG(CPI)	LOG(TNS)
Mean	1029183.	127.1239	932518.6	13.67850	4.790949	13.57410
Median	1096068.	140.8250	853022.5	13.90721	4.947318	13.65612
Maximum	1854940.	177.3100	1803600.	14.43336	5.177900	14.40530
Minimum	214558.0	59.88000	228287.0	12.27634	4.092343	12.33836
Std. Dev.	513837.9	39.10750	502974.4	0.653954	0.356250	0.644294
Skewness	-0.138556	-0.474238	0.179833	-0.841328	-0.785794	-0.506339
Kurtosis	1.780234	1.836664	1.736428	2.531400	2.228155	2.062255



Jarque-Bera	1.173466	1.689718	1.294479	2.288189	2.299227	1.428661
Probability	0.556141	0.429618	0.523489	0.318512	0.316759	0.489520
Sum	18525298	2288.230	16785334	246.2131	86.23707	244.3337
Sum Sq. Dev.	4.49E+12	25999.74	4.30E+12	7.270150	2.157543	7.056948
Observations	18	18	18	18	18	18

Source: Data processed using Eviews software.

#### 4.2. Research Methodology

The research team employed a log-log linear regression model to analyze the relationship between revenue (TNS) - budget expenditure (CNS) and inflation (CPI). The general form of the constructed model is as follows:

$$\text{LOG(CPI)} = C(1) + C(2)*\text{LOG(TNS)} + C(3)*\text{LOG(CNS)} + e$$

Where e represents random noise.

##### **The following steps were taken:**

*Step 1: Use Eviews 8 software to run the model with the collected secondary data.*

*Step 2: Check the statistical significance of the regression coefficients for the explanatory variables and the statistical significance of the regression model at a 5% significance level.*

A regression coefficient is considered statistically significant if:

- Prob < 0.05
- Prob(F-statistic) < 0.05

*Step 3: Evaluate the explanatory power of the model through the R-squared and Adjusted R-squared coefficients.*

A model is considered explanatory (appropriate) if:

- R-squared > 0.6
- Adjusted R-squared > 0.6

*Step 4: Examine the model's flaws.*

For a model to be considered good (*suitable for analysis*), in addition to having statistically significant regression coefficients, a significant regression model, and high R-squared and Adjusted R-squared values, it must also satisfy the conditions of no autocorrelation among the residuals and constant variance of the error terms. Additionally, the model's residuals should follow a normal distribution.

In this study, the authors used tools in Eviews 8 to check for these flaws, specifically:

- Utilized the Breusch-Godfrey test to examine autocorrelation. The model does not suffer from autocorrelation at a certain lag order if Prob (F-statistic) and Prob (Obs \*R-squared) > 0.05.
- Employed the Breusch-Pagan-Godfrey test to assess heteroscedasticity. The model does not exhibit heteroscedasticity if Prob (F-statistic) and Prob (Obs\*Chi-squared) > 0.05.

- Utilized the Jarque-Bera test to determine whether the model's residuals follow a normal distribution. The model's residuals adhere to a normal distribution if Prob (Jarque-Bera) > 0.05.

When these conditions are met, the estimation and analysis of the model's results will be carried out, along with a consideration of the initial hypotheses.

### 5. Data Processing Results

Quantitative economic models are used to analyze the relationship between budget revenue expenditures and inflation in Vietnam. Data collected annually is adjusted and logged. The results are presented in Table 2.

#### Estimated Results

**Table 2. The Relationship between Budget Revenues - Expenditures and Inflation in Vietnam during the period 2005-2022**

Dependent Variable: LOG(CPI)

Method: Least Squares

Date: 09/04/23 Time: 08:51

Sample: 2005 2022

Included observations: 18

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(CNS)	0.298316	0.075105	3.972005	0.0012
LOG(TNS)	0.249674	0.076231	3.275245	0.0051
C	-2.678660	0.229587	-11.66729	0.0000
R-squared	0.986082	Mean dependent var		4.790949
Adjusted R-squared	0.984226	S.D. dependent var		0.356250
S.E. of regression	0.044743	Akaike info criterion		-3.224751
Sum squared resid	0.030029	Schwarz criterion		-3.076356
Log-likelihood	32.02276	Hannan-Quinn criteria.		-3.204290
F-statistic	531.3637	Durbin-Watson stat		1.635215
Prob(F-statistic)	0.000000			

*Source: Model estimation results.*

**Testing Model Fit**

The results in Table 2 indicate that all regression coefficients are statistically significant as the Prob(LOG(CNS)) coefficient is  $0.0012 < 0.05$ ; Prob(LOG(TNS)) is  $0.0051 < 0.05$ ; Prob(C) is  $0.0000 < 0.05$ . The regression model is appropriate since the Prob(F-statistic) coefficient is  $0.000000 < 0.05$ .

The model's goodness-of-fit coefficients are as follows: R-squared =  $0.986082 > 0.6$ ; Adjusted R-squared =  $0.984226 > 0.6$ .

**Testing for Autocorrelation**

**Table 3. Breusch-Godfrey Serial Correlation LM Test (lags = 2)**

F-statistic	1.079715	Prob. F(2,13)	0.3683
Obs*R-squared	2.564064	Prob. Chi-Square(2)	0.2775

*Source: Model validation results*

According to the results in Table 3, the Prob. F(2,13) coefficient is 0.3683, which is greater than 0.05, and the Prob. Chi-Square(2) is 0.2775, also greater than 0.05. The model does not suffer from autocorrelation.

**Testing for heteroskedasticity:**

**Table 4. Heteroskedasticity Test (White)**

F-statistic	1.640219	Prob. F(5,12)	0.2234
Obs*R-squared	7.307509	Prob. Chi-Square(5)	0.1988
Scaled explained SS	3.960413	Prob. Chi-Square(5)	0.5551

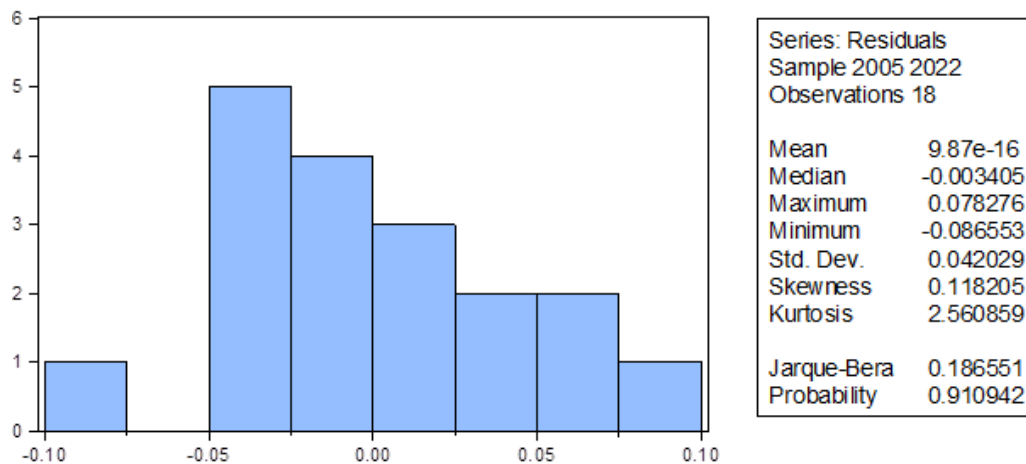
*Source: Model validation results*

The results in Table 4 indicate that the Prob. F(5,12) coefficient is 0.2234, which is greater than 0.05; Prob. Chi-Square(5) = 0.1988, also greater than 0.05; and Prob. Chi-Square(5) = 0.5551, still greater than 0.05. The model does not exhibit significant variance in error terms.

**Testing the normality of residuals**

The residuals of the model follow a normal distribution with Prob (Jarque – Bera) = 0.910942, which is greater than 0.05 (as shown in Figure 2).

**Figure 2. Residuals follow a normal distribution.**



Source: Model validation results

### Regression Model and Model Result Analysis

The results of the regression analysis using Eviews 8 software in Table 3 have indicated the relationship between budget revenue and expenditure and inflation in Vietnam for the period 2005-2022, with annual data series in the regression model as follows:

$$\text{LOG(CPI)} = -2.678660 + 0.249674 \cdot \text{LOG(TNS)} + 0.298316 \cdot \text{LOG(CNS)}$$

From the results of the regression model, the following observations can be made:

+ The Consumer Price Index (CPI) is influenced by budget revenue. Specifically, the coefficient  $C(2) = 0.249674 > 0$ , indicates that, holding other factors constant, an increase in budget revenue leads to an increase in the Consumer Price Index. When budget revenue increases by 1%, CPI increases by 0.249674%.

+ Additionally, the Consumer Price Index is also influenced by budget expenditure. According to the table, the coefficient  $C(3) = 0.298316 > 0$ . Thus, an increase in budget expenditure results in an increase in the Consumer Price Index. When budget expenditure increases by 1%, the actual CPI increases by 0.298316%.

The significance of the R-squared coefficient, which is 0.986082, indicates that the regression model explains 98.6082% of the variability in the Consumer Price Index (representing inflation).

The research group utilized a linear regression model to examine the relationship between budget revenue and expenditure and inflation in Vietnam during the period from 2005 to 2022. The data was collected annually and analyzed using a linear regression model. The results of the model provide answers to the questions: when budget revenue increases by 1%, CPI increases by 0.249674%, and when budget expenditure increases by 1%, CPI increases by 0.298316%. Increasing budget revenue to finance higher budget expenditures will have an impact on increasing inflation in the case of Vietnam.

## 6. Some recommendations

*Along with the theoretical basis, a research overview, and empirical evidence through quantitative analysis with the construction of a log-log linear regression model, it has been demonstrated that there is a relationship between budget revenue and expenditure and inflation in Vietnam during the period 2005-2022. The research group provides several recommendations to enhance the effectiveness of fiscal policies aimed at balancing revenue and expenditure, stabilizing prices, and controlling inflation in Vietnam.*

*Firstly*, it is essential to closely monitor global and domestic economic developments, accurately forecast and assess the situation, promptly identify risks, and propose proactive and coordinated solutions for fiscal policy tools. This coordination should be closely aligned with monetary policy and other macroeconomic policies to control inflation, stabilize the macroeconomy, ensure the overall balance of the economy, and contribute to economic and social recovery and development.

*Secondly*, it is crucial to maintain the principles of active and flexible fiscal policy management in the short term while adhering to long-term budgetary balance principles. This should be based on vigilant monitoring of budget planning and state budget execution at all levels. Additionally, synchronizing measures to effectively use public debt, structuring public debt in a sustainable direction, and efficiently utilizing state funds are necessary steps to restore fiscal discipline for long-term budget sustainability.

*Thirdly*, a proactive review of spending needs and restructuring of state budget expenditures is necessary. Prioritizing and closely managing state budget expenditures, promoting the efficient disbursement of public investment funds to drive economic recovery, and successfully achieving economic and social development goals are crucial. The flexible nature of fiscal policy allows for direct cash injections to individuals and businesses, timely cost reduction for enterprises and workers during challenging periods, and helps moderate the decline in consumer demand while enhancing economic recovery potential.

*Fourthly*, strict control over state budget overspending, public debt, contingent liabilities of the state budget, and local government debt is essential to ensure national financial stability and improve the efficient use of borrowed capital. New loans, including official development assistance (ODA) and preferential loans from foreign donors, should be exclusively used for development expenditures, not for regular expenses.

*Fifthly*, in addition to the state budget, there is a need to mobilize private sector capital for infrastructure investment. Further transparency, accountability, and enhanced responsibility for resource allocation and utilization are necessary for development. Lowering interest rates can facilitate economic infrastructure development, macroeconomic stability, inflation control, and exchange rate stability.

*Sixthly*, continuing to refine price management legislation is crucial. Monitoring supply and demand dynamics, market conditions, and prices, as well as conducting effective price analysis, forecasts, and scenario planning tailored to each stage, are essential. Public transparency in managing electricity, fuel prices, and other critical and essential goods and services, along with regulatory efforts to harmonize the legitimate interests of consumers, businesses, and the government, is necessary. Strengthening inspections, and price controls, and combining them with taxes to prevent and address unreasonable price increases, especially for essential raw materials and consumer goods.

*Seventhly*, there should be close coordination between fiscal policy and monetary policy sensibly and effectively. At the same time, actively addressing difficulties and obstacles to stabilize the stock market, insurance, and capital markets, and ensuring effective financial budget management and state asset management. Continuation of policies like tax extensions, deferment of tax payments, and reducing land rent to alleviate burdens on businesses and households.

## **7. Conclusion**

*Fiscal policy directly impacts the components of aggregate demand through government spending, thus influencing macroeconomic goals. Fiscal policy implementation involves complex processes and can have both short-term and long-term effects. Alongside fiscal policy, government tax and debt policies exert a significant influence on economic activities. Fiscal policies have the potential to either cause inflation or reduce growth when they expand excessively, leading to increased government borrowing domestically and abroad. Therefore, adhering to fiscal discipline is a top priority for the government in maintaining macroeconomic stability, controlling inflation, supporting economic growth, and minimizing economic risks.*

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