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### The Relation Between Government Budget Balance and Macroeconomic Stability: A Case Study in Vietnam

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#### ABSTRACT

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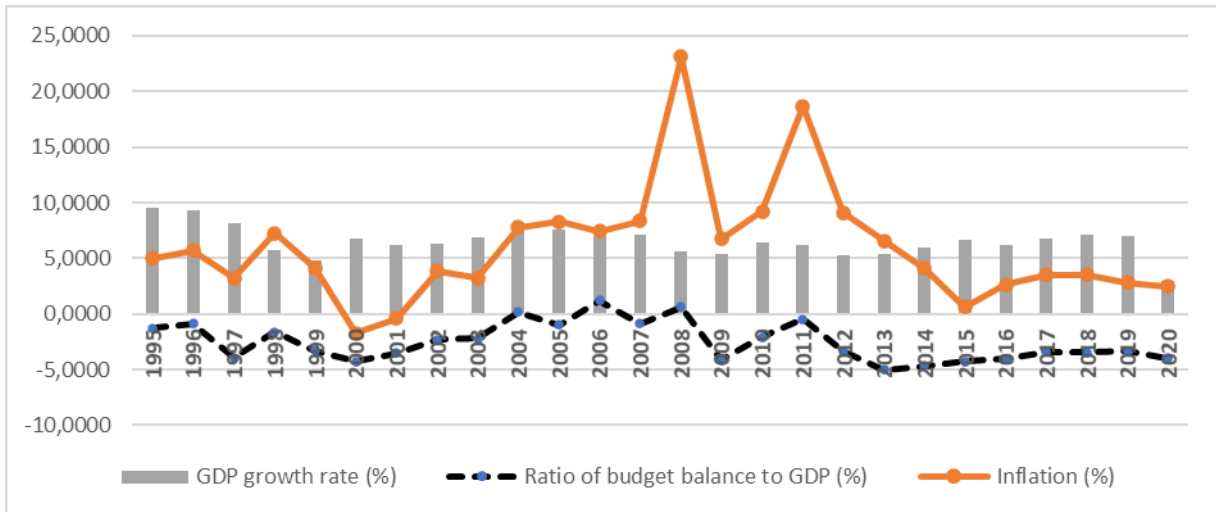
*The macro-linkage relating to Government budget balance has been concerned by worldwide researchers and whether there is a causal relation between budget balance and macroeconomic stability. Vietnam is one of emerging countries so that the management of economy is always concerned by government. Using the Vector AutoRegression (VAR) approach combined with the Granger causality test, the paper has demonstrated a causal relation between budget balance and macroeconomic stability measured by inflation and economic growth rate in Vietnam from 1995 to 2020. Moreover, the techniques of Impulse Response Function (IRF) analysis and decomposition of variance of variables (FEVD) in the VAR model provide evidence of the budget balance's impact on inflation and growth rate in the short term. However, the relationship between budget balance and inflation is negative, while the figure for economic development has an opposite trend. Besides, it is indicated that Government budget balance explains 3.95% of inflation and 21.66% of economic development in Vietnam. These effects have fluctuated slightly and extended for more later periods. From that, the study summarizes several policy implications associated with budget balance mainly about cost savings and increasing income of Government. These suggestions might contribute to stabilizing inflation and economic growth in the context that the Government is undertaking a lot of spending tasks to cope with the Covid-19 pandemic.*

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#### INTRODUCTION

The outbreak of the Covid-19 epidemic in the world at the end of 2019, extending over 2020 has seriously impacted on human health and released negative effects on the economies of several countries due to lower possibility of domestic production and limited trade among multiple countries. To keep the economy stable and to carry out prevention measures of the pandemic, many countries' Governments has to accept great influences of medical spendings on the national budget balance, including Vietnam.

In fact, the process of Government budget income and expenditure is constantly changing and associated with the reproductive process of the society. From 2011 to 2020, Vietnam always has budget deficit situation. Moreover, due to the outbreak of the Covid-19 epidemic, Government budget of Vietnam in 2020 suffered a dramatic deficit of 3.99%. Therefore, budget deficit in Vietnam has been extending for almost a decade demonstrates the country's unstable fiscal situations and great risks of budget imbalance (Figure 1).



**Figure 1.** Budget balance and inflation in Vietnam in the period of 1995-2000

Source: Authors' elaboration

According to economic experts, the current budget deficit leads to Government budget's offset measures such as borrowing money which greatly affects the domestic interest rate and causes inflation (Nam, 2013). Currently, Vietnam must deal with lots of pressures to complete Government budget income estimates to continue to execute measures to cope with the pandemic and at the same time to restore productions and business performances. The Ministry of Finance has also affirmed the important role of Government budget management in contributing to macroeconomic stability in the post-Covid-19 period (Ministry of Finance, 2020). Therefore, how the Government manages the budget and budget balance to avoid raising inflation and sustain economic growth is the key solution contributing to stabilizing the national macroeconomic situation.

This study's objective is to mainly assess the relation between Government budget balance, inflation and economic growth in Vietnam from 1995 to 2020 when shocks occur over time to give out policy implications regarding the budget management to regulate macroeconomic stability in Vietnam in the context of the Covid-19 pandemic.

## 1. LITERATURE REVIEW

### 1.1 Government budget balance and macroeconomic stability

A budget is a comprehensive document outlining economic and non-economic activities of a country that the Government likely carries out with specific objectives and strategies, displayed by forecasting earnings and expenses (Ugoh & Ukpere, 2009). Therefore, a budget means a document with estimated income and expenses of a country for a given period, usually one year (Oniore, 2014). According to OECD (2002), Government budget is the most essential national policy document on which the countries' policy objectives are strictly executed and adjusted. Morgan (1997) emphasizes that budget should be used as

a tool for planning and controlling. Lawyer and Nigeria (2013) assume that budget is a tool defining policies and programs to carry out the development goals of the Government. In general, based on many of worldwide scholars as well as Vietnamese regulations, Government budget is a plan and report showing the estimates and performances of a country's revenues and expenditures within a specified period, typically a fiscal year.

The process of Government budget revenues and expenditures is constantly changing, associated with production and business activities of the economy in a fiscal year. For that reason, the definition of budget balance in any research is always mentioned to reflect the balance of the budget or the difference between budget income and expenses (Gurley & Shaw, 1955). In case of surplus budget, the expected revenue surpasses the estimated expenditure in a financial year, budget balance is now a positive value. In contrast, the estimate expenditure exceeds the estimated revenue of a government in a fiscal year – a case of deficit budget, then budget balance is a negative value (Agénor & Montiel, 2015). Blejer and Cheasty (1993) define budget balance as the difference between Government revenues and expenditures, reflecting a country's financial gap. Tanzi et al. (1988) argue that the most common measure applied by countries around the world to determine regular budget balance is that the fund Government using within the financial year after the country's revenues is subtracted from spending. Jacobs et al. (2002) argue that the concept of budget balance, normally on cash basis, is the difference between total Government spending (including interest payments on public debts without any depreciation payments) and gross revenues on cash (taxes and non-tax income plus grants and no loan is included). Concluded from previous researchers' perspectives, Government budget balance is understood as the difference between Government revenues and expenditures.

In this study, macroeconomic stability is represented by inflation and economic growth rate. Regarding the relation between budget deficit and inflation, worldwide researchers have conducted various studies from which multiple foundational arguments are provided to serve field researches. Firstly, budget deficit raises the sum of Government's expenses, following high prices while the economy is in full employment, which is the cause of inflation (Dwyer Jr, 1982). From the monetarism point of view, Hamburger and Zwick (1981) argue that budget deficit can lead to inflation only if the economy is in full employment. Most studies hypothesize that Government spending deficit is the main cause of inflation based on theory of monetarism. Secondly, budget deficit increases inflation rate due to the rise of money supply. Friedman (1968) argues that monetary regulatory agencies can control inflation rate in the long run with proper money control. The author deems that budget deficit can only result in inflation if the economy's output is in full employment. Sargent and Wallace (1981) suggest that the Central Bank would have an obligation to increase money supply in case of budget deficit, which results in high inflation rate in the long run. Thirdly, budget deficit possibly leads to inflation by "overwhelming" effects. Miller (1983) assumes that the Government deficit is the cause of inflation regardless that the deficit increases the money supply in the economy or not. Central Bank is forced to manage the deficit according to Sargent and Wallace (1981). However, even if the Central Bank does not generate money from deficit, it is explained that budget deficit raises great interest rates, affecting private investment, reducing actual output growth and available stocks with a certain cash balance, thereby increasing the prices (Al-Khedair, 1997).

On the other hand, the Keynesian model suggests that deficits have positive effects on economic development (Frank & Bernanke, 2001). On the contrary, the Neoclassical theory emphasizes that budget deficits lead to unstable economy because of the increasing government spending (Bernheim, 1989). However, the Ricardian theory supposes that changing in budget balance does not affect any macroeconomic variables including economic growth because deficit increases are offset by future tax growth (Williamson, 2005). In general, approaches examine the linkage between government budget balance and macroeconomic variables are concerned by economists all over the world. Inappropriate Government policies, labor productivity disparities in different sectors of the economy, increase in salary, lack of flexibility in food supply, and restrictions on foreign exchange as well as limitation in budget management are likely main causes for inflation and unstable economic growth (Akinboade et al., 2004).

## 1.2 Review of previous studies

Many domestic and foreign authors have investigated on the relation between Government budget balance, inflation and economic development in various approaches. Most studies have determined that budget deficit results in negative impacts on national economic growth. Choudhary and Parai (1991) study on the role of budget deficit on inflation in Peru in period of 1973-1988 and finds out that budget deficit has a significant effect on inflation rate in Peru displayed by money supply growth. Using quantitative regression on time series data to carry out a thesis on the relation of exchange rate, budget deficit and inflation in Nigeria, Egwaikhide et al. (1994) point out not only a fall in exchange rate but the impacts of budgets and money can also directly and indirectly cause inflation. With time series testing, Darrat (2000) examines whether huge budget deficit results in consequences of inflation in Greece. The author finds out that beside monetary growth, budget deficit plays an important and direct role in the inflation process in Greece. Catão and Terrones (2003) show a positive relation between budget deficit and inflation among developing countries in the period of 1960–2001.

Using the AutoRegression Distributed Lag (ARDL) and the correction vector model, Alavirad and Athawale (2005) indicate that budget deficit have a significant impact on inflation rates in Iran in the period of 1963-1999. Using Johansen cointegration test from 1980 to 2005, Makochekeka (2008) reveals that inflation has a significant impact on increasing budget deficit in Zimbabwe. With time series data from 1970 to 2004, Rehman et al. (2008) indicate a positive impact of budget deficit on inflation rate in Pakistan, but this effect is insignificant. Awe and Olalere (2012) studies the existential correlations between the two macroeconomic variables of budget deficit and inflation in Nigeria in the period of 1980-2009. The results indicate that a significant causal effect of budget deficit on inflation while the opposite direction indicate an insignificant impact. Awe and Funlayo (2014) emphasized that there is a negative relationship between budget deficit and economic growth in Nigeria between 1980-2011. Nayab (2015) examines the impact of budget deficit on economic growth in Pakistan in the period from 1976-2007.

The results of the VAR model show that the budget deficit has a positive impact on the economic growth of Pakistan. Karimi et al. (2016) studied the influence of government spending on macroeconomic stability. By the method of Vector autoregression model (VAR) and error correction model (VECM) with time series data from 1959-2003, the results show that government consumption expenditure and tax collection government has a negative impact on economic development. Myovella and Kisava (2018) analyze the existence of a long-term relation between Government budget deficit and inflation in Tanzania from 1970 to 2015. The authors reveal a positive and persistent relation between budget deficit and inflation in Tanzania.

In Vietnam, Nam (2013) carries out a study on the relation between economic growth, budget deficit and inflation in Vietnam. With time series data, Tri et al. (2014) investigate on the budget deficit, economic growth and inflation in Vietnam in the period of 1990 – 2012 and indicate the existence of budget deficit and inflation relation in which budget deficit impact is the root cause of inflation in Vietnam. Applying the estimation method of Pooled Mean Group (PMG) and estimating the generalized error model (GMM) for panel data to empirically study on the impact of fiscal budget deficit and broad money supply (M2) on inflation in Asian countries during 1985-2012, Nguyen (2015) has found that fiscal budget deficit, Government spending and interest rates are statistically significant determinants of inflation.

In conclusion, results from previous studies indicate the inconsistent linkage of budget balance, inflation and economic growth rate. Those carried out in Vietnam have not clearly examined how the role of Government budget balance impacts on inflation and economic growth over time when shocks occur. Inherit previous domestic and abroad researches, this study aims to examine the impact of Government budget balance on inflation and economic growth in Vietnam. Not only determining the causal relation, the study also assesses the extent and economic shocks' impact tendency on the research variables.

## 2. RESEARCH METHODOLOGY

With the use of a Vector AutoRegression Vector (VAR) model, the study estimates every equation of each series variable based on the lag of variable (p) (the maximum lag) and other remaining variables. This is a system of equations. It is required that all variables must be stationary with the use of estimation of VAR model. If not, then the authors must take difference of the variables to ensure stationary. The lag should be chosen so that no autocorrelation among the estimated errors. The results of the VAR model are displayed by the Granger causality test, pulse response function and variance decomposition.

Inherited from previous studies, the aims of paper focus to examine the relation between budget balance and inflation as well as economic growth rate. According to this, inflation and economic growth rate respectively play as a dependent variable in the research model. In addition, control variables are included to help explain the causal relation among variables. In general, the model can be defined as follows:

$$Y_t = [inf_t, bd_t, gdp_t, exch_t, m2_t]$$

With t is the research year from 1995 to 2020. Variables in the research model are summarized in Table 1.

**Table 1.** Summary of abbreviation and measures of variables in the research model

Variable	Abbr.	Measures	Expectation	Source	Previous studies
Inflation	inf	$(cpi(t) - cpi(t-1))/cpi(t-1)$ (%)		Wordbank; IMF; General Statistics Office	De Wet and Solomon (2004); Oladipo and Akinbobola (2011); Tri et al. (2014) Koyuncu (2014); Ssebulime and Edward (2019)
Government budget balance	bd	$(\text{Total revenues} - \text{Total Expenses})/gdp$ (%)	-	Wordbank; IMF; General Statistics Office	
Economic growth	gdp	$\text{Real gdp growth rate } (gdp(t) - gdp(t-1))/gdp(t-1)$ (%)	-	Wordbank; IMF; General Statistics Office	
Exchange rate	exch	Real Effective Exchange Rate (REER) (2010 =100)	+	Wordbank; IMF; General Statistics Office	
Money supply M2	m2	Money supply rate $M2/gdp$ (%)	+	Wordbank; IMF; General Statistics Office	

Source: Summarized by the authors

As shown Table 1, data is collected from 1995-2020 from sources of Worldbank, IMF and the General Statistics Office of Vietnam including (i) inflation (difference of consumer price index - CPI); (ii) Government budget balance (% GDP of Government budget revenue-expenditure difference); (iii) Economic growth (Real GDP growth rate - annual GDP); (iv) exchange rate (Real Effective Exchange Rate - REER); (v) money supply M2 (% of GDP).

Moreover, based on the aims of the article and the results of previous studies, there are two hypotheses in this research as the following:

H<sub>1</sub>: Government budget balance causes the inflation in Vietnam.

H<sub>2</sub>: Government budget balance plays a key role in Vietnam's economic growth.

### 3. RESEARCH RESULTS

#### 3.1 Augmented Dickey-Fuller (ADF) test

As shown in Table 2, variables of inflation (inf), Government budget balance (bd), economic growth (gdp) are stationary at lag 0 (i.e. the original data series), while two variables of exchange rate (exch) and money supply (m2) are stationary when taking the first difference (dexch and dm2).

**Table 2.** Stationary test of the research variables

Variable	Lag length	Statistic t	P-value
inf	0	-3.086	0.0276**
bd	0	-2.894	0.0460**
exch	0	-0.103	0.9492
dexch	1	-3.485	0.0084***
gdp	0	-2.573	0.0988*
m2	0	-0.990	0.7570
dm2	1	-4.600	0.0001***

Note: (\*), (\*\*), (\*\*\*) show that the results are statistically significant at 10%, 5% và 1%

Source: Authors' analysis results

#### 3.2 Testing for the optimal model

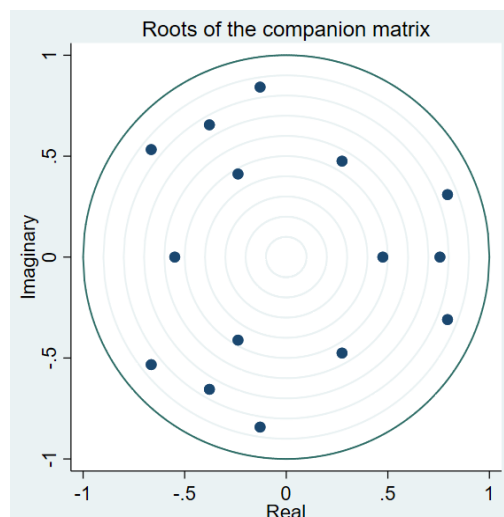
There are many criteria to select the lag length for a VAR model. Based on the database of inf, bd, gdp, dexch, dm2 variables, the authors search for lag lengths of the VAR model without missing important explanatory variables. From the results, the optimal model is may be the model with lag 3 or lag 4 (Table 3).

**Table 3.** Criteria to select lag length for the model

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-163.574				6.45987	16.0546	16.1086	16.3033
1	-133.857	59.434	25	0.000	4.47181	15.6054	15.9292	17.0976
2	-107.065	53.583	25	0.001	6.19073	15.4348	16.0285	18.1704
3	9.78521	233.7	25	0.000	.006013*	6.68712	7.5507	10.6663
4	3158.98	6298.4*	25	0.000	.	-290.855*	-289.722*	-285.633*

Source: Authors' analysis results

After testing the model stability, the autocorrelation and reliability coefficient test, the optimal model is VAR model with lag 3 (Figure 2).



**Figure 2.** Results of the stability test of the research model

Source: Author's analysis from Stata 16.0

### 3.3 Results of Granger causality

From Table 4, it can be concluded that budget balance has an impact on inflation and economic growth in Vietnam. Additionally, inflation is affected by economic growth in the research period. Meanwhile, economic growth only has a relation with budget balance in the research model.

**Table 4.** Summary of Granger causality test results

<i>Dependent variable</i>	<i>Independent (Explanatory variable)</i>	<i>p-value</i>
inf	bd	0.076*
	dexch	0.883
	gdp	0.067*
	dm2	0.473
	ALL	0.116
gdp	inf	0.831
	bd	0.024**
	dexch	0.780
	dm2	0.210
	ALL	0.092

Source: Authors' analysis results

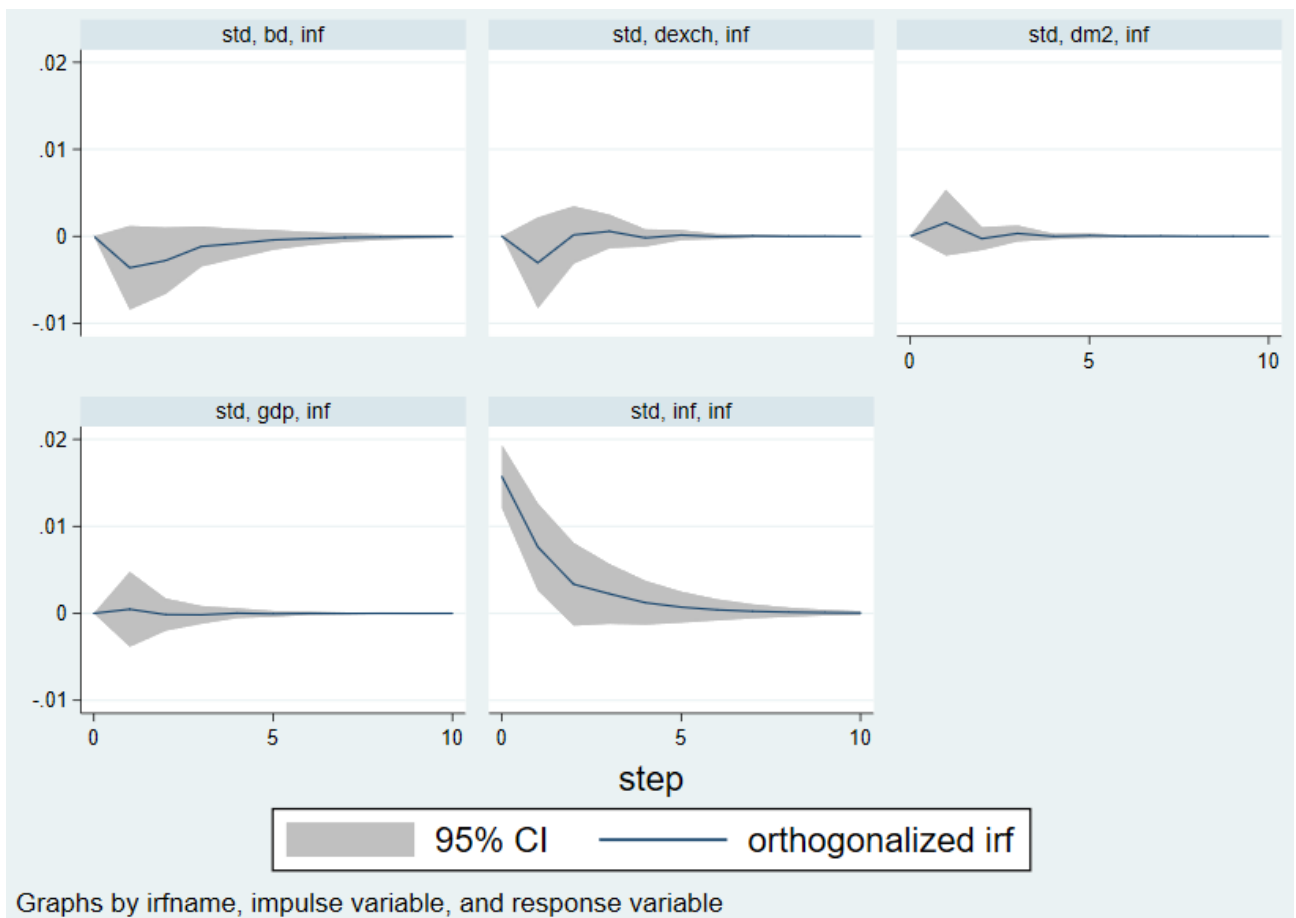
### 3.4 Results of IRF shock analysis and variance decomposition

After the Granger causality test, the study continues to analyze the Impulse Response Function (IRF analysis) to determine the effect of the budget balance on inflation as well as economic growth over time (with the assumption of 10 specific points) in the research model. At the same time, the authors monitor and analyze the impact of remaining variables on inflation and economic growth fluctuations when economic shocks occur.

### 3.4.1 The response of inflation to the changing of budget balance and remaining variables in the model

Clearly shown in Table 5 and Figure 3, the analysis results of Impulse Response Function of variables in the VAR indicate that from the first period, inflation fluctuates as soon as budget balance changes. In detail, when a shock increases Government budget balance to one standard deviation, the inflation rate decreases about 0.003611% in the first period. This impact extends through many following periods. From that, it is determined that if Government budget has been gradually improved, it might lead to a decrease in inflation in Vietnam. This result is consistent with studies of De Wet and Solomon (2004); Oladipo and Akinbobola (2011); Tri et al. (2014); Koyuncu (2014); Ssebulime and Edward (2019).

Similarly, exchange rate (dexch) has negative impact on inflation (inf) while money supply M2 (dm2) and economic growth (gdp) effect on inflation (inf) in the same direction from the first period. These impacts rapidly decline and fall to zero at the following lags. In addition, the effect of the inflation variable (inf) on itself is positive and immediate (Figure 3).



**Figure 3.** Response of results of inflation (inf) to the fluctuation of variables in the research model

Source: Author's analysis from Stata 16.0



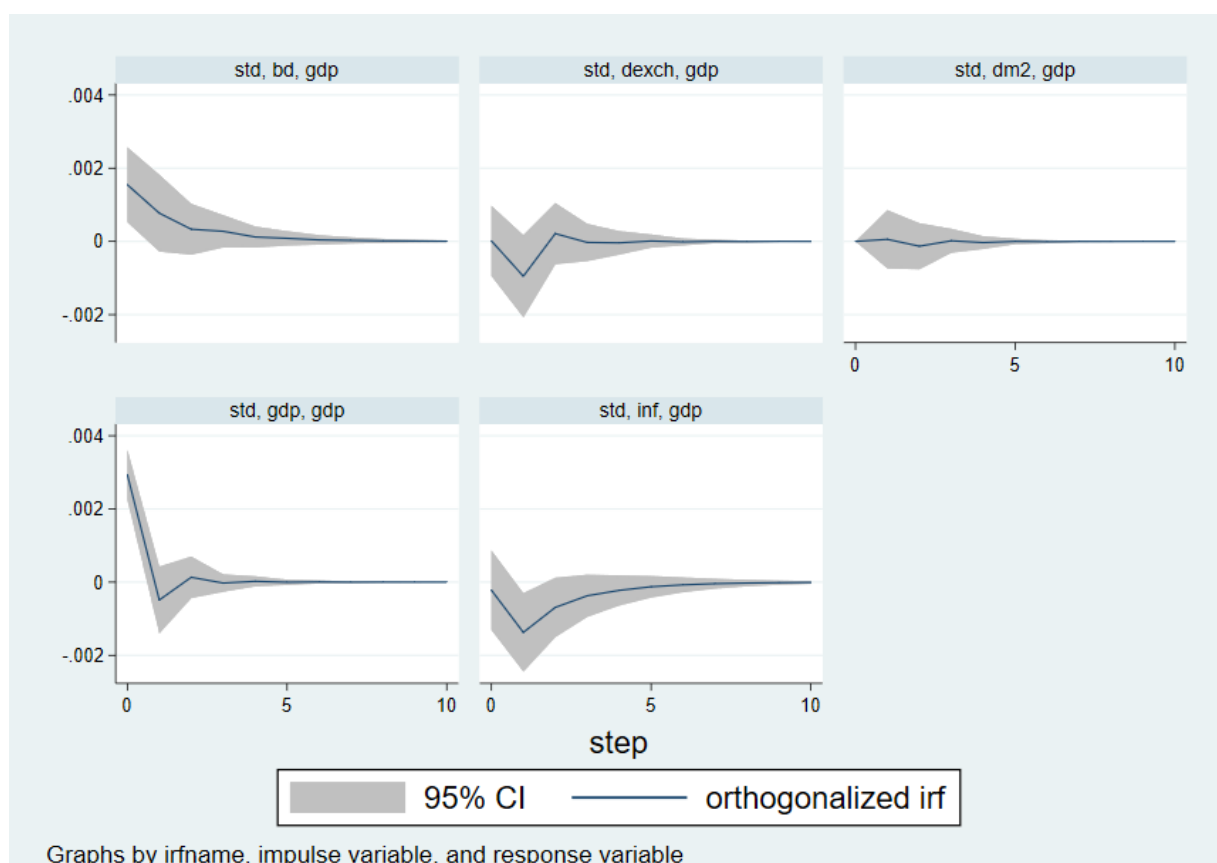
**Table 5.** Reaction results of inflation (inf) to the volatility of variables in the research model

Period	inf	bd	dexch	gdp	dm2
0	.015703	0	0	0	0
1	.007632	-.003611	-.003043	.000471	.001575
2	.003345	-.002791	.00017	-.000139	-.000263
3	.002239	-.001163	.000572	-.000169	.000331
4	.001225	-.000825	-.000179	.000025	-8.8e-06
5	.000715	-.000412	.000148	-.000054	.000084
6	.000405	-.000264	-.000025	1.5e-06	6.2e-06
7	.000235	-.000138	.000035	-.000014	.000024
8	.000133	-.000086	-2.8e-06	-1.1e-06	4.1e-06
9	.000077	-.000046	9.1e-06	-4.0e-06	6.8e-06
10	.000044	-.000028	1.7e-07	-7.0e-07	1.8e-06

Source: Authors' analysis results

### 3.4.2 Response of economic growth to the volatility of budget balance and other variables

While there is a negative effect of budget balance on inflation, Figure 4 explains a positive relation between government budget and economic growth in Vietnam. Specifically, when a shock increases budget balance by 1 standard deviation, economic growth is about 0.001549% higher in the first period, but the impact declines gradually in the next periods (Table 6). The result is consistent with previous studies such as: Awe and Funlayo (2014) and Karimi et al. (2016).



**Figure 4.** Response of results of economic growth (gdp) to the volatility of variables

Source: Author's analysis from Stata 16.0)

**Table 6.** Reaction results of economic growth (gdp) to the fluctuation of variables in the model

Period	inf	bd	dexch	gdp	dm2
0	-.000219	.001549	.000014	.002937	0
1	-.001327	.000773	-.000952	-.000487	.000057
2	-.00069	.000333	.000213	.000133	-.00013
3	-.000372	.000277	-.000028	-.000025	.000017
4	-.000225	.000121	-.000039	.000023	-.000032
5	-.000125	.000085	.000011	-3.0e-06	6.2e-07
6	-.000073	.000042	-.000013	5.6e-06	-8.5e-06
7	-.000041	.000027	2.1e-06	-1.3e-07	-7.1e-07
8	-.000024	.000014	-3.4e-06	1.5e-06	-2.4e-06
9	-.000014	8.8e-06	2.3e-07	1.2e-07	-4.4e-07
10	-7.9e-06	4.7e-06	-9.1e-07	4.0e-07	-6.9e-07

Source: Authors' analysis results

### 3.4.3 Results of decomposition of variance

Following the responses of variables caused by shocks, showing impact direction and level of the variables, the study executes decomposition of variance analysis of inflation (inf) and economic growth (gdp) in the VAR model to assess how variables in the research model affect inflation and economic growth in Vietnam. The results in Table 7 reveal that Government budget balance explains 3.95% of Vietnam's inflation and accounts for 21.66% of Vietnam's economic growth changing.

**Table 7.** Results of variance decomposition of variable inflation (inf) and economic growth (gdp)

Impulse = bd and response = inf				Impulse = bd and response = gdp			
step	fevd	Lower	Uper	step	fevd	Lower	Uper
0	0	0	0	0	0	0	0
1	0	0	0	1	.21662	-.021106	.454345
2	.039535	-.06396	.143026	2	.203794	.001412	.406175
3	.059697	-.08508	.204476	3	.202172	.000675	.403669
4	.062352	-.08826	.212965	4	.20428	.004111	.40445
5	.063867	-.09076	.218496	5	.204321	.003973	.404668
6	.064212	-.09161	.220034	6	.204476	.004154	.404799
7	.064364	-.09199	.220721	7	.204493	.004155	.40483
8	.064404	-.09212	.220929	8	.204507	.004169	.404845
9	.06442	-.09218	.221015	9	.204509	.00417	.404849
10	.064424	-.09219	.221042	10	.204511	.004171	.404851

Source: Authors' analysis results

## CONCLUSION

Examining the relation of Government budget balance and macroeconomic stability represented by inflation and economic growth in Vietnam, the study has applied various approaches. By the Granger test, the research indicates an impact of budget balance on inflation and economic growth. Additionally, the process of impulse response function analysis reveals negative effects of budget balance on inflation. However, the results show there is positive impact of budget balance on economic growth. It is noted that the improvement of budget balance might contribute to the economic growth and lead to a decline in inflation in Vietnam. These results are consistent with studies of De Wet and Solomon (2004); Oladipo and Akinbobola (2011); Tri et al. (2014); Koyuncu (2014); Ssebulime and Edward (2019).

Research results clearly show that minimizing Government budget deficit is necessary to stabilize the macro-economy, especially through reducing inflation and increasing economic development. In the context that the Government of Vietnam must undertake many spending tasks facing the Covid-19 pandemic. As these impacts occur for a long time, Vietnam should have policy directions to minimize the current Government budget deficit in order to stabilize the future economy such as cutting down ineffective and unnecessary public expenses. Facing the Covid-19 epidemic, the Government can make use of several public spending reductions such as reducing annual conference costs, foreign travel expenses, etc. to serve for activities of disease prevention, ensuring that the Government budget is balanced.

On the other hand, Government needs to improve the Government income sources in a sustainable and effective way, especially in the context that the pandemic has greatly affected the domestic production and business performance. Vietnam needs to control public investments of State-Owned Enterprises (SOEs) by establishing an Independent Panel to assess and evaluate SOEs' investment projects comprehensively and objectively based on the principles of openness and transparency, creating a favorable competitive environment in the market.

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