

Article

The Relationship of Fiscal Policy and Economic Cycle: Is Vietnam Different?

Dung Xuan Nguyen ¹  and Trung Duc Nguyen ^{2,*}

¹ Department of Finance and Banking, University of Finance and Marketing, Ho Chi Minh City 700000, Vietnam; max.nxd@gmail.com

² Faculty of Banking, Ho Chi Minh University of Banking, Ho Chi Minh City 700000, Vietnam

* Correspondence: trungnd@hub.edu.vn

Abstract: Fiscal policy is one of the most crucial areas of government economic policy, and it has the potential to influence the economic growth of any nation. According to traditional Keynesian and Ricardian theories, fiscal policy should not be pro-cyclical, and counter-cyclical fiscal policy is the most effective alternative. Furthermore, the periodicity of fiscal policy is also heavily influenced by the quality of political institutions and democracies. Thus, this paper examines the relationship between fiscal policy and economic cycle in Vietnam, a developing economy with dramatic change since 2000. The results support the causal relationship between the set of fiscal policy factors, such as public debt, government tax revenues, and government expenditures, by analyzing quarterly data over a twenty-year period beginning in 2000 by using the Vector Error-Correction Model (VECM). Therefore, the adaptation of fiscal policy to the phases of the economic cycle and the effective deployment of fiscal policy tools help the sustainability of public finances and stimulate economic growth.

Keywords: economic cycle; fiscal policy; Vietnam; VECM



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1. Introduction

The significance of fiscal policy cannot be denied by any authority. The severe economic imbalances generated by the pandemic crisis have harmed the current global economy; fiscal policy can be a vital government action tool that, if it is correctly utilized, can bring economic resilience. The article discusses the relationship between fiscal policy and the business cycle in both developed and developing nations. Developed nations are more likely to employ counter-cyclical fiscal policies, while developing nations are more likely to employ pro-cyclical fiscal policies. This distinction can be attributed to flaws in international credit markets that prevent developing nations from borrowing during recessions and the reliance of many developing nations on indirect taxes rather than direct taxation.

There are a growing number of research models that attempt to explain the relationship between the economic cycle and fiscal policy. Why do developing nations seek contractionary fiscal policy when the economy is in the downside stage, which might cause it to spiral out of control and deteriorate? According to the previous studies, there are two primary explanations: imperfections in international credit markets that prevent developing nations from borrowing in recession times, and the majority of developing nations apply indirect taxes to their economies rather than direct taxes like developed nations (Talvi and Vegh 2005; Acemoglu et al. 2013).

The effectiveness of pro-cyclical fiscal policy in developing nations during economic downturns is a significant unanswered question regarding this topic. Some economists argue that contractionary fiscal policies (i.e., reducing government spending and increasing taxes) during economic contractions worsen the recession and lead to lower economic growth (Furceri and Jalles 2016), whereas the Keynesian school of economics contend that pro-cyclical policies can be advantageous in the long run by reducing inflationary pressures and promoting fiscal sustainability (Afonso and Jalles 2013).

The empirical evidence on this subject is mixed. Some studies have found that pro-cyclical fiscal policies in developing nations are associated with reduced economic growth and greater volatility, whereas others have found no impact or even positive effects. For instance, Ghosh et al. (2013) found that pro-cyclical fiscal policies in developing countries tend to exacerbate economic downturns, whereas Kaminsky and Reinhart (1999) discovered that such policies can be effective at reducing inflation and promoting fiscal sustainability.

Thus, the effectiveness of pro-cyclical fiscal policies in developing countries remains a subject of debate and further research is needed to better understand the underlying mechanisms and to identify best practices for policy implementation.

Governments in developed nations frequently employ a counter-cyclical fiscal policy. This can be explained by an expansionary fiscal policy during economic contraction and a contractionary fiscal policy during economic expansion. Automated stabilizing instruments are used by developed countries to achieve a counter-cyclical fiscal policy. When unemployment is high, unemployment insurance and social transfer payments are increased. As declining personal income reduces government tax collection, tax policy can potentially reverse the cycle. While the economy exhibits signals of contraction, expansionary fiscal policy is enacted (Acemoglu et al. 2013; Fatas and Mihov 2013).

Vietnam's economy is quite modest in size, with a GDP per capita that, on average, made up less than 1.0% of Asia's GDP during the years 2000 and 2010. In contrast, Asia's GDP represents less than 30% of the global total. Furthermore, Vietnam's GDP per capita based on purchasing power parity was only 35% of the global average (about \$5600 compared to \$15,000) in 2015. Vietnam has also recently emerged from the group of low-income countries and reached the lower middle income group. Compared to Asia and the rest of the world, Vietnam's gross domestic product (GDP) is inadequately sized (IMF Report for Selected Nations and Subjects).

In addition, Vietnamese fiscal policy has changed and adapted with the country's development since 1990. It has implemented a policy of economic revitalization, the Law on State Budget, a Medium-term Expenditure Framework, and numerous tax reforms, including a reduction in corporate income tax rates and the introduction of a value-added tax. The Public Debt Management Law was enacted in 2013 to strengthen public debt management and assure fiscal sustainability. The Public Investment Law was enacted in 2016 to increase the efficacy and openness of public investment. Vietnam has also supported economic growth by investing in critical sectors such as infrastructure, education, and healthcare, implementing tax reforms and incentives to attract foreign investment, and maintaining a low public debt-to-GDP ratio.

In the past two decades, many nations, including Vietnam, have experienced economic cyclicity as a result of the 1997 and 2008 financial crises. In fact, the economic cycle is unpredictable and erratic. There is no formula or procedure that can precisely anticipate the time and duration of business cycles. The economic cycle is still the topic of research to limit economic crises and overheating, and to determine which fiscal and monetary policy tools governments will adopt to stabilize the economy. The purpose of this article is to estimate the relationship between Vietnam's fiscal policies and the economic cycle by employing quantitative methods and providing additional empirical evidence.

2. Literature Review

2.1. Theories of Fiscal Policy and Economic Cycle

Fiscal policy is a subset of macroeconomic policy that influences economic activity through alterations in government expenditure and/or taxation. It is disaggregated into government expenditure and revenue components to measure their effect on real GDP growth. The objectives of fiscal policy are to mobilize financial resources to meet the state's spending needs, promote economic restructuring, ensure stable and sustainable economic growth, contribute to market and commodity price stabilization, and redistribute social income among different classes of the population. The government intervenes in the economy via fiscal policy (government spending, taxes, subsidies, etc.) and monetary

policy (money supply, interest rates, exchange rates, etc.) during periods of economic recession or rapid growth.

The business cycle is the expansion and contraction of an economy caused by genuine shocks such as technological developments, natural disasters, and war. As a result of the financial crises of 1997 and 2008, the majority of countries have suffered economic cyclicity over the last two decades. No formula or method exists for precisely predicting the timing and duration of business cycles, but research into the economic cycle is performed in an effort to prevent economic crises and overheating. The economic cycle is caused by market fluctuations, which cause the economy to endure recessionary peaks and valleys. The following evolution of the economy is heavily influenced by the response of fiscal and monetary policy to economic shocks.

Keynesian theory states that prices or wages represent instantaneous price adjustments that are not fully responsive to fluctuations in demand. Countercyclical fiscal policy should actively smooth and support the business cycle by decreasing taxes and increasing spending, thereby increasing aggregate demand in the downward stage and reducing spending and increasing savings in the upward stage. Barro's (1979) hypothesis states that tax rates must be maintained at constant levels throughout the business cycle. Keynesian economists have been urging low-income developing countries (LDCs) to raise their tax burdens and reduce their recurrent spending in order to boost their savings in the government budget. However, there are a number of problems with these policy recommendations, such as a lack of specificity in analyzing the relationship between macroeconomic variables and a disregard for fundamental features of fiscal policy, such as the efficient allocation of financial resources, equitable distribution, and long-term stability.

The Keynesian hypothesis was questioned when the global economy entered a recession in the 1970s and when tax cuts and austerity spending led to an economic boom in the 1980s. John Maynard Keynes theorized that the government should intervene in the economy by raising taxes and expanding government expenditure to deal with the economic crisis and the high unemployment rate. However, many economists believed that reducing the budget deficit was the "magic elixir" for economic expansion. The relationship between budget deficit, interest rate, investment, and growth is exaggerated, and neither school stresses the magnitude of budget expenditures. In the 1930s and 1960s, ideas of market failure led to the establishment of enormous government spending programs under the framework of fiscal policy, but in the 1970s and 1980s, the downsides of government spending programs began to show.

Therefore, the market frequently fails, and the government rarely succeeds in overcoming market failures. The primary reasons for government failure are: Slow policy issuance and implementation results from limited information, limited control over the private sector, bureaucracy, and constraints of the political consultation process (Le and Pham 2018).

2.2. Relevant Empirical Studies of Pro-Cyclical Fiscal Policy

Gavin and Perotti (1997) concluded that fiscal policy in 13 Latin American countries from 1968 to 1995 was pro-cyclical. Talvi and Végh (2005) concluded that the procyclicality of fiscal policy is prevalent in all 36 developing countries in their sample, and not just in Latin America. Ilzetski and Végh (2008) studied the cyclical effects of fiscal policy on the business cycle, as well as the reverse causality between them by using a variety of econometric models. Thornton (2008) discovered that real government consumption in 37 African nations is procyclical to output changes, and Manasse (2006) issued a warning about the observed disparities in the economic cyclicity between developing and developed nations, which are in part attributable to the greater severity of economic shocks in developing nations. Kaminsky et al. (2004) analyzed the cyclicity of capital flows, fiscal policy, and monetary policy in 104 countries from 1960 to 2003 and reached the following conclusions: (1) capital flows are a procyclical input in OECD and emerging nations; (2) fis-

cal and monetary policy are procyclical for the majority of developing nations, with the effect being most prominent in upper middle-income nations.

Fiscal policy is a popular topic choice for empirical studies, and is widely accepted in developing nations. [Stein et al. \(1999\)](#) discovered a correlation coefficient of 0.52 between public consumption and economic growth in 26 Latin American nations from 1970 to 1995. [Talvi and Vegh \(2005\)](#) found that public consumption is cyclical across 36 developing nations from Asia, Africa, the Middle East, and Latin America. [Kaminsky et al. \(2004\)](#) investigated the fiscal policy of 83 low- and middle-income countries and found that fiscal policy is procyclical. Studies have shown potential causes of procyclicality, including institutional weakness, social friction, and a loss in creditworthiness on international credit markets.

Corruption and democracy are the most important factors that affect cyclicity in developing countries, and the coefficients for the role of net external debt and social inequality as measured by the GINI index tend to oscillate around the 10% significance threshold. The relationship between the economic cycle and fiscal policy has been the subject of numerous other hypotheses, particularly those that focus on the distinctions between developed and developing nations.

[Alesina et al. \(2008\)](#) explored the association between corruption, political issues, and fiscal policy using data from OECD countries. The most important details in this text are that if a government is corrupt and voters observe a substantial increase in the economy's income, they will demand more public goods from the government and tax cuts, resulting in a procyclical skew in fiscal policy. This is more prominent in economies with high levels of corruption, where voters are unable to verify the amount of government income collected by the state bureaucracy. This public pressure compels the government to spend in accordance with the business cycle and to even borrow more money. The empirical findings support the premise that countries with a greater prevalence of corruption have fiscal policies that are more pro-cyclical. Some theories of the procyclical character of fiscal policy in developing countries contend that developing countries confront credit limits that prevent them from borrowing during economic downturns, and that they were forced to service their obligations during that time, prompting a contractionary fiscal policy when economic growth weakened. Gavin and Perotti initially suggested this explanation, and their research found that the IMF's fund accessibility to emergency finance is greater during these periods.

[Kaminsky et al. \(2004\)](#) and [Suzuki \(2015\)](#) suggest that pro-cyclical fiscal policy arises due to inefficiencies in the credit market. [Calderón and Schmidt-Hebbel \(2008\)](#) suggest that greater access to both domestic and international capital markets enables the implementation of fiscal policies that reverse the economic cycle. [Riascos and Végh \(2004\)](#) and [Caballero and Krishnamurthy \(2004\)](#) contend that inadequate financial depth, as measured by domestic loans to the private sector and homogeneity in financial asset class, impedes the execution of fiscal policy against the business cycle. Cyclical fiscal policy can restrain long-term economic growth, particularly in nations with low levels of financial intermediation, and it also represents vulnerability.

The responsiveness of public spending to fluctuations in the economic cycle is contingent on the degree of political polarization and the limits of government debt. [Stoian et al. \(2018\)](#) established a framework for assessing the fiscal risk of 28 EU countries from 1990 to 2013, and the data indicate that the Czech Republic, Greece, France, Italy, Malta, Portugal, and the United Kingdom have the greatest coefficients of financial vulnerability over the period studied. [Lewis \(2009\)](#) employed time series analysis to investigate the cyclicity, inertia, and effects of EU membership on the fiscal policies of Central and Eastern European nations, and the results indicate that the budget balances respond to stabilizing economic activity, are less stable than those of Western Europe, and that beginning in 1999, the EU membership process creates financial losses for countries in this region. [Talvi and Vegh \(2005\)](#) also found that cyclical fiscal policy in emerging nations is mostly due to policy distortions, and that the application of tax reduction measures is detrimental to developing nations since the tax base in developing nations is highly volatile. Political

variables contribute to the procyclicality of fiscal policy, as these oscillations are a result of political dynamics.

Fiscal policy in developing nations tends to be more cyclical during good economic times due to the low latent propensity to save. Political dynamics and the quality of political governance appear to be the primary determinants of fiscal policy cyclicality. [Calderón et al. \(2016\)](#) suggest that the responsiveness of fiscal policy to the volatility of the business cycle is largely contingent on the quality of institutions. [Tornell and Lane \(1999\)](#) suggest that when productivity rises, redistributive effects grow due to rivalry among interest groups for publicly owned resources. Both democratic and non-democratic developing nations use fiscal strategies that correspond to the business cycle, but improved institutional quality is essential for governments to rein in cyclical fiscal policies.

[Temsumrit \(2020\)](#) examined 63 developing nations between 1980 and 2013 and found that cyclical fiscal policy exists in both democracies and non-democracies. Institutional improvement plays a significant role in limiting this policy, and fiscal policy tends to be less cyclical in well-established and stable democracies. Additionally, democratic governments tend to have less cyclical fiscal policies than non-democratic governments due to their maturity and stability. To transition away from pro-cyclical fiscal policy, improvements in the quality of political institutions and regime stability are crucial. Income inequality, as measured by the GINI coefficient, is also a crucial variable in cross-country assessments of fiscal policy procyclicality.

[Easterly \(2001\)](#) demonstrated that communities divided into factions are more likely to become redistributive, whereas civilizations united by a shared culture are more likely to build consensus for development. Other factors include various types of social polarization, such as inequality in income, education, and political power. [Lane \(2003\)](#) and [Woo \(2009\)](#) examined the impact of business cycles on the fiscal policy of OECD nations. Lane found that cyclical fiscal policy is more prominent in nations with a separation of political power, while Woo found that public spending is more volatile and procyclical if policymakers have less patience. Other factors impacting fiscal policy include the economy's degree of openness, capital account openness, and fiscal sustainability. Studies have shown that advanced economies are more suited to changes in the business cycle, as they have higher levels of financial development and are advised by major organizations. [Blanchard et al. \(1990\)](#) define fiscal sustainability as effective resource management, but sustainability also relates to the outcomes of the current fiscal strategy.

Fiscal sustainability requires a fiscal strategy that does not lead to economic system distortions, a major rise in public debt and tax rates, or a rapid decrease in government expenditures. Most definitions of fiscal sustainability include the capacity of fiscal policy to stabilize or even reduce public debt as a proportion of GDP relative to prior eras. [Debrun et al. \(2008\)](#) suggest that the introduction of the European fiscal framework and country-specific characteristics of fiscal management played a significant role in the introduction of numerical fiscal rules. [Pham \(2016\)](#) research examined a variety of empirical studies on economic cyclicality and fiscal policy in developed and developing nations in order to provide further insights on the macroeconomic management of these nations. In developed nations, fiscal policy is either anticyclical or noncyclical, while in developing economies, it is procyclical. Vietnam has achieved economic growth successes, including macroeconomic stability and inflation management, but revamping the government budget has become an essential necessity for ensuring long-term budget sustainability, strengthening market confidence, and supporting economic growth more effectively.

2.3. Relevant Empirical Studies of Counter-Cyclical Fiscal Policy

A renewed interest in Keynesian programs has resulted from the 2008 economic recession, with fiscal policies that oppose the economic cycle viewed as a solution for growth recovery in developed nations. According to neoclassical models, the ideal fiscal policy is countercyclical, which involves maintaining consistent tax rates throughout the business cycle. [Talvi and Vegh \(2005\)](#) found that the fiscal policy of the G7 nations is

not cyclical, while the average correlation between government spending distribution and GDP in the G7 is zero. [Gavin and Perotti \(1997\)](#) found that both developed and developing nations have distinct economic cycles, with developed nations predominantly employing countercyclical fiscal strategies and emerging and developing nations adopting cyclical fiscal policies. [Strawczynski and Zeira \(2011\)](#) assessed the cycle of fiscal policy in 22 developed OECD nations, finding that the investment expenditure strategies of industrialized nations are inversely proportional to the business cycle, while countries with significant amounts of foreign direct investment will have fewer cyclical policies.

[Frankel et al. \(2011\)](#) compared the use of fiscal policy to manage the business cycle in developing and developed nations, and found that developed nations predominantly employ countercyclical strategies, while emerging nations have adopted cyclical strategies over the past decade. The quality of a country's public institutions is crucial for the success of fiscal policy.

2.4. Theoretical Frameworks and Research Gaps on Economic Cycle and Fiscal Policy

According to Neoclassical and Keynesian perspectives, fiscal policy is one of the most effective tools for stabilizing short-term economic volatility and promoting long-term economic expansion. Fiscal policy is implemented through taxation and government spending. To stabilize production volatility, a fiscal policy must be able to prevent the economy from overheating during expansions and stimulate it during recessions; this is known as countercyclical fiscal policy. Due to its reciprocal processes, the contrasting fiscal policy approach helps the economy avoid recession. This means that the government injects liquidity into the economy during a recession in order to sustain private spending and contracted investments. The rise in output resulting from the public sector's high demand provides revenue for households and generates employment opportunities. As a result, households might boost their demand for goods and consumption. This procedure contributes to the economy's recovery from recession.

Previous researches have demonstrated that many emerging nations tend to embrace pro-cyclical fiscal policies. During economic downturns, governments reduce expenditure and raise taxes, while during economic expansions, they increase spending and reduce taxes. The cyclical nature of fiscal policy is deemed unsatisfactory for both developed and developing countries. During a recession, private consumption and investment diminish as a result of decreased demand, and they will worsen if governments undertake contractionary policies. Similarly, cyclical fiscal policy causes the economy to overheat during periods of economic expansion. The economy becomes overly optimistic as a result of tax cuts, more government spending, and higher aggregate demand from the private sector. There is a lot of evidence that emerging countries use cyclical fiscal policy, even though its implementation is not desirable.

Previous studies have attempted to explain why economies, particularly developing economies, elect to pursue cyclical fiscal policies. There are two primary explanations for this: first, cyclical fiscal policy resulting from inefficiencies and credit limits on international credit markets ([Gavin and Perotti 1997](#); [Kaminsky et al. 2004](#); [Caballero and Krishnamurthy 2004](#); [Calderón et al. 2010](#); [Aghion et al. 2014](#)). The immaturity of these developing nations' credit markets makes their fiscal policy cyclical. Emerging countries will utilize a limited variety of credit instruments in the event of negative economic shocks, based on their ratings, as shown in Latin American countries during times of crisis. Periods of IMF loan utilization are significantly more frequent than typical periods ([Gavin and Perotti 1997](#)). [Alberola et al. \(2006\)](#) also confirmed the cyclical nature of Latin America's fiscal policy, arguing that the region's financial vulnerability is not only attributable to outstanding public debt levels, but also to fluctuations in financial conditions and their effect on the financial performance of financial institutions. The second approach holds that political variables, such as the distortion of political regimes, the quality of political institutions, or political polarization, are the root problem of cyclical fiscal policy ([Calderón and Schmidt-Hebbel 2008](#)). Studies have focused on identifying factors that may contribute to the

procyclicality of public spending, examining theories related to social inequality (Woo 2009), key structures countries (Alesina et al. 2008), and imperfect credit markets (Gavin and Perotti 1997). The results show that political factors and social inequality are associated with cyclical government expenditures for the entire group of countries analyzed in the EU, in both cross-country regression and table data.

Prior studies have primarily concentrated on government spending as a proxy for fiscal policy. The proxies of government revenue have not been taken into good consideration due to the dearth of information on government revenue and tax rates for developing nations. Numerous studies and tests of theories have been conducted on the cyclicity of fiscal policy in emerging nations. According to Talvi and Vegh (2005), regression is the most effective tool for measuring the fiscal policy reaction to the business cycle. In order to construct regressions, the dependent variable must be identified as an outcome of fiscal policy, government spending, or fiscal balances, which are the most frequently employed variables. The evolution of the GDP in several forms (logarithmic or growth rate) is also often employed to measure business cycle changes. In addition, in the context of COVID-19, Chakraborty et al. (2021) examined the effectiveness of fiscal stimulus packages in mitigating the economic impact of the COVID-19 pandemic in Asia and Europe, which suggested that countries with larger stimulus packages tended to have better economic outcomes than those with smaller packages.

It would be good to monitor the evolution of tax collections in order to more accurately evaluate the cyclical aspects of countries' fiscal strategies. However, tax-related variables in the sample are frequently inconsistent over the long term. Moreover, depending on the country sample analyzed, tax revenues may also be affected by other significant factors, such as tax evasion and the shadow economy, the impact of elections, government regulation of tax collection, or consumption. Even though some aspects may be defined, the information data of the countries under examination are of dubious reliability.

Thus, based on the theoretical foundation and analytical framework inherited from prior investigations, the study employs Keynes's theory and Talvi and Vegh's (2005) research model as the original research model to examine the fiscal policy's response to Vietnam's economic cycle.

3. Methodology and Data

3.1. Methodology

The Vector Error Correction Model (VECM) is a suitable model for a country like Vietnam because it allows for the examination of both long-run and short-run dynamics in the relationship between variables. This is particularly important in developing countries such as Vietnam, where structural changes in the economy can have a significant impact on the relationship between variables over time. Furthermore, it is an extension of the VAR (Vector Autoregression) model with the addition of error correction terms that reflect the adjustment process toward long-run equilibrium relationships, which permits researchers to investigate both short-run and long-run dynamics between variables. While DSGE (Dynamic Stochastic General Equilibrium) models require strong assumptions about the structure of the economy, which may not always hold in reality, and SVAR (Structural Vector Autoregression) models identifying structural shocks require additional assertions regarding the timing and impact of each shock, which can be challenging to verify.

It is possible to produce spurious regressions when regressing a nonstationary time series against another nonstationary time series. In such a scenario, the normal test procedures t and F are invalid, and the resulting regression is invalid. Despite the fact that these time series exhibit the same trend, the results are in doubt when they are examined more closely. Typically, the findings of spurious regression are quite desirable: R^2 is quite high, t -ratios are substantial, but the Durbin-Watson d statistic is small. Granger and Newbold suggested that $R^2 > d$ indicates false regression. If the time series are not stationary, but their linear combination is stationary, this is known as cointegration. According to Granger, a cointegration test can be viewed as a preliminary test to exclude unconfirmed regression scenarios. The VECM

model can be utilized for regression in situations in which the chains are not stationary but do indicate cointegration.

Time series analysis typically reveals that the series is not stationary. In the estimation of non-stationary variables using the OLS method, the findings may be erroneous.

When employing a regression or a linear combination of these techniques, there are many circumstances in which white noise is still produced, even though the variables being analyzed are nonstationary. This is the case in a number of different situations. This section will introduce the fundamental ideas of cointegration and model estimation techniques. Co-integration tests reveals the number of stationary linear combinations for a group of non-stationary variables.

VECM Model Forming:

$$y_t - y_{t-1} = (A_1 + A_2 + \dots + A_p - I)y_{t-1} - (A_2 + \dots + A_p)(y_{t-1} - y_{t-2}) - (A_3 + \dots + A_p)(y_{t-2} - y_{t-3}) - \dots - A_p(y_{t-p+1} - y_{t-p}) + u_t \quad (1)$$

$$\Delta y_t = \Pi y_{t-1} + C_1 \Delta y_{t-1} + C_2 \Delta y_{t-2} + \dots + C_{p-1} \Delta y_{t-p+1} + u_t \quad (2)$$

$$\text{In which, } \Pi = -(I - A_1 - A_2 - \dots - A_p); C_i = -\sum_{j=i+1}^p A_j, i = 1, 2, \dots, p-1 \quad (3)$$

The model contains Π , y_{t-1} is the correct part of errors in ECM. If y_t and k are cointegration, then Π has form:

$$\Pi = \alpha \times \beta \quad (4)$$

Whereas, $\alpha = (k \times r)$, and $\beta = (r \times k)$

$$\text{Then: } \Delta y_t = \alpha\beta y_{t-1} + C_1 \Delta y_{t-1} + C_2 \Delta y_{t-2} + \dots + C_{p-1} \Delta y_{t-p+1} + u_t \quad (5)$$

Set $EC_{t-1} = \beta y_{t-1}$: non-stop series combinations in y_t to become a stationary series and EC_{t-1} is the redundancy of those combinations and EC_{t-1} indicates an imbalance in period $t-1$, then α indicates the correction coefficient of Δy_t when an imbalance occurs.

In order to determine the stationarity of time series, the author performed the unit root test. The results demonstrated that the data series are stationary with the same level of association: $I(1)$. Therefore, the Engle—Granger test or the Johansen test can be used to determine whether or not the data series are cointegrated. The author employed the VECM method based on the study of Johansen (1990) to test for cointegration if the stationary series have the same order of difference. Johansen performed a series of statistical tests to identify the number of linked vectors, including checks for cointegration and tests to find the maximum number of data chain cointegrations. The results indicate that the data series are cointegrated. The VECM regression model is selected. Checking for stationarity and cointegration of data series is necessary for determining the appropriate VECM model and avoiding spurious regression or particular error issues. Furthermore, when the stationary variables have the same order of difference and are cointegrated, it suggests that a regressive VECM model is required (Granger and Newbold 1987).

This section is divided by subheadings. It provides a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

3.2. Data and Model Specifications

This study provides a fresh perspective on Vietnam’s fiscal policy’s response to the economic cycle in terms of public spending. The thesis has built a research model with variables indicating the economic cycle and fiscal policy based on Talvi and Vegg’s (2005) model.

According to the research of Debrun and Kapoor (2011), Furceri and Jalles (2016), and Afonso and Jalles (2013), the size of government spending is frequently regarded as the most significant factor in determining fiscal policy stability. Keynes (1936) argued that the economic cycle is caused by fluctuations in economic growth accompanied by recessionary peaks and troughs. Table 1 presents the sources of variables used in the model, including economic growth (GDP) reflecting the business cycle and government spending (representing fiscal policy).

Table 1. Sources of variables used in the model.

Variables	Symbol	Ratios	Source
Vietnam production	GDP	GDP index (%)	IMF
Government expenditures	LNEXP	EXP index ¹	IMF
Government tax revenues	LNTAX	TAX index ¹	IMF
Government debts	LNLIA	LIA index ¹	IMF

¹ logarithm of data.

Table 2 presents the descriptive statistics of the variables. These variables include government expenditures (EXP), Vietnam’s gross domestic product (GDP), government tax revenues (TAX), and government debts (LIA). The data is quarterly applicable for the years 2000 through 2021. The percentage of Vietnam’s gross domestic product (GDP) presents Vietnam’s gross domestic product, a common indicator of a nation’s economic activity, which was derived from the IMF’s international financial data. Government Spending Variables (LNEXP) measure the level of government spending on products and services in Vietnam, Government Tax Revenue (LNTAX) indicates the amount of tax revenue collected by the Vietnamese government, and Government Debts (LNLIA) monitor the total government borrowings in Vietnam, collected from IMF’s international financial statistics. The government’s expenditure; government tax revenue and government debt is a trend variable that does not have a normal distribution; the deviation must be very large; research is required to convert this variable to a logarithmic base natural form so that the variable has a distribution close to the distribution standard and meets the model’s input data conditions. In addition, variables with an annual frequency are frequently affected by the seasonal factor.

Table 2. Descriptive statistics of the variables.

Values	EXP	GDP	LIA
Mean	32.48437	6.536612	16.45983
Median	32.61859	6.730000	16.86875
Maximum	33.77033	9.261000	17.01868
Minimum	30.84740	0.390000	15.67639
Std. Dev.	0.933886	1.447579	0.519136
Skewness	−0.347415	−1.114815	−0.244880
Kurtosis	1.696106	6.125947	1.176560
Jarque-Bera	7.731208	52.21407	12.62533
Probability	0.020950	0.000000	0.001813
Sum	2761.171	555.6120	1399.085
Sum Sq. Dev.	73.26002	176.0208	22.63819
Observations	85	85	85

4. Results and Discussion

4.1. Stationary Test for Data Series

When analyzing time series data, a model is considered credible if the data series used in the research are stationary data series. A time series Y_t is stationary if three conditions are met: its mean and variance are constant over time, and the covariance between Y_t and Y_{t-s} only depends on the distance between the two time points s and not on the time t . If the time series are not stationary, the regression may produce erroneous results.

To test whether Y_t is stationary, it is necessary to check whether Y_t is a random walk:

$$H_0: \beta_1 = 1$$

$$H_1: \beta_1 < 1$$

If H_0 is accepted at significance level α , the time series is non-stationary, whereas if H_0 is rejected, the time series is stationary. The Dickey-Fuller unit root test was conducted to test the stationarity of the series LNEXP and GDP, respectively. Results indicate that the series does not stop at $d = 0$.

Table 3 has shown the results indicating, with a significance level of $\alpha = 0.05$, that all accept the H_0 hypothesis of the presence of a unit root; therefore, the series EXP, TAX, LIA, and GDP do not stop at the difference $d = 0$.

Table 3. Unit root test of data series ($d = 0$).

Augmented Dickey-Fuller Test Statistic	Prob. *
Null Hypothesis: LIA has a unit root	0.5113
Null Hypothesis: EXP has a unit root	0.1692
Null Hypothesis: TAX has a unit root	0.1145
Null Hypothesis: GDP has a unit root	0.0529

* $p < 0.05$.

The vast majority of economic time series are non-stationary; however, they can be converted to stationary series by the process of difference. If a series is non-stationary and stops at a difference of order d , it is referred to as a connected series of order d with symbol: $Y_t \approx I(d)$. Table 4 showed the results of the Dickey-Fuller unit root test to examine the stationarity of the LNEXP and GDP series, respectively, at a difference of $d = 2$.

Table 4. Unit root test of data series ($d = 2$).

Augmented Dickey-Fuller Test Statistic	Prob. *
Null Hypothesis: LIA has a unit root	0.0000
Null Hypothesis: EXP has a unit root	0.0000
Null Hypothesis: TAX has a unit root	0.0000
Null Hypothesis: GDP has a unit root	0.0000

* $p < 0.05$.

Using a significance level of $\alpha = 0.05$, the unit root test results indicate that the existence of unit roots in the H_0 hypothesis is not supported; hence, the series EXP, TAX, LIA, and GDP stop at the second difference level. Consequently, the data series are stationary with the same difference order, and the cointegration test will continue to be conducted.

4.2. Co-Integration Test

Since the data series are stationary with the same order of difference ($d = 2$), the Johansen test is performed to check whether the series EXP, TAX, LIA, and GDP are cointegrated or not. The results obtained from Johansen’s test show that the series EXP, TAX, LIA, and GDP have cointegration, at a significance level $\alpha = 0.05$, and a p -value = $0.0194 < \alpha$, so the null hypothesis for $H_0: r = 0$ (there is no cointegration between variables). For more detailed information on the Cointegration Test used in this study, please refer to Appendix A.

Thus, according to the results in Table 5, the series are stationary with the same order of difference ($d = 2$) and the Johansen’s test shows that the series have cointegration. Therefore, the VECM model selected to test the relationship between the economic cycle and the fiscal policy of Vietnam is appropriate.

Table 5. Unrestricted Cointegration Rank Test (Maximum Eigenvalue).

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob. **
None *	0.257683	52.00129	47.85613	0.0194
At most 1	0.166278	27.56697	29.79707	0.0885
At most 2	0.096903	12.65486	15.49471	0.1281
At most 3 *	0.051053	4.296971	3.841466	0.0382

* denotes rejection of the hypothesis at the 0.05 level, ** *p*-values Unrestricted Cointegrating Coefficients (normalized by $b' \times S11 \times b = I$).

4.3. Granger Causality Test

Granger’s Wald Tests help determine whether the variables included in the model are endogenous or exogenous, and are necessary to be included in the model. The variables in the model include: EXP, TAX, LIA, and GDP when conducting Granger’s Wald Tests. The results of Table 6 indicates that, at a significance level $\alpha = 0.05$, EXP has an impact on GDP (5%), GDP has an impact on LIA (5%), TAX has an impact on GDP. At a significance level of $\alpha = 0.1$, LIA has an impact on GDP (10%). Thus, the variables are all endogenous and are necessary to be included in the model.

Table 6. Pairwise Granger Causality Tests.

Null Hypothesis:	Obs	F-Statistic	Prob.
GDP does not Granger Cause EXP EXP does not Granger Cause GDP	83	2.73114 3.31170	0.0714 0.0416
LIA does not Granger Cause EXP EXP does not Granger Cause LIA	83	0.00231 2.62721	0.9977 0.0787
TAX does not Granger Cause EXP EXP does not Granger Cause TAX	83	2.00308 0.50411	0.1418 0.6060
LIA does not Granger Cause GDP GDP does not Granger Cause LIA	83	2.59160 4.15017	0.0813 0.0194
TAX does not Granger Cause GDP GDP does not Granger Cause TAX	83	4.09654 3.44239	0.0203 0.0369
TAX does not Granger Cause LIA LIA does not Granger Cause TAX	83	2.18552 0.41915	0.1193 0.6591

4.4. Stability Test in the Research Model

To test the stability of the VECM model, use the AR Root Test to consider whether the solutions or the eigenvalues are not greater than 1 or are not outside the unit circle; thus, the VECM model achieves stability. Figure 1 has shown that the solutions are not larger than 1 or are not outside the unit circle; therefore, the VECM model is stable and the model is suitable for regression.

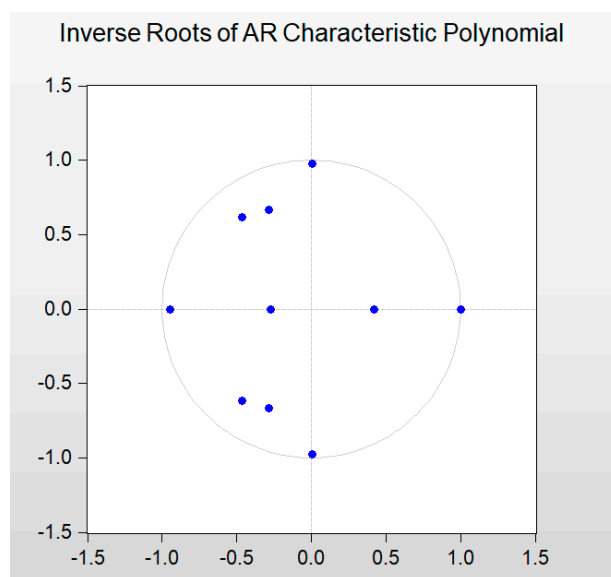


Figure 1. The AR Root Test.

4.5. The VECM Model

In the long term, the volatility of GDP is positively related to the volatility of EXP and inversely related with the volatility of LIA and TAX.

The combination of non-stationary sequences into a stationary sequence, and EC_{t-1} is the residual in that combination; $EC_{t-1} = \alpha$ indicates an imbalance in the $t-1$ period, α is the adjustment coefficient when an imbalance occurs in the short run.

In Table 7, $EC_{t-1} = -0.910403$ shows that if the previous period imbalance is one unit, in the first period, the dependent variable will adjust back to the equilibrium of 91%. Thus, it takes a total of more than two periods to restore equilibrium.

Table 7. The Vector Error Correction Model.

Cointegrating Eq:	CointEq1
D(GDP(-1),2)	1.000000
EXP01(-1)	-0.095912 (0.05522) [-1.73677]
D(LIA(-1),2)	1.881209 (0.99337) [-1.89376]
D(TAX(-1),2)	26.02291 (2.08690) [-12.4697]
C	3.100242
CointEq1	-0.910403

4.6. Impulse Response Function

To analyze the causal relationship between fiscal policy and the business cycle, variance decomposition functions and impulse response functions are constructed. These functions assist in analyzing the direct and indirect impacts of one factor’s shock on another. This enabled the author to properly comprehend their dynamic connection. The author used the Cholesky factor coefficient recommended by Sims (1980) to determine the system’s shocks.

Government spending volatility shocks result in an initial positive response to real GDP, which has a negative effect and is particularly pronounced in the first four periods.

This is explained by the fact that Vietnam is a developing nation; when the economy is strengthened with a sum of capital from government spending, production will increase and economic growth will be positively promoted. When spending outpaces production requirements starting in the sixth period, the GDP response slightly fluctuates over the long term.

The responsiveness of GDP to LIA shocks has continually reversed since the first phase. Government borrowing will increase the volatility of interest rates and can have crowding-out effects on the private sector. Therefore, fluctuations in government debt will have significant effects on economic growth as shown in the Figure 2.

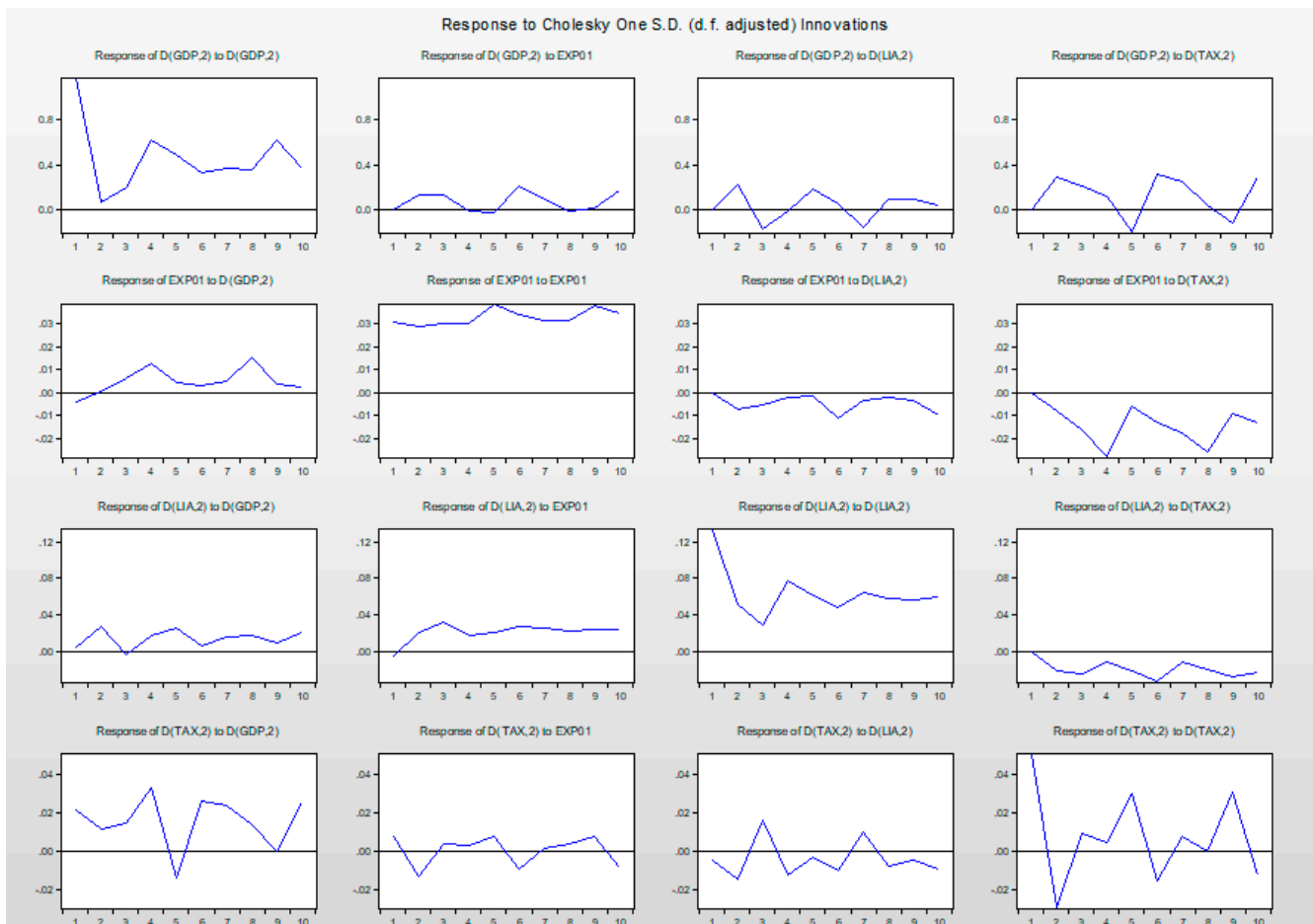


Figure 2. The Impulse Response function of EXP, TAX, LIA, and GDP.

Similarly, tax income is one of the indicators of the response of the economy to the state’s fiscal policies. Increasing tax income is not always conducive to economic growth.

When economic development slows, government spending decreases, and the government increases both public debt and tax collections to cover the deficit.

4.7. The Variance Decomposition

When forecasting varies in the VECM model, variance decomposition of error is used to distinguish between the contributions of the time series themselves and those made by other time series. The variance decomposition from Table 8 results is consistent with the impulse response function results and, more crucially, they establish the significance of fiscal policy considerations for the business cycle. Although the projected inaccuracy in GDP due to the variation of government expenditure EXP is approximately 3%, it has persisted over subsequent periods and has shown no evidence of diminishing. Government debt volatility reportedly exceeds 4% of GDP volatility. The impact of tax revenue on economic growth

is deemed considerable when it exceeds 10%. This is entirely consistent with Vietnam’s current fiscal policy, which continues to primarily rely on tax collection.

Table 8. Variance Decomposition of Variables.

Period	S.E.	D(GDP,2)	D(EXP,2)	D(LIA,2)	D(TAX,2)
1	1.168062	100.0000	0.000000	0.000000	0.000000
2	1.234664	89.86475	1.219998	3.437062	5.478193
3	1.285326	85.33336	2.133990	4.851632	7.681021
4	1.435247	87.50381	1.713810	3.900553	6.881831
5	1.540345	86.19089	1.503984	4.824023	7.481100
6	1.623455	81.89801	2.980262	4.469710	10.65202
7	1.692766	79.96287	3.068010	4.954812	12.01431
8	1.733458	80.53291	2.931953	5.006654	11.52849
9	1.846891	82.19460	2.592329	4.681548	10.53152
10	1.913499	80.25710	3.276754	4.415854	12.05029

4.8. Discussion

According to the study’s findings, fiscal policy in developing nations such as Vietnam tends to be pro-cyclical. During economic expansions, the government spends more on investments and social benefits, whereas during recessions, it reduces expenditure to reduce the budget deficit.

This finding is consistent with earlier studies, such as those by [Acemoglu et al. \(2013\)](#) and [Fatas and Mihov \(2013\)](#), who also discovered that fiscal policy in developing countries tends to be pro-cyclical. According to the study provided, developing nations lack stabilizing instruments, such as unemployment insurance and social benefits, which can make fiscal policy more procyclical. In addition, indirect taxes are more prevalent than direct taxes in developing nations, which contribute to the procyclical nature of fiscal policy.

Furthermore, this paper provides additional empirical evidence from Vietnam, one of the countries examined in [Bazzaoui and Nagayasu’s \(2021\)](#) study. Specifically, the author extends the analysis of the paper by evaluating the efficacy of fiscal policy in attaining economic stability and sustainable development, taking into account the challenges that globalization, financial integration, and technological change pose. In addition, they can analyze the distributive effects of fiscal policy on income inequality and poverty reduction, and provide policy recommendations for addressing these issues while promoting growth and macroeconomic stability.

The study also discovered that fiscal policy can have a significant impact on economic development in developing nations. Government spending volatility events have an initial positive impact on real GDP, but this impact diminishes over time, while government debt volatility has a significant impact on economic growth. In addition, the study indicates that increasing tax revenue is not always conducive to economic expansion.

Overall, the study’s findings suggest that fiscal policy in developing nations can have significant procyclical effects on the economic cycle. Therefore, policymakers in developing nations must be cognizant of the impact of their fiscal policies on the business cycle and should consider employing countercyclical policies to stabilize the economy during recessionary periods. This is a crucial issue for policymakers in developing nations, and additional research is required to better comprehend the relationship between fiscal policy and economic cycles in these nations.

5. Conclusions

This study analyzed the fiscal policy tool used during the examined period to determine that the premise that developed countries employ a countercyclical policy while developing countries follow a procyclical policy is entirely consistent with the empirical case in Vietnam. Consequently, fiscal policy in the majority of emerging nations was aligned with the business cycle over the studied period. Public spending, government debt, and

tax revenues were examined as possible contributors to the cyclical nature of fiscal policy. The results indicated that government spending positively varies with economic growth, as indicated by a positive regression coefficient, whereas government debt and tax revenue negatively change with economic growth, as indicated by a negative regression coefficient.

The fiscal policy of developing nations is aligned with the economic cycle, and the research findings are compatible with empirical studies of such nations. Vietnam is a developing country when the economic growth rate is positive; thus, it must boost production resources to keep up with the development momentum, and physical resources are crucial for the economy's expansion. They should instead transition into a condition of wealth accumulation, in contrast to the position of developed countries, which have excess potential.

In times of economic distress, credit constraints and the complexity of credit markets make it difficult or impossible for developing nations to attain adequate finance. The credit rating of Vietnam, which is already not very high, will be further constrained and put at a disadvantage when the economy enters a crisis. Therefore, the economy's access to credit will be restricted, and the government must reduce spending and impose a strict fiscal policy.

In developing countries such as Vietnam, the majority of a government's spending goes toward two categories of expenditures: salaries for government employees and investment costs. When the economy is in a recession and the government is compelled to reduce spending, it must choose between reducing investment and wages. Most governments will be compelled to reduce investments due to pressure. On the other hand, long-term government spending is closely tied to economic expansion. Without public projects, it is difficult for the government to sustainably raise taxes.

In fact, when the economy is in a recession, the trade-off between governments in developing countries lowering investment and implementing recurrent spending may lose the potential to stimulate future economic growth. When the economy is in a recession and the government is forced to implement contractionary fiscal policy, it should proceed with caution when deciding to reduce investment spending.

Vietnam, on the other hand, is a growing nation and will require a lot of capital as the economy expands in order to generate and develop. The government has an expansionary fiscal policy, but in order to support economic growth, it is important to concentrate on efficiency and investment. The government should avoid wasting investment capital by spreading out investments.

Current research on the relationship between Vietnam's fiscal policy and economic cycle primarily focuses on qualitative analysis and situational evaluation. In addition to evaluating the real conditions of Vietnam's fiscal policy and economic cycle over the past few years, this study also employed a quantitative model that spans a reasonably long length of time. The degree of interaction between variables increases in complexity as the level of economic and financial market development advances. Therefore, it is crucial for policymakers to conduct research that uses variables over an extended period of time because this will provide a new viewpoint and, perhaps, a more accurate representation of the situation. Finally, it can illuminate the appropriate selection of the most effective fiscal policy operating mechanisms for the expansion of the Vietnamese economy.

Moreover, the fiscal policies of developing nations and their economic cycle, including Vietnam, have been changed by the influence of the COVID-19 pandemic. Nonetheless, each nation's fiscal policy will be modified differently based on the impact of the COVID-19 pandemic and the nation's financial capacity. For instance, the study by [Nguyen and Nguyen \(2021\)](#) examined changes in Vietnamese fiscal policy during the onset of the COVID-19 pandemic. They discovered that the government's fiscal policy during the first six months of the pandemic was countercyclical, as it increased public expenditure and provided tax relief to support economic recovery. However, the study also noted that the government's fiscal policy reverted to a procyclical posture in the second half of 2020, as it prioritized fiscal consolidation in an effort to mitigate rising public debt and inflation risks,

which is consistent with the findings of the article indicating that many developing nations employ procyclical fiscal policies during economic downturns.

Vietnam is a country with an economy in which the market factor has yet to be firmly defined. This study provides significant empirical evidence that the research outcomes in Vietnam are compatible with the theoretical foundations and prior empirical studies on procyclical fiscal policies in developing nations. For instance, the result is consistent with previous studies on procyclical fiscal policies in developing countries (Acemoglu et al. 2013; Fatas and Mihov 2013). It is well known that developing nations lack stabilizing instruments such as unemployment insurance and social benefits, and that the majority of government expenditures consist of recurring costs, such as compensation. As a result, indirect taxes are more prevalent than direct taxes, and the contribution of the personal income tax to the government budget is minimal. Moreover, the study sheds light on the relationship between fiscal policy and the Vietnam business cycle. This research, however, is limited by the fact that its sample size is only over 21 years. This is due to the lack of sufficient accurate and complete data sources for extended data series in the accumulation of statistics regarding the government of Vietnam’s income and expenditures. Thus, this may have an impact on the results of the study model providing inappropriate policies.

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Data Availability Statement: The data will be available at request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Results of the Johansen Cointegration Test

Date: 12/11/22 Time: 21:22				
Sample (adjusted): 2000Q4 2021Q1				
Included observations: 82 after adjustments				
Trend assumption: Linear deterministic trend				
Series: EXP01 GDP LIA TAX				
Lags interval (in first differences): 1 to 2				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.257683	52.00129	47.85613	0.0194
At most 1	0.166278	27.56697	29.79707	0.0885
At most 2	0.096903	12.65486	15.49471	0.1281
At most 3 *	0.051053	4.296971	3.841466	0.0382
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.257683	24.43432	27.58434	0.1203
At most 1	0.166278	14.91212	21.13162	0.2951
At most 2	0.096903	8.357887	14.26460	0.3435
At most 3 *	0.051053	4.296971	3.841466	0.0382
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Unrestricted Cointegrating Coefficients (normalized by b*S11*b=I):				
EXP01	GDP	LIA	TAX	
-13.21485	-0.906969	-0.472622	13.80006	
5.894675	-0.789919	-0.258778	-6.508665	
-5.178532	0.057520	2.296019	5.455924	
3.284411	-0.052231	-3.318165	-1.136024	
Unrestricted Adjustment Coefficients (alpha):				
D(EXP01)	0.016795	-0.014777	-0.007865	-0.004060
D(GDP)	-0.030712	0.327034	-0.033985	-0.046028
D(LIA)	0.013964	0.006242	-0.009419	0.015624
D(TAX)	-0.001490	-0.010235	-0.015775	-0.003165
1 Cointegrating Equation(s):		Log likelihood	273.7085	
Normalized cointegrating coefficients (standard error in parentheses)				
EXP01	GDP	LIA	TAX	
1.000000	0.068633	0.035764	-1.044284	
	(0.01700)	(0.05911)	(0.03478)	
Adjustment coefficients (standard error in parentheses)				
D(EXP01)	-0.221947			
	(0.08653)			
D(GDP)	0.405856			
	(1.30239)			
D(LIA)	-0.184537			
	(0.12549)			
D(TAX)	0.019695			
	(0.09082)			
2 Cointegrating Equation(s):		Log likelihood	281.1646	
Normalized cointegrating coefficients (standard error in parentheses)				
EXP01	GDP	LIA	TAX	
1.000000	0.000000	0.008782	-1.064564	
		(0.06702)	(0.04174)	
0.000000	1.000000	0.393138	0.295483	
		(0.86026)	(0.53581)	
Adjustment coefficients (standard error in parentheses)				
D(EXP01)	-0.309051	-0.003560		
	(0.09134)	(0.00759)		
D(GDP)	2.333615	-0.230476		
	(1.31252)	(0.10910)		
D(LIA)	-0.147742	-0.017596		
	(0.13700)	(0.01139)		
D(TAX)	-0.040635	0.009436		
	(0.09790)	(0.00814)		
3 Cointegrating Equation(s):		Log likelihood	285.3435	
Normalized cointegrating coefficients (standard error in parentheses)				
EXP01	GDP	LIA	TAX	
1.000000	0.000000	0.000000	-1.064284	
			(0.02275)	
0.000000	1.000000	0.000000	0.308020	
			(0.32284)	
0.000000	0.000000	1.000000	-0.031890	
			(0.20586)	
Adjustment coefficients (standard error in parentheses)				
D(EXP01)	-0.268321	-0.004013	-0.022173	
	(0.09596)	(0.00752)	(0.01473)	
D(GDP)	2.509607	-0.232430	-0.148144	
	(1.39268)	(0.10911)	(0.21371)	
D(LIA)	-0.098967	-0.018138	-0.029840	
	(0.14450)	(0.01132)	(0.02217)	
D(TAX)	0.041055	0.008529	-0.032866	
	(0.09998)	(0.00783)	(0.01534)	

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