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## ARTÍCULO

# Twin Deficit or Current Account Target in Vietnam? An ARDL Approach

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### Jel Codes:

E62, F14, F30, H62

### Keywords:

Budget Deficit, Current Account Target, Trade Balance, Trade Defecit, Twin Deficit.

**Abstract:** The issue of budget deficits and trade balances has garnered significant interest from scholars and politicians. There are two primary perspectives concerning the correlation between budget and trade deficits. The Keynesian theory posits that the budget deficit is the primary catalyst for the trade imbalance. Conversely, the current account target theory posits that the budget deficit is a consequence of the trade imbalance. The objective of this study is to assess the accuracy of the Keynesian theory and the current account goal hypothesis in the context of Vietnam. This will be achieved by examining the correlation between budget deficits and trade deficits. Utilising data from 1991 to 2022, we employed the Autoregressive Distributed Lag (ARDL) method, Granger causality test, and impulse response analysis to validate that the trade balance has a unidirectional negative effect on the budget deficit. However, we did not find any statistical evidence indicating that the budget deficit has an impact on the trade balance. The findings validate the presence of the Current Account Target Hypothesis and bolster the Neo-classical perspective on the correlation between the trade balance and the budget deficit in Vietnam. Furthermore, we also examine the influence of income, economic openness, and the real exchange rate on the budget deficit. Based on the research findings, we suggest several policy implications to address the trade balance and budget deficit, with the aim of ensuring the long-term stability of the macroeconomy.

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<https://doi.org/10.32826/cude.v46i132.1213>

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## 1. Introduction

Over the past few decades, growing global competitiveness has disrupted trade and budget balances in developing economies that have lower levels of specialisation. As a result, twin deficits have emerged as a significant worry for policymakers and economies around the world. A trade imbalance arises when a nation purchases a greater quantity of products and services from abroad than it sells to other countries. One benefit of a trade imbalance is that it can enhance living standards by providing people with greater access to a diverse array of goods and services at more competitive rates. This can mitigate the danger of inflation by promoting lower pricing and generating additional job possibilities. Nevertheless, trade imbalances exert a detrimental influence on the economy. Continued trade deficits can frequently exert a negative impact on interest rates and exert downward pressure on a nation's currency, potentially resulting in inflation, capital outflows, the failure of local enterprises, increased unemployment, and related issues. The trade deficit indicates a need for enterprises to enhance their production and business capabilities in order to meet both domestic consumption demands and export requirements. Consequently, the government should enact financial policies to provide support to these businesses and create favourable conditions for their expansion. Furthermore, a trade deficit indicates a high savings rate in the country and a decrease in demand for goods, resulting in a slowdown and potential decline in economic growth. This indirectly leads to a reduction in budget revenue from income taxes and consumption taxes, exacerbating the budget deficit issue. Trade imbalances typically undermine the economy and diminish National Budget Revenue, resulting in a budget deficit. The simultaneous occurrence of trade deficit and budget deficit is sometimes referred to as the "twin deficit" situation (Mangala & Singla, 2023). Keynesian macroeconomic theory posits that the aggregate output of the economy, which represents the total income, is determined by many components including household consumption, company investment, expansion expenditure, government spending, and net exports (Keynes, 1983). If any measures are taken to decrease taxes or raise public expenditure, it will result in a budget deficit, diminished public savings, and subsequently a decline in national savings, given that the State Budget is currently in equilibrium. Inadequate domestic savings for investment create favourable circumstances for a surge of foreign direct investment (FDI) to enter the economy. This influx of FDI results in a decline in exchange rates, which in turn stimulates imports and reduces exports. Consequently, the trade deficit expands, exacerbating the current account balance situation (Tu Nguyen et al., 2022). In contrast, when the current account balance is in deficit, the economy must rely on resources obtained from foreign borrowing. When a nation accepts external assistance to enhance its economy, it encounters the potential danger of a fiscal shortfall (Zubdeh, 2021). When countries face an economic crisis, financial crisis, or solvency crisis due to a current account deficit that surpasses the acceptable limit, governments must allocate a significant portion of their budget to restore the financial system, enhance corporate governance, and counteract the recession (Tu Nguyen et al., 2022). Hence, the existing deficit in the current account hampers economic growth, resulting in an escalation of the state budget deficit. The correlation between the trade balance and the budget balance is referred to as a "twin deficit" scenario.

In emerging nations with open, small economies, whose economic growth relies heavily on direct foreign investment and other forms of capital inflows, the probability of experiencing a "twin deficit" is higher compared to other countries. If a country employs fiscal policy to achieve equilibrium in the current account balance, then in the event of a deficit in the current account balance, mostly caused by a trade deficit, the government will raise its spending while reducing tax collection. This will result in a deceleration of economic growth and an expansion of the budget deficit.

Countries that have a positive budget balance see significant economic growth. Surplus budget balances primarily enable countries to allocate funds towards industrial advancement, universal healthcare, advanced education, and other crucial components of the economy (Brender & Drazen, 2008). An optimal fiscal equilibrium enables nations to make more cost-effective choices for both current and future generations. The primary drawback experienced by the majority of developing nations is the constrained tax money generated from their citizens, necessitating the government to resort to borrowing and subsequently leading to a budget deficit. Njoroge et al. (2014) argue that reducing government expenditure is challenging due to its crucial role in sustaining the economy and its need to provide social services. Developing countries are distinguished by their limited investment activity, slow industrial advancement, and income disparity (Precious & Asrat, 2014). Consequently, the sources of budget revenues are restricted. The objective of these nations is to foster stable and sustainable development. Hence, it is imperative to closely oversee these two equilibriums in order to attain all-encompassing but enduring economic stability and expansion (Lawless et al., 2015).

The correlation between budget deficits and trade deficits has garnered significant scholarly interest and is a subject of controversy among economists and policymakers in both developed and developing nations (Suresh & Gautam, 2015). Vietnam is a compact and liberalised economy grappling with chronic budget imbalances characterised by deficits resulting from reduced tax receipts and substantial government expenditures. The budget deficit ratio consistently remains elevated, exceeding the 5% GDP barrier in numerous years and peaking at over 8% GDP in 2012. The average fiscal shortfall ratio for the 2011-2015 period stood at 6.1% of the Gross Domestic Product (GDP), thereafter declining to below 4% of GDP in the 2016-2019 period. Over the past decade, indirect tax has been the primary source of tax income, representing more than 35% of the Gross Domestic Product (GDP), whilst direct tax only contributes around 20% of the GDP. In addition, the percentage of revenue generated by import-export activities in relation to the overall state budget revenue declined from an average of 20.0% during the years 2006-2010 to 17.7% during the years 2011-2015, and further dropped to around 14.2% during the years 2016-2020. The budget's lack of sustainability arises from its heavy reliance on indirect taxes, as these levies can lead to distortions in domestic consumption levels by causing an increase in domestic prices. Government spending is primarily comprised of recurrent spending, which exceeds the government's overall budget income, leading to persistent budget deficits. A significant portion of the budget deficit is funded by the issuance of public debt or by implementing indirect tax hikes. Vietnam has had a remarkable transformation in its trade balance, shifting from consistent imports to continuous exports during the period of 2011-2020, with the exception of 2015. While there has

been an improvement in the trade balance over the previous decade, the growth of export items remains uncertain in the medium and long term, presenting numerous possible dangers. These hazards arise from trade imbalances with markets. In addition, excessive reliance on foreign direct investment (FDI) indicates the lack of competitiveness in the domestic economic sector, particularly when considering the export aspect. Excessive dependence on FDI (Foreign Direct Investment) can also expose exports to dangers, particularly in the face of significant external changes. Consequently, the nation's overall competitiveness and economic efficiency persist at a subpar level.

The economy will be negatively impacted by significant budget deficits, particularly due to the substantial tax burden that future generations will bear. The combination of significant budget deficits and unsustainable trade patterns is eroding the net foreign investment position. This is mostly due to the increased reliance on external borrowing, which is leading to macroeconomic imbalances and negatively impacting long-term economic growth prospects. Empirical studies examining the correlation between budget deficit and trade balance have yielded numerous findings that validate conflicting theoretical ideas. The existing empirical research in Viet Nam is inadequate to establish a durable relationship in both the short and long term. This study examines the correlation between the trade balance and the budget deficit in Vietnam. It does so by utilising an eclectic model that incorporates GDP per capita, real exchange rates, and the openness of the economy. The estimation is conducted using the ARDL-limited test method. The employed methodological framework will yield reliable projections for both the immediate and far future.

The empirical examination of the correlation between the trade deficit and the budget deficit has been a topic of disagreement. Does the trade deficit have an impact on the budget deficit, or is it the other way around? To what degree and by what means does the trade deficit impact the budget deficit? and the opposite is also true. The involved matters carry significant policy ramifications. If the primary cause of increasing trade deficits is truly the mounting fiscal deficits. In this scenario, policymakers may prioritise the reduction of budget deficits as a means to address the issue of trade deficits. In contrast, should the trade deficit lead to a budget deficit, authorities may need to enhance macroeconomic circumstances and promote trade in order to preserve the long-term viability of the budget.

The remaining portion of the article is structured in the following manner: Theoretical background is presented in Section 2. Section 3 of this paper provides a description of the methods used. Section 4 discusses the empirical findings of the study, while section 5 provides a conclusion and offers policy recommendations.

## 2. Literature Review

### 2.1. Theoretical Framework

The available resources or publications in the theoretical and empirical literature regarding the correlation between budget deficits and trade balances are many with conflicting views and findings. Anoruo and Ramchander (1998) assert that the "twin deficit" concept holds significant importance in economics due to its crucial role in fostering long-term economic growth and development. The twin deficit concept was initially examined in the United States during the 1980s when the nation

encountered trade and fiscal deficits. In the 1980s, wealthy countries like Sweden and Germany also started examining the validity of the twin deficit hypothesis, as noted by Baharumshah et al. (2006). The issue of the twin deficit concept then extends to developing nations. Contemporary economic literature presents four distinct approaches to explain this relationship, which are the Keynesian approach (twin deficit hypothesis), the Ricardian equivalence hypothesis, the twin divergence phenomenon (twin divergence hypothesis), and the Neo-classical view (current account targeting hypothesis).

### 2.2. Keynesian Approach

Based on the Keynesian method, namely Keynes's income-spending theory, an expansion of the budget deficit would lead to a rise in overall domestic spending ( $C + I + G$ ), resulting in an increase in domestic income. Rising income levels will lead to higher imports, thereby causing a decrease in trade surplus and/or an increase in trade deficit. Hence, a rise in the budget deficit will result in a corresponding increase in the current account/trade imbalance. Put simply, an expansion in the budget deficit resulting from government expenditure would result in a rise in the overall revenue of a country by encouraging greater levels of consumption and output. Rising gross domestic product results in a corresponding increase in the volume of imported goods and services. If exports remain unchanged, the trade deficit would correspond precisely to the budget deficit.

Keynes's open economy model attributes current account/trade deficits in high-capital mobility economies to budget deficits. Hence, the rise in governmental expenditure will diminish the level of domestic savings. The phenomenon of reduced saving serves as a cautionary signal to governmental agencies regarding the escalation of interest rates. Conversely, the government must incur debt in order to fund the budget deficit, resulting in elevated interest rates. The rise in interest rates garnered the interest of international investors and led to an influx of speculative capital into the nation. An influx of speculative capital leads to an expansion in the foreign currency reserves, resulting in an appreciation of the domestic currency. When the home currency has a higher value compared to the foreign currency, imports will have a lower price while domestic goods would have a higher price. Consequently, the expenses associated with importing would rise while the expenses associated with exporting will decline. Consequently, there will be an escalation in both the trade deficit and the current account deficit.

Considering all the points, Keynes's theory elucidates the correlation between current account/trade deficits and budget deficits through two mechanisms. There is an indication of a direct correlation between budget deficits and current account/trade deficits. Furthermore, it provides a clear elucidation of the cause-and-effect connection between them. Keynes' approach posits that budget deficits result in current account deficits. To clarify, the relationship between budget deficits and current account deficits indicates that budget deficits cause current account deficits.

#### 2.2.1. Ricardian Equivalence Hypothesis

Some economists who advocate for the Ricardian Equivalence Hypothesis (REH) reject the notion that a rise in the budget deficit caused by government expenditures has an impact on the trade deficit. REH posits that tax cuts causing a budget deficit will have no impact on the trade balance. When economic entities make decisions to spend

and save, they take into account a budget that spans their whole lifespan. Therefore, in an economy characterised by consistent public spending and absence of debt burden, even reductions in taxes will have no impact on savings levels. Due to their anticipation of higher future tax obligations, economic entities opt to save rather than increase their expenditures at present. Put simply, personal saving will align with the declining level of public expenditure. Given the stability of savings levels, the aforementioned mechanism will have no impact on the existing trade balance (Barro, 1989).

### 2.2.2. The Twin Divergence Phenomenon

Twin divergence refers to a separate body of economic research which proposes that budget deficits and current account/trade deficits, in contrast to twin deficits, can exhibit opposing movements (Baxter, 1995). Baxter (1995) contends that variations in output and the displacement of investment can significantly influence the budget balance and current account. As per the findings of Sakyi and Opoku (2016), a higher budget deficit will lead to a rise in domestic interest rates, which in turn will displace private investment and enhance private savings. This scenario results in a decline in overall demand and a positive development in the current account. Therefore, this scenario implies a reciprocal correlation between the budget deficit and the trade deficit, sometimes referred to as twin divergence.

Unlike a decline in overall demand, positive shocks in overall demand can also exhibit an inverse correlation with the current account (Baxter, 1995). An upsurge in aggregate demand during an economic boom will help reduce the budget deficit and enhance investment, therefore worsening the trade deficit. In their study, Kim and Roubini (2008) demonstrate that technology shocks in the United States during the period from 1995 to 2000 had a positive impact on investment and led to higher trade deficits, while simultaneously decreasing the budget balance.

### 2.2.3. Neo-classical View

According to the Neo-classical perspective, a decrease in the current account would result in a deceleration of economic growth, which would then lead to a reduction in the budget balance. The causal link in this instance arises from the current account deficit leading to the budget deficit (Magazzino, 2012). A nation that is facing financial problems and insolvency crises sometimes demonstrates these issues by having an enormous deficit in its current account or trade balance. Following the crisis, the country will see numerous challenges in public expenditure as it seeks to restore some financial indicators, enhance its governance structure, alleviate the recession, and address an escalating budget deficit. Therefore, we observe a unilateral correlation between the trade deficit and the budget deficit.

The term "Current Account Targeting" coined by Summers (1988) refers to this cause-and-effect relationship. Countries substantially dependent on foreign direct investment to stimulate their economies may encounter current account targeting. To clarify, significant capital inflows that necessitate substantial infrastructure will have a negative impact on government revenue (Marinho, 2008). Although budget deficits can lead to current account/trade deficits, there is a reciprocal relationship between the two, meaning that large reactions can cause a causal connection to occur in both directions (Kim, 2009).

### 2.2.4. Empirical Studies

Extensive empirical research has been conducted on the correlation between budget deficits and trade deficits, often known as current account deficits. Nevertheless, these studies exhibit significant variations in both affluent and developing nations, and the connection between them continues to be a subject of debate. Multiple studies provide evidence in favour of Keynes's theory of twin deficits, which states that budget deficits lead to trade balance deficits (Forte & Magazzino, 2013; Leachman & Francis, 2002; Miteza, 2012; Piersanti, 2000; Salvatore, 2006; Vamvoukas, 1999). Other writers have identified a causal relationship between a trade balance deficit or current account deficit and a budget deficit (Marinho, 2008; Sobrino, 2013). Furthermore, several investigations have discovered a reciprocal cause-and-effect connection between the two balances (Baharumshah et al., 2006; Ganchev, 2010; Mukhtar & Khan, 2016; Normandin, 1999). Additional research supports the notion of the Ricardian Equivalence Hypothesis, which posits a causal relationship between the two variables. This is evidenced by studies conducted by Enders and Lee (1990), Kaufmann et al. (2002), and Olanipekun (2012).

### 2.2.5. Studies Supporting the Keynesian Approach

In his study, Holmes et al. (2010) elucidates the correlation between budget deficits and current account deficits in the United States and presents empirical support for the existence of twin deficits. Vamvoukas (1999) examined the correlation between budget deficits and trade balance deficits in Greece's small open economy. The study utilised cointegration analysis, error correction modelling, and Granger's three-variable causality analysis. The investigation covered the time span from 1948 to 1994. The study's findings demonstrate the presence of both immediate and prolonged beneficial causal impacts of budget deficits on trade balance deficits. Kosteletou (2013) validated the presence of the twin deficit hypothesis in the southern Eurozone countries by analysing a portfolio model that included variables from the financial sector. Suliková et al. (2015) examined the causal connection between budget deficits and current account deficits in three small open Baltic countries, specifically Estonia, Latvia, and Lithuania, during the period from the first quarter of 1999 to the second quarter of 2011. The VECM was employed alongside cointegration analysis, Granger causality, and variance decomposition. The findings indicate a substantial and enduring positive correlation between budget balances and current account balances in Estonia and Lithuania. However, no such correlation has been identified in Latvia. Hussain et al. (2023) employ the ARDL model to assess the twin deficit hypothesis within the Pakistani context in recent research. The authors affirm the presence of the twin deficit hypothesis in Pakistan over a prolonged period, with a unidirectional causal link solely from the budget deficit to the trade balance. In their study conducted in India from 1978 to 2021, Mehta and Mallikarjun (2023) found compelling evidence of a substantial and lasting relationship between the current account and budget deficit, exchange rate, and trade openness. Their findings support the "twin deficit" hypothesis.

### 2.2.6. Studies supporting the Ricardian Equivalence Hypothesis

The core tenet of REH posits that an augmentation in the budget deficit will have no impact on aggregate savings, interest rates, price levels, and national income, and

hence will not influence the trade balance. The empirical research on budget deficits and trade balances offers a multitude of findings that provide support for the Rational Expectations Hypothesis (REH). [Kim & Kim \(2006\)](#) examined the potential causal connection between the budget balance and the current account in Korea by employing the non-causal Granger technique from 1970 to 2003. No evidence of a causal link was discovered. [Hashemzadeh and Wilson \(2006\)](#) have demonstrated, using an empirical model, that there is no causal relationship between the state budget deficit and the current account deficit in Egypt, Iran, Morocco, Syria, Nigeria, Tunisia, and Bahrain during the period of 1977 - 2003. Similarly, [Gabrisch \(2015\)](#) conducted a thorough research on the influence of budget deficits on current account deficits in three post-transition countries: the Czech Republic, Hungary, and Poland. This analysis involved the use of cointegration analysis and Granger causality analysis. The findings invalidated the twin deficit hypothesis. [Ncanywa and Letsoalo \(2019\)](#) investigated the empirical correlation between budget deficit and trade deficit in South Africa during the post-apartheid era, utilising time series data spanning from 1994 to 2016. The ARDL approach was employed and verified the presence of a substantial and favourable correlation between the budget deficit and the short-term trade deficit. Over time, the Ricardian Equivalence Hypothesis finds support in South Africa. [Magazzino \(2012\)](#) examined the correlation between trade balance and public budget in ASEAN countries. A long-term correlation has been shown between current account balances and net lending in both ASEAN-6 and ASEAN-10 countries, based on annual data from 1980 to 2012 in the 10 member countries. The Granger causal analysis demonstrates that the Ricardian Equivalence Hypothesis is the prevailing theory in the South Asian region.

### 2.2.7. Studies Support the Twin Divergence Phenomenon.

[Kim and Roubini \(2008\)](#) examined the influence of government deficit shocks on the current account balance of the United States by employing the VAR model. The projected findings indicate that the expansionary budget shock had a positive impact on the US current account balance, which has been referred to as the "twin divergence phenomenon". They advocated that a rise in personal savings and a decline in personal investment would lead to a positive impact on the current account. In contrast, the devaluation of the nominal exchange rate, rather than the change in comparable prices, is the primary factor behind the devaluation of the real exchange rate. Furthermore, they provide a rationale for the "twin divergence phenomenon" by citing the high occurrence of output shocks caused by fiscal spending. [Cardoso and Domenech \(2011\)](#) investigated the effects of different expansionary fiscal policies on Spain's trade deficit using a comprehensive dynamic balancing model. The results indicate that implementing expansionary fiscal policies has a detrimental effect on trade deficits, therefore providing support for the twin divergence hypothesis. They propose that it could be attributed to the substantial output shock that offsets the effects of fiscal expansion policies and substantial alterations in consumption and saving models within the economy.

[Obadić et al. \(2014\)](#) provided an alternative explanation for the occurrence of twin divergence by examining the correlation between budget deficits and trade deficits in four rising European nations, namely Bulgaria, Croatia, Poland, and Romania, during the period from 1999(Q1) to 2011(Q4). These findings have verified the presence of twin divergence. They assert that nations with tax systems

focused on indirect taxes have enhanced their trade surpluses, leading to decreased post-tax earnings and hence higher budget deficits.

In their 2020 study, Bilman and Karaođlan investigate the significance of the twin deficit theory in 25 chosen OECD nations. They analyse annual data from 2005 to 2016 and focus on the various regimes of real interest rates. Studies indicate that there is a complex connection between the budget deficit and the trade balance, which is influenced by the crucial threshold of real interest rates. The data indicate that the twin deficit theory holds true only under the condition of a low real interest rate mechanism. Specifically, when real interest rates fall below a certain threshold, an increase in the budget deficit results in a decline in the trade balance. When the focus is on the high real interest rate regime (i.e. above a certain level), an increasing budget deficit will result in a positive change in the trade balance, in line with the dual divergence hypothesis.

### 2.2.8. Studies Supporting the Neo-Classical View

Empirical evidence, such as the research conducted by [Saysombath and Kyophilavong \(2013\)](#) in Saudi Arabia and [Anoruo & Ramchander \(1998\)](#) for Asian nations, supports the notion that there is a unilateral influence from the trade balance on the budget deficit. [Marinho \(2008\)](#) examined the relationship between Egypt's budget deficit and the current account imbalance by employing cointegration analysis and the Granger causality test. The analysis disproves the twin deficit theory by establishing an inverse Granger causation, indicating that external trade deficits cause budget deficits. [Anoruo and Ramchander \(1998\)](#) employ time series multivariate data analysis to examine the contentious concept of the "twin deficit" in Asian developing nations, specifically India, Indonesia, Korea, Malaysia, and the Philippines. The analysis of Granger causality on a VAR model using various intermediary variables, which are known to influence the trade deficit, reveals that, based on the findings, it is the trade deficit that leads to the fiscal deficit, rather than the reverse (with the exception of Malaysia, where a two-way relationship is observed). In a recent study, [Helmy \(2018\)](#) examined the causal connection between Egypt's budget balance and trade deficit by employing the VAR model and the VECM model. Estimates indicate the absence of a cointegration relationship between the budget deficit and the trade balance. The VAR model is employed to investigate the unilateral causal relationship that demonstrates the direction of causality from the trade deficit to the fiscal deficit.

Various studies have examined the correlation between trade balance and budget deficit, but there are still significant discrepancies in the findings. Moreover, research on this topic in Vietnam has not been given sufficient attention ([Magazzino, 2012](#)). Several studies conducted in Vietnam have short research durations, typically less than 10 years, which raises issues regarding the trustworthiness of regression results obtained using time series models. Furthermore, prior research conducted in Vietnam has predominantly concentrated on the correlation between two primary factors, namely the trade deficit and the budget deficit, without accounting for the impact of intermediary variables such as exchange rates or the level of economic openness. These intermediary factors can potentially influence the attraction of foreign capital or the demand for imported goods based on income levels. The research gap remains significant, necessitating further investigation into the relationship between the trade deficit and the budget deficit. This research aims to

assess the influence of the trade deficit on the budget deficit, ultimately offering financial policy remedies to enhance the trade balance and diminish the budget deficit.

### 3. Methodology

#### 3.1. Model

The investment-savings relationship and national income determine the twin deficit according to the Keynesian view of an open economy (Banday, 2021; Fidrmuc, 2003; Kormendi, 1983):

$$Y = C + I + G + NX \quad (1)$$

In which,  $Y$  is national income,  $C$  is consumption,  $I$  is investment,  $G$  is government spending and  $NX = X - M$  is net export of goods and services.

Equation (1) can be rewritten as disposable income (after taxes) with private savings ( $S_p$ ) and consumption as follows:  $S_p + (T - G) = I + NX$  (2)

Equation (2) can be rearranged as follows:

$$(T - G) + (S_p - I) = (X - M) \quad (3)$$

This simply says that the trade balance is defined as private savings minus investment plus the budget balance. Assuming that the gap between private sector savings and investment (savings investment gap) is stable, the increased budget deficit will lead to an increased current account deficit. This is called the "twin deficit" relationship.

Equation (1) can also be rearranged to link the flows of capital, consumption, savings, and investment:

$$I + (X - M) = Y - C - G \quad (4)$$

Where  $Y - C - G$  represents national savings ( $S$ ) including Private Savings ( $s_p = Y - T - C$ ) and Government Savings ( $S_g = T - G$ ). Rewrite Equation (4), we have:

$$X - M = S - I \quad (5)$$

Equation (5) demonstrates that the disparity between national savings and domestic investment ( $S - I$ ) is equivalent to net exports ( $NX = X - M$ ). The disparity between exports and imports, whether positive or negative, must be balanced by the capital movements of the economy, either inflows or outflows. Equation (5) demonstrates the correlation between capital flows between the two economies and net exports ( $NX$ ), which is sometimes referred to as the trade balance. When net exports ( $NX$ ) are positive, or the trade balance is in excess, there is an inflow of capital, indicating that national savings exceed domestic investment ( $S > I$ ). National savings consist of private savings ( $Y - T - C$ ) and government savings ( $T - G$ ). Increased national saving indicates a situation where the state budget has a surplus or a decrease in the budget deficit. In contrast, when there are negative net exports, trade balance deficits, and net capital inflows, it results in national savings being lower than domestic investment ( $S < I$ ), which indicates a budget deficit ( $T < G$ ). This relationship can be reciprocal. When there are budget deficits ( $T < G$ ), the total amount of national savings (which includes private savings ( $Y - T - C$ ) and government savings ( $T - G$ )) will be less than the amount of domestic investment ( $S < I$ ). As a result, there will be negative net exports and net inflows, and the opposite is also true.

Equation (5) demonstrates the direct impact of the trade balance on private and government savings ( $T - G$ ) and vice versa. According to the Keynesian perspective, an expansion in fiscal deficits resulting from increased government expenditure leads to a trade imbalance. Similarly, a trade deficit also results in a deficit in the government's budget balance. The causal relationship

between the trade balance and the budget balance, as depicted in Equations (3) and (5), is expressed in Equation (6).

Equation (6) represents the relationship between budget deficit ( $BG$ ), trade balance ( $NX$ ), and national income ( $Y$ ) (Ahmed, 2020; Bhat & Sharma, 2021; Mallick et al., 2021; Mohanty, 2019; Nautiyal et al., 2023).

$$BG_t = f(NX_t, Y_t) \quad (6)$$

In which,  $BG$  is the budget deficit at time  $t$ ,  $NX$  is the trade balance at time  $t$  and  $Y$  is the real GDP at time  $t$ .

#### Exchange rates

The Mundell-Fleming model elucidates the relationship between the budget deficit and the trade balance. This model elucidates the relationship between budget deficits, which result in higher domestic interest rates, and the subsequent increase in capital inflows and exchange rates (Bilgili et al., 2022; Mundell, 1992). Consequently, this will affect the balance of payments by reducing the cost of imported commodities and increasing the price of exporting ones. According to Feldstein (1986), the trade imbalance will shrink under a flexible exchange rate regime. Furthermore, within a fixed exchange rate system, fiscal deficits resulting from expansionary fiscal policies lead to an increase in real incomes and inflation, hence exacerbating the trade balance.

The equation (6) is modified by introducing the exchange rate variable to account for the influence of exchange rate fluctuations on the connection between trade balance and budget deficit (Ahmed, 2020; Bhat & Sharma, 2021; Feldstein, 1986; Mohanty, 2019).

$$BG_t = f(NX_t, Y_t, ER_t) \quad (7)$$

In which  $ER$  is the real exchange rate at time  $t$ .

#### 3.2. Economic Openness

The economy's level of openness has a direct impact on both the budget deficit and the trade balance. The "compensation hypothesis" posited by Rodrik (2008) suggests that open economies allocate greater resources to safeguard local sectors against trade, investment, and foreign market disturbances (Benarroch & Pandey, 2017; Dixit, 2015; Ngueta et al., 2023). Free trade and investment policies will result in a rise in government spending, thereby leading to an increase in the budget deficit. The study conducted by Abbas and Nawaz (2023) has revealed that openness has a substantial adverse economic effect on several developing and less-developed economies. Furthermore, the implementation of free trade and investment policies will result in a surplus in the trade balance (Al-Yousif, 2002; Wani & Mir, 2021).

By adding the economy's openness to Equation (7), we get Equation (8) as follows:

$$BG_t = f(NX_t, Y_t, ER_t, OPEN_t) \quad (8)$$

With  $OPEN$  is the openness degree of the economy at time  $t$ .

#### 3.3. Data

Data for this study were collected from World Bank Development Indicators (WDI), IMF's International Financial Statistics (IFS), Penn World Table Database (PWT), and the Vietnam General Statistics Office (GSO) with an annual frequency between 1991 and 2022. We focus on the connection between the trade balance and the budget deficit as well as the influencing factors. Thus, the series of variables collected include the trade balance (% of GDP), budget deficit (% of GDP), GDP per capita at the 2010 fixed price (USD/person), the openness of the economy, and the real exchange rate. The definition and description of the variable are presented in Table 1.

Table 1: Description of Research Variables.

Variable Name	Symbol	Measured	Source
Budget deficit	BG	(Total State Budget Spending - Total State Budget Revenue)/GDP (%)	GSO
Trade Balance	NX	(Export-Import)/GDP (%)	WDI
Income	lnY	Natural logarithm of GDP per capita at a constant price in 2010 (USD/person)	WDI
Openness	OPEN	Openness at 2005 constant prices (%) for Vietnam	PWT
Real Exchange Rates	ER	ER (USD/VND) = USD/VND nominal rate * CPI <sub>US</sub> / CPI <sub>VN</sub>	IMF

Source: Authors

### 3.4. Method

#### 3.4.1. Unit Root Test

The presence of a stationary or non-stationary component in a time series data can significantly impact the characteristics and dynamics of the variable. Consequently, employing traditional linear regression on non-stationary series can produce misleading regression outcomes. Consequently, it is essential to conduct stationarity testing prior to analysing the correlation between time-dependent data series. Various techniques exist to assess the stationarity of a time series, such as the DF test, the ADF test, and the Ng-Perron test. This study employs the Phillips-Perron unit root test and the KPSS stationarity test.

#### 3.3.2. Test for Cointegration

The ARDL envelope cointegration test is more advantageous than other conventional methods due to its applicability to small sample sizes and its ability to produce unbiased estimation results even when the variables in the model exhibit varying levels of stationarity, such as I(0), I(1), or a combination of both (Pesaran, 2007). Hence, in this work, we employ the ARDL cointegration test methodology (Pesaran, 2007).

The Unrestricted Error Correction Model (UECM) is utilised in the ARDL model to analyse the correlation between the trade balance and the budget deficit.

$$\Delta BG_t = \beta_0 + \sum_{i=1}^{n1} \beta_{1i} \Delta BG_{t-i} + \sum_{i=0}^{n2} \beta_{2i} \Delta NX_{t-i} + \sum_{i=0}^{n3} \beta_{3i} \Delta OPEN_{t-i} + \sum_{i=0}^{n4} \beta_{4i} \Delta LNY_{t-i} + \sum_{i=0}^{n5} \beta_{5i} \Delta ER_{t-i} + \theta_0 BG_{t-1} + \theta_1 NX_{t-1} + \theta_2 OPEN_{t-1} + \theta_3 LNY_{t-1} + \theta_4 ER_{t-1} + \varepsilon_t \quad (9)$$

The 1st order differential operator is denoted as  $\Delta$ . The constant  $\beta_0$  and the coefficients  $\theta$  indicate the long-run relationship, while the short-run relationship is expressed by the  $\beta_{ji}$ . The lag for the ARDL model is determined by selecting the minimal value of the Akaike information criterion (AIC). The hypothesis posits that variables without a cointegrating relationship will be rejected if the F-test value, with the null hypothesis (H0) stating that the coefficients are concurrently equal to 0 (F-statistic), exceeds the upper bound value as determined by Pesaran (2007). If the F-statistic is below the lower bound value, it indicates that the variables are not cointegrating. If the F-statistic falls between the two bound values, it is uncertain if there is a cointegrating relationship.

#### 3.3.3. Estimates using the Autoregressive Distributed Lag (ARDL) model.

The cointegrating test findings also provide estimates for the coefficients that represent the link in both the short and long run.

If there is a cointegrating relationship between the variables, the coefficient of the long-run relationship between variable  $Z$  and  $BG$  is defined by the negative ratio between the estimated coefficient of variable  $Z_{t-1}$  and the estimated coefficient of variable  $BG_{t-1}$ . The long-term equation of the variables can be expressed as follows:

$$BG = c + b_1 NX + b_2 OPEN + b_3 LNY + b_4 ER + v_t \quad (10)$$

Then  $b_z = -\theta_z/\theta_0$  for  $z = 1; 2; 3; 4$  respectively.

Then the estimation equation for the short-term relationship will be expressed as follows:

$$\begin{aligned} \Delta BG &= \beta_0^S + \sum_{i=1}^{n1} \beta_{1i}^S \Delta BG_{t-i} + \sum_{i=0}^{n2} \beta_{2i}^S \Delta NX_{t-i} \\ &+ \sum_{i=0}^{n3} \beta_{3i}^S \Delta OPEN_{t-i} + \sum_{i=0}^{n4} \beta_{4i}^S \Delta LNY_{t-i} + \sum_{i=0}^{n5} \beta_{5i}^S \Delta ER_{t-i} \\ &+ \gamma^S EC_{t-1} + \varepsilon_t^S \end{aligned} \quad (11)$$

The term  $EC_{t-1}$  represents the error correction term, which refers to the adjustment process that corrects deviations from long-term equilibrium. On the other hand,  $\gamma^S$  represents the speed at which variables adjust in the short-term to return to the long-term equilibrium. The computed coefficient  $\gamma^S$  of EC should have a negative value, be less than 1, and possess statistical significance. To assess the model's appropriateness and reliability over both short and long periods, various tests are conducted. These tests include examining the normal distribution, autocorrelation, and heteroscedasticity of residuals, as well as performing the RESET test, cumulative sum test (CUSUM), and cumulative sum of squares test (CUSUMSQ).

#### 3.3.4. Granger Causality Test and Impulse Response Analysis

In the relevant literature, Granger standard testing (Granger, 1969) has traditionally been employed to analyse the causal link between two variables. This experiment establishes that if the previous values of one variable  $X_2$  make a significant contribution to predicting the value of another variable  $X_1$ , then  $X_2$  is the Granger cause of  $X_1$ , and vice versa. The notion of Granger causality does not pertain to the potential for an immediate link between  $X_2$  and  $X_1$ . The regression-based tests for stationary series  $X_1$  and  $X_2$  are as described in Granger (1969) work.

$$\begin{aligned} X_{1t} &= \delta_1 + \sum_{i=1}^p a_i X_{1t-i} + \sum_{i=1}^p b_i X_{2t-i} + u_{1t} \\ X_{2t} &= \delta_2 + \sum_{i=1}^p c_i X_{1t-i} + \sum_{i=1}^p d_i X_{2t-i} + u_{2t} \end{aligned}$$

The given equation includes two constant terms,  $\delta_1$  and  $\delta_2$ , as well as two white noise sequences,  $u_{1t}$  and  $u_{2t}$ . The variable  $p$  denotes the latency order. The Fisher test is employed to assess whether all coefficients  $b_i$  are zero to investigate the absence of Granger causation between variable  $X_2$  and variable  $X_1$ . Similarly, the basic causal model presented in (1) suggests that  $X_1$  is a Granger cause of  $X_2$  if there exists a non-zero value  $c_i$ .

To accomplish our research goals, we conduct a Granger causality test on the VECM model, in addition to the ARDL estimate. This test is performed to determine if there is a causal relationship between the budget deficit and the trade balance, and to ascertain the direction of this causal association.

The VECM model enables us to compute the impulse response of variables. Impulse response analysis provides insights into the influence of specific variables, including their delayed values, on a particular variable. This helps to elucidate the feedback mechanism in the interaction between the two variables under consideration.

## 4. Results and Discussions

### 4.1. Descriptive Statistics

Descriptive statistics of variables in the research model are presented in Table 2. During the 1991 - 2022 research period, Vietnam's average budget deficit stood at 4.476% of GDP, of which the deficit was the highest in 2013 with a deficit of up to 6.606% of GDP and the lowest in 1991 at 2.369% of GDP. Along with that, the trade balance was also in deficit for the whole period, with an average of 3.730% of GDP. The trade balance surged mainly in the period 2012 - 2022, with the highest surplus accounting for 5.611% of GDP in 2019. Meanwhile, in the period 1991 - 2011, Vietnam's trade was always in a state of deficit, the trade balance was constantly in deficit. The largest trade deficit amounted to -13.644% of GDP in 2008 under the impact of the global financial crisis.

Table 2: Descriptive Statistics.

	BG	NX	OPEN	Y	ER
Mean	4.476	-3.730	124.799	1867.937	20223.710
Median	4.606	-3.445	127.988	1714.341	18982.140
Maximum	6.606	5.611	186.468	3655.463	30073.330
Minimum	2.369	-13.644	66.212	698.430	15983.810
Std. Dev.	1.171	6.028	32.964	890.171	3719.900
Skewness	0.115	-0.040	-0.150	0.487	0.659
Kurtosis	2.171	1.797	2.193	2.034	2.589
Jarque-Bera	0.987	1.937	0.988	2.510	2.539
Probability	0.611	0.380	0.610	0.285	0.281
Observations	32	32	32	32	32

Source: Authors

The openness of Vietnam's economy in the period 1991 - 2022 is at an average of 124.799%, of which, the highest opening level is in 2021 (186.468%) and the lowest is in 1993 (66.212). The per capita income at the fixed price in 2005 of our country averaged 1867.937 USD/person/year for more than 30 years. The average income per capita reaches the highest level of 3655.463 USD/person/year in 2022 and the lowest is in 1991 with an income of 698.430 USD/person/year. Thus, Vietnam has had outstanding economic growth. Over the past 30 years, Vietnam's per capita income has increased more than 5 times, bringing Vietnam from a low-income country to a middle-income country. Finally, the bilateral real exchange rate between VND and USD was at an average of 20223.710 during the research period, VND lost its real value compared to the USD at its highest in 1991 with a real exchange rate of 30073.330. Although the nominal USD/VND exchange rate in 1991 only reached 10121.893, however, due to Vietnam's inflation rate

Table 4: Results of Cointegration Test.

k	F-Statistics	Critical value (F-Critical)							
		90%		95%		97,50%		99%	
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
4	3.381*	2.2	3.09	2.56	3.49	2.88	3.87	3.29	4.37

Note: \*\*\* represents a significance level of 10%

To assess the stability of the estimation findings, it is essential to examine the  $t$ -statistic value of the regression coefficient  $\theta_0$  associated with the variable  $BG_{t-1}$ , as

(81.8% in 1991, up from 36% in 1990), at a much higher rate than US inflation (4.2% in 1991, down from 5.4% in 1990), so the real value of VND has seriously decreased. In contrast, VND had its highest real value in 2014, with the real exchange rate at 15983.810, while the nominal exchange rate was at 21148. Also in this year, Vietnam's inflation was at 4.1%, down 2.5% compared to 2013, however, inflation in the US increased from 1.5% in 2013 to 1.6% in 2014, so the dollar depreciated and the VND to the real price.

### 4.2. Results of Unit Root Test

The first step in time series analysis is to determine the order of integration of the variable series. This also ensures that the input data series satisfies the requirements of an ARDL cointegration test and that there is no second-order integrated series. This study uses the Phillips-Perron unit root test and the KPSS stationarity test.

Table 3: Results of Unit Root Test.

Variable	Phillip-Perron	KPSS	Conclusion
BG	-3.443**	0.162	I (0)
NX	-1.566	0.498**	I (1)
OPEN	-0.822	0.687**	I (1)
LNY	-2.854*	0.753***	I (1)
ER	-0.652	0.732**	I (1)
$\Delta$ BG	-7.860***	0.332	
$\Delta$ NX	-7.532***	0.500**	
$\Delta$ OPEN	-5.779***	0.117	
$\Delta$ LNY	-3.018**	0.306	
$\Delta$ ER	-3.938***	0.076	

Note: The \*, \*\* and \*\*\* indicate a significance of 10%, 5% and 1%, respectively.

The results in Table 3 show that null hypothesis that there is a unit root for the level cannot be rejected at the 5% significance level by the PP test for the series NX, OPEN, LNY, ER, while the null hypothesis that the series is stationary is rejected by the KPSS test. Particularly, with BG, null hypothesis is rejected with the PP test and accepted in the KPSS test. Therefore, the BG is stationary at the level. With first-order difference of variables, the results at both PP and KPSS tests showed that all the first-order difference series were stationary. Thus, the NX, OPEN, LNY, and ER are I (1), while the BG is I (0). No variable is I (2), which satisfies the condition of the ARDL model.

### 4.3. Results of the Cointegration Test

To perform the ARDL cointegration test, we first determine the optimal lag structure of the system according to the AIC standard because it has superior performance in the small sample. The cointegration test results shown in Table 4 show that the statistical value F is greater than the upper value at a significance level of 10%. Therefore, there exists a cointegration relationship between variables in the model.

suggested by (Pesaran, 2007). If the magnitude of the  $t$ -statistic exceeds the magnitude of the upper bound value of the variable (as referenced in Pesaran (2007), pp. 303-



304), then it confirms the cointegration results presented in Table 3. The calculated T-statistic is 3.401689, above the upper bound of the dependent variable at 10% which is 3.09. This confirms the presence of cointegration between the variables.

#### 4.4. ARDL Estimation Results

We estimate the ARDL model (1,2,2,1,1) with the optimal lag selected according to the AIC standard, the results are shown in Table 5.

Table 5: ARDL Estimation Results.

A - Long-run elasticities				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NX	-0.302*	0.173	-1.739	0.099
OPEN	-0.018	0.050	-0.366	0.719
LNY	-11.766	8.637	-1.362	0.190
ER	0.002*	0.001	1.960	0.066
C	69.483	47.567	1.461	0.161
EC = BG - (-0.3017*NX -0.0182*OPEN -11.7659*LNY + 0.0016*ER + 69.4826)				
B - Short-run elasticities				
$\Delta NX$	-0.144***	0.042	-3.407	0.003
$\Delta NX (-1)$	0.132***	0.038	3.500	0.003
$\Delta OPEN$	-0.062***	0.016	-3.928	0.001
$\Delta OPEN (-1)$	0.044**	0.019	2.263	0.036
$\Delta LNY$	-25.492***	6.700	-3.805	0.001
$\Delta ER$	-0.0002	0.000	-0.739	0.470
EC (-1)*	-0.464***	0.091	-5.091	0.000
C - Diagnostic tests				
R <sup>2</sup>	0.687			
Adjusted-R <sup>2</sup>	0.495			
F-Statistic	3.588***	(0.008)		
$\chi^2_{NORMAL}$	0.982	(0.612)		
$\chi^2_{SERIAL}$	2.050	(0.161)		
$\chi^2_{ARCH}$	0.771	(0.388)		
$\chi^2_{RESET}$	1.704	(0.107)		

Note: \*, \*\* and \*\*\* represent significance levels of 10%, 5% and 1%, respectively.

The results in Table 5 show that the trade balance has a negative impact on the budget deficit (or the trade balance has a positive impact on the budget balance) in both the short and long term. A 1% increase in the trade balance (trade balance surplus) contributes to a reduction in the budget deficit of 0.012% in the short term and 0.302% in the long term. This result is consistent with the findings of (Alkhatib & Al-Towajjari, 1999), for Saudi Arabia, (Anoruo & Ramchander, 1998), in Asian countries, (Baharumshah et al., 2006) in Indonesia, (Hashemzadeh & Wilson, 2006) for Syria and Yemen.

Trade balance is a factor that strongly affects each country's macroeconomics. The trade balance represents the level of investment, income, and savings of a country. If the trade balance is surplus, it is a signal that the level of investment accounts for a larger proportion than the savings rate, and at the same time, increased income of workers shows improved living standards and increased investment leads to increased economic growth. The surplus trade balance also shows that the economy has good production capacity, growing trade, and attracting capital inflows, thereby contributing to economic growth. This, in turn, increases revenue for the state budget, reduces the budget deficit, and improves the budget balance. However, if the trade balance is in deficit, it shows that the country's savings rate is large, and the demand for goods tends to decrease, this then slows down economic growth, indirectly reducing budget revenue from income taxes and consumption taxes. In addition, the trade balance deficit also shows that the production and business process of the business is limited, it needs to be improved to be able to meet the needs of domestic use and export standards. At that time, the Government needs to implement an expanded fiscal policy (tax reduction, increase in government spending) to support businesses to ensure that businesses have profitable conditions for development. The increase in spending to stimulate the economy and improve the trade balance along with the reduction in revenue from taxes exacerbates the budget

deficit. This is consistent with the reality in Vietnam, when during the period from 1991 to 2022, Vietnam often had a trade deficit with an average value of -3,730% of GDP, along with a budget deficit average during this period in Vietnam was -4,476% of GDP.

Regarding the impact of control variables, the openness of the economy and income negatively impact the budget deficit in the short term, but no statistical evidence of the impact in the long term was found. In terms of economic significance, the real exchange rate has a negative impact on the budget deficit in the short term but no statistical significance has been found. In contrast, in the long run, we find statistical evidence of the positive impact of real exchange rates on budget deficits.

The more the economy grows, the higher the income, investment, and consumption will increase accordingly. This is a condition for a greater level of revenue mobilization for the state budget through income and consumption taxes. A growing economy also limits government overspending during recessions to revive the economy. Therefore, the higher the income, the better the budget balance, and the lower the budget deficit.

Along with development and growth, the openness of the economy also has a positive impact on the budget balance, reducing the deficit. Opening up the economy helps us to take advantage of our comparative advantages and those of other countries. A developing country like Vietnam will learn many modern techniques and technologies as well as advanced production processes and high-level management skills in developed countries. Since then, domestic production has achieved higher efficiency, promoted economic growth and improving revenue for the state budget. Opening up for integration also means attracting foreign investment more easily, supplementing capital for the country's economic development, which is a condition to improve the government's budget balance. In addition, the higher the degree of openness, the increased competitiveness forces domestic enterprises to regularly innovate to access the vast international market. The more

international trade develops, it is a condition for increasing the trade balance surplus, indirectly affecting the budget balance surplus, and reducing the budget deficit.

The higher the real exchange rate, the lower the value of the local currency, which has a negative impact on the trade balance in the short term but has a positive impact in the long term under the J-curve effect. These effects on the trade balance will entail a spillover effect on the budget balance in the same direction. In addition, the

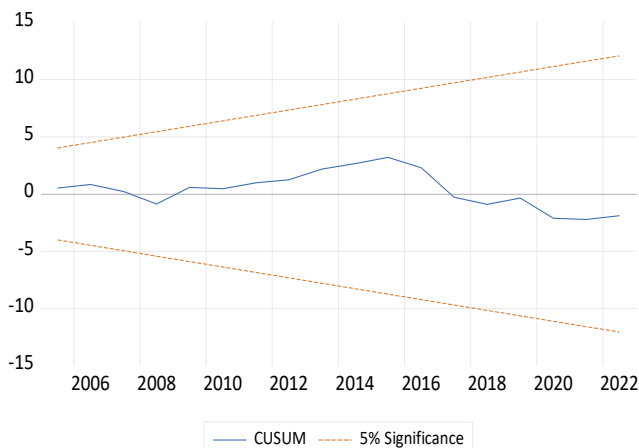


Figure 1: CUSUM and CUSUMSQ Statistic Plot.

Subsequently, a battery of diagnostic tests was conducted on the ARDL model, and the model successfully cleared all diagnostic tests (refer to section C of Table 5). Our analysis revealed that the residue follows a normal distribution and there is no autocorrelation observed at the secondary level. In addition, we did not discover any indication of the ARCH effect (Autoregressive Conditional Heteroskedasticity) in relation to the variability of residuals in the model. The Ramsey RESET test confirms that the model is accurately defined. The CUSUM and CUSUMSQ statistics exhibit fluctuations within the normal 5% threshold, indicating that the calculated parameters remain both accurate and stable over time (Figure 1).

Table 6: Results of Granger Causality Test.

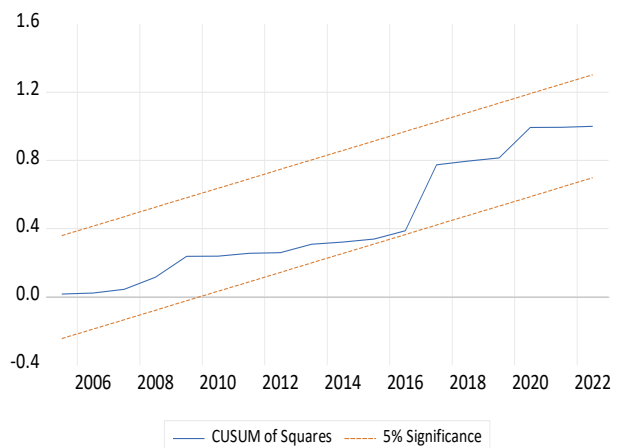
Dependent Variable	Independent Variable	BG	NX	OPEN	LNLY	ER
BG			0.024	0.650	0.296	0.666
NX		4.566**		0.004	0.279	2.307
OPEN		6.255**	0.001		0.078	7.767***
LNLY		0.384	0.022	0.008		0.155
ER		0.350	0.002	0.487	5.341**	
ALL		9.140*	0.039	0.956	7.071	8.434*

Note: \*, \*\*, and \*\*\* represent statistical significance levels of 10%, 5%, and 1%, respectively.

#### 4.6. Impulse Response Analysis

To examine the response of the budget deficit to the trade balance and vice versa, we report the impulse response function with the bootstrap method of 1000 iterations and a 95% confidence level. The results are shown in Figure 2. Focusing on the response of the budget deficit to the change in the trade balance, it can be seen that, when there is an increase in the shock of a standard deviation in the trade balance, the budget deficit continuously decreases. The reduction of the budget deficit peaked after 6 periods and then showed signs of recovery but was still in decline in the following periods. The response of the budget deficit returned to equilibrium since the 8th period.

devaluation of the domestic currency shows the weakening of the domestic macroeconomy foundation. In order to stabilize the value of the local currency and ensure the sustainability of the macroeconomic foundation, the Government often has to take measures such as reducing foreign exchange reserves or increasing spending to stimulate the recovery of the economy. This has a negative impact on the budget balance, increasing the budget deficit.



#### 4.5. Granger Causality Test

We conducted a Granger causality test on the VECM model. The results are presented in Table 6. The trade balance (NX) is the Granger cause of the budget deficit (BG) at a significant 5%. We found no statistical evidence of the reverse causal direction from the budget deficit to the trade balance in Vietnam. These results are consistent with the findings of (Alkhatib & Al-Towajjari, 1999; Marinheiro, 2008; Sadiku et al., 2018; Sobrino, 2013) which find a one-sided causal relationship between the trade balance (or current account balance) to the budget deficit. This evidence once again confirms the “current account targeting” hypothesis and reinforces the neoclassical view of the relationship between the budget deficit and the trade balance in Vietnam during the research period, in which the causal direction is one-sided from the trade balance to the budget deficit, not the other way around.

On the other hand, when there is an increase in the shock of a standard deviation in the budget deficit, the trade balance responds to a decrease (deficit) in 3 consecutive periods, peaking in the 2nd period with a decrease of -1,048%, then recovering slightly and returning to equilibrium after 7 periods. The response of the trade balance to the budget deficit shock is weaker and turns off faster than the response of the budget deficit to the trade balance shock.

The impulse response results once again confirm the “current account targeting” hypothesis and support the Neoclassical view of the relationship between the budget deficit and the trade balance that exists strongly in Vietnam.

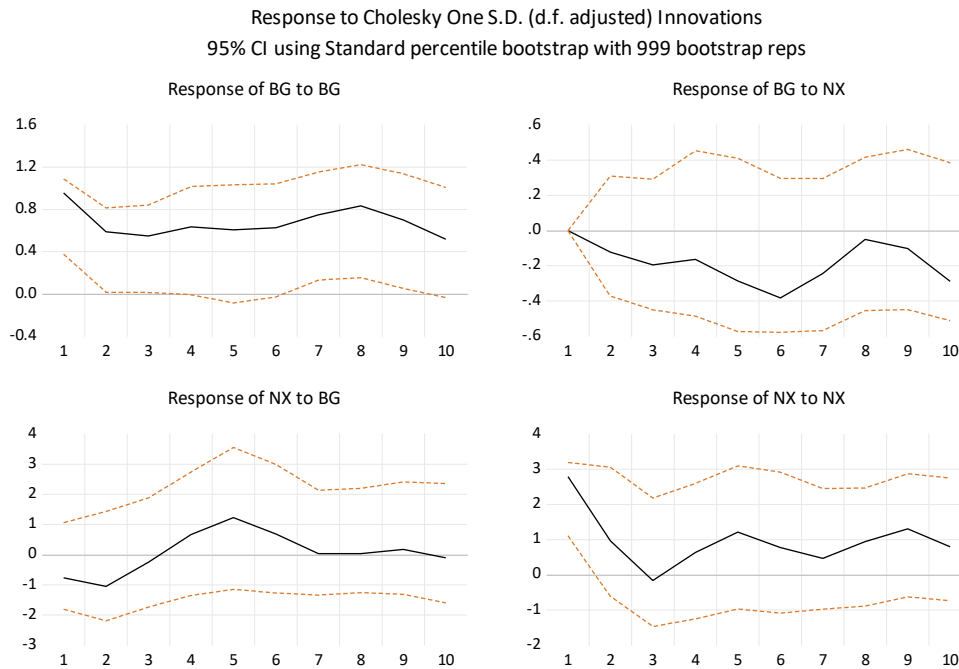


Figure 2: Impulse Response of Budget Deficit and Trade Balance.

## 5. Conclusions and Policy Implications

Vietnam has experienced chronic fiscal deficits for over three decades, impeding the nation's capacity for holistic economic expansion while concurrently confronting uncertainties in its trade equilibrium. In order to attain economic stability and ensure sustainable yet all-encompassing economic expansion, it is imperative to regularly manage the two deficits: the budget deficit and the trade deficit. This paper investigates the empirical correlation between the budget deficit and the trade balance in Vietnam from 1991 to 2022. The autoregressive distributed lag (ARDL) method is employed to examine the presence of a cointegration relationship among a group of variables, encompassing both short-term and long-term dynamics, in conjunction with the error correction model. Our research revealed a unilateral adverse effect of the trade balance on the budget deficit, persisting in both the short and long term. Simultaneously, the analysis discovered no statistically significant evidence of causal impacts in the reverse way, from the budget deficit to the trade balance. This outcome validates the theory of "current account targeting" and reinforces the Neoclassical perspective on the connection between budget deficits and trade balances.

Based on the research findings, in order to enhance the fiscal deficit, the Government should implement strategies to augment tax revenue by broadening the tax base, as well as boosting revenue from the State's economic operations and executing budget spending responsibilities in a prudent manner. Furthermore, as the trade balance has a detrimental effect on the budget deficit, it is imperative for the Government to implement policies aimed at enhancing the trade balance in order to achieve a sustainable and favourable fiscal equilibrium. Despite previously experiencing a consistent surplus in imports, we have recently observed a remarkable shift towards a consistent surplus in exports. This surpasses the strategic objective of achieving a balanced trade balance by 2020 and aims to achieve even higher levels of exports starting in 2021. Although export growth has accelerated significantly, it is not viable in the medium and long term due to its reliance on a limited number of major markets,

which presents numerous potential concerns. Furthermore, the existing trade balance exhibits excessive reliance on Foreign Direct Investment (FDI), indicating the lack of competitiveness in the domestic economic sector. Excessive dependence on foreign direct investment (FDI) can potentially expose the economy to dangers, particularly when faced with significant external volatility. Hence, governmental strategies aimed at fostering trade surplus should prioritise the overhaul of administrative protocols and enhancement of the commercial landscape, with the goal of establishing conducive circumstances for domestic enterprises to thrive. This includes a particular emphasis on bolstering supporting industries and facilitating the growth of export-oriented businesses by elevating the localization rate. Export promotion strategies should prioritise the identification of untapped markets and the promotion of competitive advantages in potential markets. Additionally, it is crucial to sustain existing markets to avoid excessive reliance on a limited number of markets. The Government should implement policies that incentivize and assist businesses in leveraging Free Trade Agreements (FTAs), thereby fostering economic growth and indirectly bolstering state budget revenue. This will help strengthen and sustain domestic revenue sources, as well as alleviate the budget deficit.

This study enhances the current body of research on the correlation between trade and budget deficit in Vietnam, a country that is classified as one of the emerging and rapidly developing economies. This study also provides an opportunity for more research on the correlation between budget deficit, trade balance, trade openness, exchange rate, and income... These linkages can be better understood by initially conducting a global analysis rather than focusing on a specific country. Additionally, the scope of analysis can be broadened by including a panel of similar economies. Furthermore, it is necessary to conduct additional empirical study to examine the correlation between trade openness and two deficits, considering other macroeconomic variables.

## Data Availability

The study uses quantitative/secondary data sources obtained

publicly from the General Statistics Office of Vietnam (<https://www.gso.gov.vn/>), the World Development Indicators statistical database (<https://data.worldbank.org/indicator>), the IMF's International Financial Statistics (<https://data.imf.org/>) and the Penn World Table Database (<https://www.rug.nl/ggdc/productivity/pwt/?lang=en>).

- **Acknowledgements:**

The authors are supported by the University of Finance - Marketing, Viet Nam.

- **Disclosure Statement:**

The authors report there are no competing interests to declare.

- **Ethical Statements:**

This article does not contain any studies with human participants performed by any of the authors.

## References

- Abbas, A., & Nawaz, S. (2023). A Comprehensive Assessment of Fiscal Policy and Economic Development: An ARDL Analysis. *Journal of Policy Research*, 9(1), 521-527. doi: <https://doi.org/10.5281/zenodo.8224086>
- Ahmed, H. A. (2020). Dynamics between the budget deficit and the government debt in the United States: a nonlinear analysis. *Studies in Nonlinear Dynamics & Econometrics*, 25(3), 93-109. doi: <https://doi.org/10.1515/snde-2018-0087>
- Al-Yousif, Y. K. (2002). Defense spending and economic growth: Some empirical evidence from the Arab Gulf region. *Defence and Peace Economics*, 13(3), 187-197. doi: <https://doi.org/10.1080/10242690210977>
- Alkhatib, A. M., & Al-Towajari, H. A. (1999). Cointegration, error correction and the demand for money in Saudi Arabia. *Economia Internazionale/International Economics*, 52(3), 299-308. Retrieved from <https://econpapers.repec.org/RePEC:ris:econt:0267>
- Anoruo, E., & Ramchander, S. (1998). Current account and fiscal deficits: Evidence from five developing economies of Asia. *Journal of Asian Economics*, 9(3), 487-501. doi: [https://doi.org/10.1016/S1049-0078\(99\)80099-2](https://doi.org/10.1016/S1049-0078(99)80099-2)
- Baharumshah, A. Z., Lau, E., & Khalid, A. M. (2006). Testing twin deficits hypothesis using VARs and variance decomposition. *Journal of the Asia Pacific economy*, 11(3), 331-354. doi: <https://doi.org/10.1080/13547860600764245>
- Banday, U. J. (2021). *A Comparative Study of Twin Deficit Hypothesis for BRICS Countries* (Doctoral dissertation, Central University of Haryana). Retrieved from <http://idr.cuh.ac.in:8080/jspui/bitstream/123456789/725/19/papers.pdf>
- Barro, R. J. (1989). The Ricardian approach to budget deficits. *Journal of Economic Perspectives*, 3(2), 37-54. doi: <https://doi.org/10.1257/jep.3.2.37>
- Baxter, M. (1995). International trade and business cycles. In *Handbook of international economics* (Vol. 3, pp. 1801-1864). Elsevier. doi: [https://doi.org/10.1016/S1573-4404\(05\)80015-2](https://doi.org/10.1016/S1573-4404(05)80015-2)
- Benarroch, M., & Pandey, M. (2017). The Impact of Imports and Exports on the Size and Composition of Government Expenditures. *International Journal of Economics and Finance*, 9(3), 57-68. doi: <https://doi.org/10.5539/ijef.v9n3p57>
- Bhat, J. A., & Sharma, N. K. (2021). Asymmetric fiscal multipliers in India-Evidence from a non-linear cointegration. *Macroeconomics and Finance in Emerging Market Economies*, 14(2), 157-179. doi: <https://doi.org/10.1080/17520843.2020.1818802>
- Bilgili, F., Ünlü, F., Gençoğlu, P., & Kuşkaya, S. (2022). Modeling the exchange rate pass-through in Turkey with uncertainty and geopolitical risk: a Markov regime-switching approach. *Applied Economic Analysis*, 30(88), 52-70. doi: <https://doi.org/10.1108/AEA-08-2020-0105>
- Brender, A., & Drazen, A. (2008). How do budget deficits and economic growth affect reelection prospects? Evidence from a large panel of countries. *American Economic Review*, 98(5), 2203-2220. doi: <https://doi.org/10.1257/aer.98.5.2203>
- Cardoso, M., & Domenech, R. (2011). On Ricardian equivalence and twin divergence. In *The Spanish Economy: A General Equilibrium Perspective* (pp. 144-159). Springer. doi: [https://doi.org/10.1057/9780230307544\\_6](https://doi.org/10.1057/9780230307544_6)
- Dixit, V. (2015). Fiscal Rule and Social Sector Spending: A Study of North-East India. In *Understanding Development: An Indian Perspective on Legal and Economic Policy* (pp. 155-171). Springer. doi: [https://doi.org/10.1007/978-81-322-2455-6\\_11](https://doi.org/10.1007/978-81-322-2455-6_11)
- Enders, W., & Lee, B.-S. (1990). Current account and budget deficits: twins or distant cousins? *The Review of Economics and Statistics*, 72(3), 373-381. doi: <https://doi.org/10.2307/2109344>
- Feldstein, M. (1986). Correcting the Trade Deficit. *Foreign Affairs*, 65(4), 795-806. doi: <https://doi.org/10.2307/20043094>
- Fidmuc, J. (2003). The Feldstein-Horioka puzzle and twin deficits in selected countries. *Economics of Planning*, 36, 135-152. doi: <https://doi.org/10.1023/B:ECOP.0000012256.88112.c2>
- Forte, F., & Magazzino, C. (2013). Twin deficits in the European countries. *International Advances in Economic Research*, 19, 289-310. doi: <https://doi.org/10.1007/s11294-013-9406-3>
- Gabrisch, H. (2015). On the twin deficits hypothesis and the import intensity in transition countries. *International Economics and Economic Policy*, 12, 205-220. doi: <https://doi.org/10.1007/s10368-014-0272-0>
- Ganchev, G. T. (2010). The twin deficit hypothesis: the case of Bulgaria. *Financial Theory and Practice*, 34(4), 357-377. Retrieved from <https://hrcak.srce.hr/63165>
- Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*, 37(3), 424-438. doi: <https://doi.org/10.2307/1912791>
- Hashemzadeh, N., & Wilson, L. (2006). The dynamics of current account and budget deficits in selected countries if the Middle East and North Africa. *International Research Journal of Finance and Economics*, 7(9), 111-129. Retrieved from <https://www.semanticscholar.org/paper/726d75a0abd37f463ab0ab21ef99d402692c8c04>
- Helmy, H. E. (2018). The twin deficit hypothesis in Egypt. *Journal of Policy Modeling*, 40(2), 328-349. doi: <https://doi.org/10.1016/j.jpolmod.2018.01.009>
- Holmes, M. J., Otero, J., & Panagiotidis, T. (2010). Are EU budget deficits stationary? *Empirical Economics*, 38, 767-778. doi: <https://doi.org/10.1007/s00181-009-0289-3>
- Hussain, I., Hayat, U., Alam, M. S., & Khan, U. (2023). A Dynamic Analysis of the Twin-Deficit Hypothesis: the Case of a Developing Country. *Asia-Pacific Financial Markets*, 1-28. doi: <https://doi.org/10.1007/s10690-023-09405-y>
- Kaufmann, S., Scharler, J., & Winckler, G. (2002). The Austrian current account deficit: Driven by twin deficits or by intertemporal expenditure

- allocation? *Empirical Economics*, 27, 529-542. doi: <https://doi.org/10.1007/s001810100094>
- Keynes, J. M. (1983). Keynes as an investor. In *The Collected Works of John Maynard Keynes* (Vol. 12, pp. 1-113). Cambridge University Press. doi: <https://doi.org/10.1017/UPO9781139524193.003>
- Kim, A. (2009). An empirical analysis of Korea's trade imbalances with the US and Japan. *Journal of the Asia Pacific Economy*, 14(3), 211-226. doi: <https://doi.org/10.1080/13547860902974971>
- Kim, S., & Roubini, N. (2008). Twin deficit or twin divergence? Fiscal policy, current account, and real exchange rate in the US. *Journal of International Economics*, 74(2), 362-383. doi: <https://doi.org/10.1016/j.jinteco.2007.05.012>
- Kormendi, R. C. (1983). Government debt, government spending, and private sector behavior. *The American Economic Review*, 73(5), 994-1010. Retrieved from <https://www.jstor.org/stable/1814667>
- Kosteletou, N. E. (2013). Financial integration, euro and the twin deficits of southern eurozone countries. *Panaeconomicus*, 60(2), 161-178. doi: <https://doi.org/10.2298/PAN1302161K>
- Lawless, M., O'Connell, B., & O'Toole, C. (2015). SME recovery following a financial crisis: Does debt overhang matter? *Journal of Financial Stability*, 19, 45-59. doi: <https://doi.org/10.1016/j.jfs.2015.05.002>
- Leachman, L. L., & Francis, B. (2002). Twin deficits: apparition or reality? *Applied Economics*, 34(9), 1121-1132. doi: <https://doi.org/10.1080/00036840110069976>
- Magazzino, C. (2012). The twin deficits phenomenon: evidence from Italy. *Journal of Economic Cooperation and Development*, 33(3), 65-80. doi: <https://doi.org/10.1007/s10272-020-0924-y>
- Mallick, L., Behera, S. R., & Murthy, R. R. (2021). Does the twin deficit hypothesis exist in India? Empirical evidence from an asymmetric non-linear cointegration approach. *The Journal of Economic Asymmetries*, 24, e00219. doi: <https://doi.org/10.1016/j.jeca.2021.e00219>
- Mangala, D., & Singla, N. (2023). Do corporate governance practices restrain earnings management in banking industry? Lessons from India. *Journal of Financial Reporting and Accounting*, 21(3), 526-552. doi: <https://doi.org/10.1108/JFRA-02-2021-0060>
- Marinheiro, C. F. (2008). Ricardian equivalence, twin deficits, and the Feldstein-Horioka puzzle in Egypt. *Journal of Policy Modeling*, 30(6), 1041-1056. doi: <https://doi.org/10.1016/j.jpolmod.2007.12.001>
- Mehta, D., & Mallikarjun, M. (2023). Impact of fiscal deficit and trade openness on current account deficit in India: new evidence on twin deficits hypothesis. *Economia*, 24(2), 172-188. doi: <https://doi.org/10.1108/ECON-07-2022-0091>
- Miteza, I. (2012). Fiscal deficits, current deficits and investment: a panel causality framework of 20 OECD Countries. *Applied Econometrics and International Development*, 12(1), 6-19. doi: <https://doi.org/10.4236/me.2012.31006>
- Mohanty, R. K. (2019). Does fiscal deficit crowd out private corporate sector investment in India? *The Singapore Economic Review*, 64(05), 1201-1224. doi: <https://doi.org/10.1142/S0217590816500302>
- Mukhtar, T., & Khan, A. H. (2016). The current account deficit sustainability: An empirical investigation for Pakistan. *The Pakistan Development Review*, 55(4), 397-419. Retrieved from <http://www.jstor.org/stable/44985995>
- Mundell, R. (1992). Fiscal policy and the theory of international trade. In *Money, Trade, and Competition: Essays in Memory of Egon Sohmen* (pp. 125-149). Springer. doi: [https://doi.org/10.1007/978-3-642-77267-2\\_8](https://doi.org/10.1007/978-3-642-77267-2_8)
- Nautiyal, N., Belwal, S., & Belwal, R. (2023). Assessment, interaction and the transmission process of twin deficit hypothesis: Fresh Evidence from India. *Business Perspectives and Research*, 11(2), 269-286. doi: <https://doi.org/10.1177/22785337211070378>
- Ncanywa, T., & Letsoalo, T. E. (2019). Which among twin deficits hypothesis, twin divergence, and Ricardian's equivalence hold in a developing country? *Journal of Public Affairs*, 19(2), 1904. doi: <https://doi.org/10.1002/pa.1904>
- Nguea, S. M., Noula, A. G., & Nounba, I. (2023). Financial globalization and democracy: implications for economic growth in African countries. *Journal of the Knowledge Economy*, 1-25. doi: <https://doi.org/10.1007/s13132-023-01311-y>
- Njoroge, E. K., Kosimbei, G., & Korir, J. (2014). Testing the twin deficit hypothesis for Kenya 1970-2012. *International Journal of Business and Economics Research*, 3(5), 160-169. doi: <https://doi.org/10.11648/j.ijber.20140305.11>
- Normandin, M. (1999). Budget deficit persistence and the twin deficits hypothesis. *Journal of International Economics*, 49(1), 171-193. doi: [https://doi.org/10.1016/S0022-1996\(98\)00058-0](https://doi.org/10.1016/S0022-1996(98)00058-0)
- Obadić, A., Globan, T., & Nadoveza, O. (2014). Contradicting the twin deficits hypothesis: The role of tax revenues composition. *Panaeconomicus*, 61(6), 653-667. doi: <https://doi.org/10.2298/PAN1406653O>
- Olanipekun, D. B. (2012). A bound testing analysis of budget deficits and current account balance in Nigeria 1960-2008. *International Business Management*, 6(4), 408-416. doi: <https://doi.org/10.3923/ibm.2012.408.416>
- Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics*, 22(2), 265-312. doi: <https://doi.org/10.1002/jae.951>
- Piersanti, G. (2000). Current account dynamics and expected future budget deficits: some international evidence. *Journal of International Money and Finance*, 19(2), 255-271. doi: [https://doi.org/10.1016/S0261-5606\(00\)00004-8](https://doi.org/10.1016/S0261-5606(00)00004-8)
- Precious, C., & Asrat, T. (2014). Determinants of household savings in South Africa: an econometric approach (1990-2011). *Mediterranean Journal of Social Sciences*, 5(15), 183. doi: <https://doi.org/10.5901/mjss.2014.v5n15p183>
- Rodrik, D. (2008). The real exchange rate and economic growth. *Brookings Papers on Economic Activity*, 2008(2), 365-412. doi: <https://doi.org/10.1353/eca.0.0020>
- Sadiku, L., Bexheti, A., Bexheti, G., & Bilic, S. (2018). Empirical analyses of the relationship between trade and budget deficit of FYR of Macedonia. *KnE Social Sciences*, 1-15. doi: <https://doi.org/10.18502/kss.v3i10.3527>
- Sakyi, D., & Opoku, E. E. O. (2016). *The twin deficits hypothesis in developing countries: Empirical evidence for Ghana* (S-33201-GHA-1). The International Growth Centre (IGC). Retrieved from <https://www.theigc.org/sites/default/files/2016/09/Sakyi-Opoku-2016-working-paper.pdf>
- Salvatore, D. (2006). Twin deficits in the G-7 countries and global structural imbalances. *Journal of Policy Modeling*, 28(6), 701-712. doi: <https://doi.org/10.1016/j.jpolmod.2006.06.003>
- Saysombath, P., & Kyophilavong, P. (2013). Twin deficits in the lao PDR: An empirical study. *International Business and Management*, 7(1), 62-68. doi: <https://doi.org/10.3968/j.ibm.1923842820130701.1135>
- Sobrinho, C. R. (2013). The twin deficits hypothesis and reverse causality: A short-run analysis of Peru. *Journal of Economics Finance and*

- Administrative Science*, 18(34), 9-15. doi: [https://doi.org/10.1016/S2077-1886\(13\)70018-0](https://doi.org/10.1016/S2077-1886(13)70018-0)
- Suliková, V., Djukic, M., Gazda, V., Horváth, D., & Kulhánek, L. (2015). Asymmetric impact of public debt on economic growth in selected EU countries 1. *Ekonomicky Casopis*, 63(9), 944. doi: <https://doi.org/10.1080/23322039.2022.2046323>
- Summers, L. H. (1988). Tax policy and international competitiveness. In *International aspects of fiscal policies* (pp. 349-386). University of Chicago Press. Retrieved from <http://www.nber.org/chapters/c7931>
- Suresh, K. G., & Gautam, V. (2015). Relevance of twin deficit hypotheses: an econometric analysis with reference to India. *Theoretical Economics Letters*, 5(2), 304-311. doi: <https://doi.org/10.4236/tel.2015.52036>
- Tu Nguyen, M., Binh Nguyen, T., Khoi Dang, K., Luu, T., Hung Thach, P., Lan Phuong Nguyen, K., & Quan Nguyen, H. (2022). Current and potential uses of agricultural by-products and waste in main food sectors in Vietnam—A circular economy perspective. In *Circular Economy and Waste Valorisation: Theory and Practice from an International Perspective* (Vol. 2, pp. 131-151). Springer. doi: [https://doi.org/10.1007/978-3-031-04725-1\\_6](https://doi.org/10.1007/978-3-031-04725-1_6)
- Vamvoukas, G. A. (1999). Budget deficits and economic activity. *International Advances in Economic Research*, 5(1), 65-73. doi: <https://doi.org/10.1007/BF02295032>
- Wani, S. H., & Mir, M. A. (2021). Globalisation and economic growth in India: An ARDL approach. *The Indian Economic Journal*, 69(1), 51-65. doi: <https://doi.org/10.1177/00194662211015388>
- Zubdeh, K. H. (2021). The Determinant of Budget Fiscal Deficit of the Palestinian Authority and the Economic Factors Affecting It. *Research in World Economy*, 12(3), 10.5430. doi: <https://doi.org/10.5430/rwe.v12n3p63>