

## International determinants of foreign reserves accumulation in Vietnam

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### ARTICLE INFO

DOI:10.46223/HCMCOUJS.  
econ.en.16.3.4183.2026

JEL classification code:  
C13; F14; F43

Received: February 26<sup>th</sup>, 2025

Revised: June 24<sup>th</sup>, 2025

Accepted: July 01<sup>st</sup>, 2025

*Keywords:*

ARDL; exchange rate; exports;  
FDI; foreign reserves

### ABSTRACT

Motivated by the recent decline in Vietnam's foreign reserves, this study investigates their key determinants, with a particular focus on international factors. Based on empirical literature, the research examines three external drivers - exports, Foreign Direct Investment (FDI), and exchange rate - along with three domestic variables: inflation, money supply, and GDP. Using quarterly data from 2005 to 2023 and applying the Autoregressive Distributed Lag Error Correction Model (ARDL-ECM), the study explores both short- and long-run relationships. The results reveal that exports and money supply positively affect foreign reserves in the long run, with elasticity coefficients of 1.37 ( $p < 0.01$ ) and 1.22 ( $p < 0.01$ ), respectively. Conversely, exchange rates and GDP exert negative impacts, with coefficients of -5.17 ( $p < 0.01$ ) and -1.12 ( $p < 0.05$ ), respectively. FDI and inflation are found to be statistically insignificant. In the short run, only the exchange rate demonstrates a significant effect. These findings underscore the growing importance of international dynamics in shaping Vietnam's reserve accumulation. The study offers practical policy implications, suggesting that enhancing exports and stabilizing exchange rates could be more effective than relying solely on domestic macroeconomic measures.

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### 1. Introduction

The vital role of foreign reserves has been evidenced in numerous studies. Initially, it serves as an indicator of the nation's creditworthiness and the effectiveness of the monetary policy (Andriyani et al., 2020; Salan et al., 2023). Foreign reserves are also used to mitigate payment imbalances of financing imports and foreign liabilities (Simamora & Widanta, 2021). By utilizing reserves, the government can intervene in the foreign exchange market to stabilize the exchange rate. Furthermore, adequate reserves can act as a country's defense against sudden external shocks and crises (International Monetary Fund [IMF], 2011). Particularly, as the wave of global integration continues to grow, developing countries, including Vietnam, are increasingly vulnerable to global changes and crises. In this case, effectively managing foreign reserves is critical to stabilizing the economy.

While numerous international studies have examined the determinants of foreign reserves, most existing research in Vietnam focuses primarily on domestic macroeconomic factors such as GDP, inflation, and the money supply. For instance, Tran and Dang (2022)

employ the VECM model to explore the role of internal variables, but largely overlook the influence of external dynamics. This creates a significant empirical gap, given Vietnam's high degree of economic openness, in which international trade and capital flows are increasingly central.

Moreover, existing studies rarely investigate the differential effects of external and internal factors in both the short and long run. The volatility of Vietnam's foreign reserves in recent years - driven by external shocks such as the Covid-19 aftermath, global interest rate hikes, and geopolitical instability - calls for a deeper understanding of international determinants. Compared to more resilient developed markets, emerging economies like Vietnam are more vulnerable to global disruptions, making it critical to analyze how exports, FDI, and exchange rate movements influence reserve accumulation over time.

This paper contributes to the literature by explicitly incorporating external sector variables into the empirical model, using a robust ARDL-ECM framework and updated data from 2005 to 2023. It aims to fill a research gap by providing a comprehensive assessment of both international and domestic drivers of Vietnam's foreign reserves, thereby offering a timely, policy-relevant perspective in light of the country's growing integration into the global economy.

A set of research objectives in this study is:

1. To identify international factors that affect Vietnam's foreign reserves based on empirical evidence.
2. To evaluate how the international factors influence Vietnam's foreign reserves.
3. To provide policy implications for Vietnamese authorities and policymakers based on the analysis results to strengthen Vietnam's foreign reserves.

## **2. Literature review**

### ***2.1. Foreign exchange reserves overview***

According to the IMF, foreign exchange reserves are "external assets that are readily available to and controlled by monetary authorities" (IMF, 2011, p. 59). Countries utilize these assets to finance payment imbalances or to intervene in exchange markets to control the currency exchange rate, and/or for other purposes.

Theoretically, reserve accumulation is driven by several motives. The precautionary motive (Aizenman & Marion, 2003) suggests that countries hold reserves as a form of self-insurance against financial volatility and sudden capital outflows. The mercantilist view emphasizes reserve accumulation through trade surpluses to promote export-led growth (Dooley et al., 2003), while the optimal reserves theory (Jeanne & Ranci re, 2011) weighs the benefits of reserves against their opportunity costs.

Building on these frameworks, empirical literature classifies reserve determinants into five categories (Makarenko & Gordieieva, 2015; Niaz et al., 2014; Olokoyo et al., 2009; Wang & Hueng, 2019): (1) economic size (e.g., GDP); (2) current account vulnerability (e.g., exports, trade openness); (3) capital account volatility (e.g., money supply, FDI, short-term debt); (4) exchange rate regime and volatility; and (5) opportunity cost (interest rate differentials). The first group is economic size, represented by GDP, GDP per capita, or population. The level of foreign reserves accumulation theoretically increases with economic size. The second category is current account vulnerability, which can be assessed through exports, imports, and trade

openness. In response to heightened exposure of external shocks, countries tend to accumulate more foreign reserves. The next one is capital account vulnerability, which comprises financial openness and resident-based capital flight from the domestic currency. Variables such as broad money (M2), capital flows, and short-term debt are used to capture the volatility of the capital account. Theoretically, increases in these variables could lead to higher demand for foreign reserves. The fourth group is the exchange rate volatility. The need to hold foreign reserves could generally decrease if countries gain greater exchange rate flexibility. The last one is opportunity cost, measured by the differential between the yield on foreign reserves and the interest rate of an alternative investment. In theory, higher opportunity costs could lead to a lower level of foreign reserve holdings.

## **2.2. Empirical studies**

Foo et al. (2023) analyzed 21 developing countries from 2001 to 2015. They found that international trade, exchange rates, and money supply were positively correlated with foreign reserves, whereas interest rates and government debt were negatively correlated. Sanusi et al. (2019), using an ARDL-ECM model in Southern Africa, found that exports, inflation, and exchange rate were significant long-run determinants. Similarly, Sunaryo (2023) showed that exports and money supply positively influence reserves in five ASEAN countries.

In Indonesia, Andriyani et al. (2020) reported that external debt, inflation, exchange rate, and exports significantly affect reserves between 2016 and 2018. Gajurel (2022) used an ARDL-ECM to examine Nepal and found long-run correlations among reserves, FDI, GDP per capita, inflation, and the exchange rate. In India, Jacob (2020) found positive effects of FDI, FPI, and exports, and adverse effects of the exchange rate and imports. Verma and Bhakri (2021) extended the Indian case to include short-term debt, confirming strong effects from FDI, exports, and the exchange rate.

In Bangladesh, Niaz et al. (2014) identified remittances, exports, exchange rate, GDP, and broad money (M2) as significant determinants. Nigerian studies such as Olokoyo et al. (2009) and Osigwe et al. (2015) confirm that GDP, trade, FDI, and inflation influence reserve accumulation. In Ukraine, Makarenko and Gordieieva (2015) found strong links among reserves, FDI, M2, GDP, imports, and short-term debt using both VECM and ARDL approaches.

In Vietnam, however, research remains limited. Tran and Dang (2022), using quarterly data from 2005 to 2020, employed a VECM and found that GDP, M2, CPI, and the exchange rate significantly influenced reserves. Nonetheless, their analysis focused primarily on domestic variables, omitting international determinants such as exports and FDI.

## **2.3. Research gap**

Despite a rich body of international studies, there is an apparent lack of empirical research in Vietnam that integrates both internal and external determinants. Most local studies have concentrated on internal macroeconomic factors - such as GDP, inflation, and money supply - without adequately accounting for the country's increasing exposure to international trade and capital flows.

This gap is particularly concerning given recent global developments. The sharp decline in Vietnam's reserves post-2021, amid rising global interest rates, geopolitical tensions, and trade disruptions, underscores the need to reassess the role of external factors. Furthermore, few existing studies apply dynamic time-series methods, such as ARDL-ECM, to analyze both short- and long-run impacts using updated data.

This study contributes to the literature by explicitly incorporating key international variables - exports, FDI, and exchange rate - alongside domestic ones, using quarterly data from 2005 to 2023. By applying the ARDL-ECM framework, it aims to provide a more comprehensive and policy-relevant analysis of Vietnam's foreign reserve dynamics in an increasingly globalized context.

### 3. Methodology

#### 3.1. Variables and data collection

The paper studies 07 variables as presented in the table below. Time-series data will be collected quarterly from the 1st quarter of 2005 to the 3rd quarter of 2023. CPI is used to represent the inflation variable, as it is the most widely used indicator of inflation according to the Reserve Bank of Australia. Moreover, GDP (billion VND) is converted into GDP (million USD) by utilizing the Nominal exchange rate as follows:

$$\text{GDP (million USD)} = \text{GDP (billion VND)} * 1,000/\text{Nominal exchange rate.} \quad (1)$$

This conversion approach is adopted to ensure consistency in unit measurement across monetary variables, as foreign reserves, exports, and FDI are all expressed in nominal USD terms. Using nominal GDP converted using the exchange rate provides a coherent basis for international comparisons and external sector analysis. Although real GDP is commonly used in macroeconomic modeling, its application here would require deflation procedures that may introduce inconsistencies. Furthermore, previous studies on foreign reserves accumulation, such as Akpan (2016) and Jena and Sethi (2021), have also employed nominal GDP as a proxy for economic size in similar empirical contexts.

**Table 1**

*Summary of Variables*

Variables	Description	Unit	Source
<b>Dependent Variable</b>			
FORE	Foreign reserves	Million USD	CEIC
<b>Independent Variables</b>			
EXP	Export	Million USD	GSO
FDI	Foreign Direct Investment	Million USD	CEIC
EXR	Nominal Exchange Rate	LCU per US\$, period average	World Bank
CPI	Consumer Price Index	Base year: 2019	Trading Economics
M2	Money Supply	Million USD	CEIC
GDP	Gross Domestic Product	Million USD	GSO

*Note.* Compiled by authors

In this study, all variables are transformed using natural logarithms to reduce skewness in the original dataset. The general equation of this research is:

$$\ln \text{FORE}_t = \alpha_0 + \alpha_1 \ln \text{EXP}_t + \alpha_2 \ln \text{FDI}_t + \alpha_3 \ln \text{EXR}_t + \alpha_4 \ln \text{CPI}_t + \alpha_5 \ln \text{M2}_t + \alpha_6 \ln \text{GDP}_t + \varepsilon_t \quad (2)$$

### 3.2. Research methodology

This study employs a quantitative method, using Stata 17.

Firstly, descriptive statistics are used to examine the overall statistical characteristics of the variables during the study period.

Secondly, the Augmented Dickey-Fuller (ADF) unit root test is conducted to assess stationarity of the variables. If all variables are stationary, it is recommended to use models such as OLS or VAR. If all variables are nonstationary, the Johansen test is used to examine whether a cointegrating relation exists among them. If cointegration is found, the Vector Error Correction Model (VECM) will be applied. For situations involving both stationary and nonstationary variables, the Autoregressive Distributed Lag (ARDL) approach is most appropriate.

In this study, the ARDL approach will be applied due to the presence of mixed variables, as discussed in the next part. Accordingly, the VAR model is employed to determine the optimal lag length and model specifications, using the Akaike Information Criterion (AIC).

Pesaran et al. (2001) advanced the ARDL model to assess both short-term and long-term effects of variable alterations by incorporating lagged values and differences of variables. The formula for the ARDL can be expressed as follows:

$$\Delta Y_t = \alpha + \sum_{i=1}^p \alpha_i \Delta Y_{t-i} + \sum_{i=1}^q \alpha_j \Delta X_{t-i} + \beta_i Y_{t-i} + \beta_j X_{t-i} + \varepsilon_t \quad (3)$$

Where: Y and X represent the dependent and independent variables;  $\alpha_i$  and  $\alpha_j$  indicate the coefficients of the short-term part while  $\beta_i$  and  $\beta_j$  show long-run dynamics; p and q are the optimal lag for the dependent and independent variables;  $\alpha$  is the constant term; and  $\varepsilon_t$  is the error term or white noise.

In addition, the ARDL bound test is used to assess the presence of a long-term relationship among the variables. Once confirmed, the ARDL-ECM model is executed. The ARDL-ECM model can be specified as:

$$\Delta Y_t = \alpha + \sum_{i=1}^p \alpha_i \Delta Y_{t-i} + \sum_{i=1}^q \alpha_j \Delta X_{t-i} + \delta ECT_{t-i} + \varepsilon_t \quad (4)$$

The Error Correction Term (ECT) captures the adjustment process towards the long-run equilibrium after short-run deviations.

Finally, diagnostic tests are subsequently conducted to validate the reliability and robustness of the estimated model.

## 4. Result and discussion

### 4.1. Result

#### 4.1.1. Descriptive statistics

The table below summarizes the characteristics of the data. During the studied period, the average foreign reserves accumulated in Vietnam amounted to approximately 42.3 billion USD, ranging from around 08 billion USD to nearly 110 billion USD.

**Table 2***The Descriptive Statistics of Variables*

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
FORE	75	42,300.04	3,0781.13	8,008.942	109,962.7
EXP	75	41,487.85	27,243.16	6.719	96,928
FDI	75	2,697.08	1,256.306	247	5,620
EXR	75	20,612.75	2,767.822	15,812.61	24,224.69
CPI	75	79.39973	23.7888	36.05	113.28
M2	75	226,029.4	147,353.6	32,754.15	520,008.6
GDP	75	47,290.08	28,122.2	10,386.84	112,228.3

Note. Compiled by authors

*4.1.2. Unit root test*

Table 3 reports the results of the Augmented Dickey-Fuller (ADF) unit root test. The findings indicate that three variables - lnFDI, lnCPI, and lnM2 - are stationary at the level, suggesting they are integrated of order zero I(0). In contrast, the remaining four variables - lnEX, lnGDP, lnEXR, and lnFORE - are nonstationary at the level but become stationary after first differencing, thus identified as I(1) series. Importantly, none of the variables are integrated of order two or higher.

**Table 3***ADF Unit Root Test Results*

Variable	At level			At first difference			Status
	T-statistic	Critical value at 5%	Decision	T-statistic	Critical value at 5%	Decision	
lnFORE	-1.303	-2.911	Nonstationary	-6.380	-2.912	Stationary	I(1)
lnEXP	-1.593	-2.911	Nonstationary	-9.588	-2.912	Stationary	I(1)
lnFDI	-3.041	-2.911	Stationary	-	-2.912	-	I(0)
lnEXR	-1.540	-2.911	Nonstationary	-8.457	-2.912	Stationary	I(1)
lnCPI	-4.057	-2.911	Stationary	-	-2.912	-	I(0)
lnM2	-3.956	-2.911	Stationary	-	-2.912	-	I(0)
lnGDP	-2.041	-2.911	Nonstationary	-15.813	-2.912	Stationary	I(1)

Note. Compiled by authors

This combination of I(0) and I(1) variables satisfies the essential requirement for applying the ARDL bounds testing approach, which is valid only in the absence of I(2) variables. Therefore, the stationarity testing confirms the methodological appropriateness and robustness of the empirical framework adopted in this study.

#### 4.1.3. Optimal lag length

Table 4 shows that the maximum optimal lag length to be chosen is 4 according to the recommendations of AIC and the majority of the other criteria. With a maximum lag of 4 and based on the AIC criterion, the optimal lag for lnFORE, lnEXP, lnFDI, lnEXR, lnCPI, lnM2, and lnGDP are 3, 2, 2, 4, 0, 0, 2, respectively.

**Table 4**

#### *Optimal Lag Length of the Mode*

Lag	LL	LR	FPE	AIC	HQIC	SBIC
0	306.651	NA	5.1e-13	-8.44086	-8.35215	-8.21778
1	839.733	1,066.2	6.1e-19	-22.077	-21.3673	-20.2923*
2	906.38	133.3	3.9e-19	-22.5741	-21.2434	-19.2279
3	967.228	121.7	3.1e-19	-22.9078	-20.9562	-18.0001
4	1,054.14	173.82*	1.3e-19*	-23.9757*	-21.403*	-17.5063

Note. Compiled by authors

#### 4.1.4. ARDL bound test

The F-statistic (5.066) exceeds all the upper bounds I(1) at the 1%, 2.5%, 5%, and 10% levels of significance, confirming the existence of a long-term correlation among the variables. Therefore, the ARDL-ECM is subsequently applied.

**Table 5**

#### *ARDL Bound Test Results*

Test Statistics	Value	Significance level	I(0) bound	I(1) bound
F-statistic	5.066	10%	2.12	3.23
K	6	5%	2.45	3.61
		2.5%	2.75	3.99
		1%	3.15	4.43

Note. Compiled by authors

#### 4.1.5. Short-term impacts

From Table 6, the value of  $ECT_{t-1}$  suggests a 32.44139% adjustment back to long-term equilibrium quarterly in response to any prior disequilibrium. This also implies that, in the event of a deviation from equilibrium, it takes about 3/4 of eight days for the long-run equilibrium to be re-established. Moreover,  $ECT_{t-1}$  also affirms the robust long-run correlation among the variables studied.

It is also evident that there is a significant and positive relationship between the difference of FORE with lag 1 and FORE itself in the short term. In terms of EXP, the substantial negative coefficients of both the present and previous quarters confirm their negative impacts on FORE in Vietnam. Moreover, current FDI positively affects FORE, whereas lagged FDI has no significant effect. Regarding EXR, no correlation is found between lag-1 as well as lag-2 EXR and FORE. However, its present and lag-3 values both significantly and negatively affect

FORE finally, whereas FORE is not affected by current-period GDP but is positively affected by lag-1 GDP.

**Table 6**

*Short-Term Coefficient Results*

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	14.39728**	6.084736	2.37	0.022
DlnFORE(-1)	0.2810987**	0.1130073	2.49	0.016
DlnFORE(-2)	-0.2199001*	0.11117076	-1.97	0.054
DlnEXP	-0.4914127***	0.1718632	-2.86	0.006
DlnEXP(-1)	-0.387137***	0.1417181	-2.73	0.009
DlnFDI	0.135983**	0.0638982	2.13	0.038
DlnFDI(-1)	0.0545726	0.043872	1.24	0.219
DlnEXR	-2.42278***	0.8013567	-3.02	0.004
DlnEXR(-1)	-0.9688593	0.8523155	-1.14	0.261
DlnEXR(-2)	-1.530032*	0.8467314	-1.81	0.077
DlnEXR(-3)	-1.648722**	0.7091199	-2.33	0.024
DlnGDP	0.1517443	0.1305411	1.16	0.250
DlnGDP(-1)	0.1726734**	0.0803536	2.15	0.036
ECT(-1)	-0.3244139***	0.0804699	-4.03	0.000
R-squared	0.7500	Adjusted R-squared		0.6569

Note. \*, \*\*, \*\*\* indicate the level of significance at 10%, 5% and 1% respectively. Compiled by authors

*4.1.6. Long-term impacts*

Table 7 presents the long-run coefficients estimated by the ARDL model. The results show that four out of six independent variables - exports, money supply (M2), exchange rate, and GDP - are statistically significant at the 1% or 5% level, while FDI and CPI are insignificant.

**Table 7**

*Long-Term Coefficient Results*

Variable	Coefficient	Std. Error	T-statistic	Prob.
lnEXP	1.368347***	0.4041494	3.39	0.001
lnFDI	-0.0904627	0.1925912	-0.47	0.641
lnEXR	-5.168123***	1.587968	-3.25	0.002
lnCPI	0.2396704	0.7391029	0.32	0.747
lnM2	1.224332***	0.3840247	3.19	0.002
lnGDP	-1.115327**	0.462075	-2.41	0.019

Note. \*, \*\*, \*\*\* indicate the level of significance at 10%, 5% and 1% respectively. Compiled by authors

The coefficient of  $\ln\text{EXP}$  (exports) is 1.3683 and statistically significant at the 1% level. This implies that, *ceteris paribus*, a 1% increase in exports leads to approximately a 1.37% increase in foreign reserves in the long run. This elasticity exceeding one suggests that Vietnam's reserves are highly responsive to trade performance, reflecting the country's heavy reliance on export earnings as a primary source of foreign exchange. The result supports the mercantilist perspective, in which trade surpluses play a central role in reserve accumulation.

The coefficient for  $\ln\text{M2}$  (money supply) is 1.2243, also significant at the 1% level. This suggests that a 1% increase in money supply is associated with a 1.22% increase in foreign reserves. This strong elasticity may reflect the structural nature of Vietnam's monetary policy, where reserve accumulation is closely tied to sterilization operations and the central bank's management of liquidity. It also aligns with capital account considerations, as an increased money supply could reflect rising domestic savings and capital inflows that require reserve intervention.

Conversely, the exchange rate ( $\ln\text{EXR}$ ) has a significant adverse long-run effect, with a coefficient of -5.1681. This implies that a 1% depreciation of the Vietnamese currency is associated with a 5.17% decline in foreign reserves. This high elasticity signals a strong sensitivity of reserves to currency volatility. Depreciation may trigger capital outflows or require reserves to defend the currency, hence depleting the reserve stock. This finding is consistent with precautionary motive theory and previous studies (e.g., Makarenko & Gordieieva, 2015).

The coefficient of  $\ln\text{GDP}$  is -1.1153, significant at the 5% level. Surprisingly, this negative relationship suggests that higher GDP is associated with lower reserves, holding other factors constant. This may reflect Vietnam's economic expansion, coupled with rising imports, external debt payments, or a reduced need for precautionary reserves. Alternatively, rapid GDP growth without corresponding increases in exports or capital inflows may dilute the reserve ratio.

FDI and inflation (CPI) show no statistically significant long-run effect on reserves. The lack of significance for FDI could be due to the profit repatriation behavior of foreign investors or its relatively minor contribution compared to trade. CPI's insignificance suggests that inflation is not a direct determinant of reserve holdings in Vietnam, possibly due to effective inflation-targeting policies.

Overall, the findings indicate that external sector variables - particularly exports and the exchange rate - are the dominant long-run drivers of Vietnam's reserves. This reinforces the relevance of the precautionary and mercantilist frameworks in explaining reserve dynamics in open, export-dependent economies like Vietnam.

#### 4.1.7. Robustness check

Table 8 confirmed that no serial correlation and no heteroskedasticity were found.

**Table 8**

*Result of Diagnostic Test*

Diagnostic Test	Prob > chi2	Results
Breusch-Godfrey LM test for autocorrelation	0.3421	No serial correlation
White test	0.4442	No heteroskedasticity

*Note.* Compiled by authors

## **4.2. Discussion**

Firstly, in the short term, a negative correlation between exports and foreign reserves can be explained by the fact that domestic enterprises have to pay for importing raw materials from abroad for production before exporting. According to the Vietnam Chamber of Commerce and Industry (VCCI) (2022), many of Vietnam's major industries depend on imported raw materials. Meanwhile, exports positively affect foreign reserves in the long term by generating a large volume of foreign currency from payments. This result is in line with Andriyani et al. (2020), Jacob (2020), and Sunaryo (2023). Secondly, FDI positively affects foreign reserves in the short run by bringing a large amount of foreign currency into a country. However, the FDI value is much smaller than that of foreign reserves. Therefore, the influence level is relatively small in the short run and becomes negligible in the long run. This result aligns with the study of Salan et al. (2023). Thirdly, the exchange rate negatively influences foreign reserves. This finding is consistent with the actual situation in Vietnam during 2015 - 2023. To illustrate, sharply increasing exchange rates in the period 2008 - 2011 after the global financial crisis, and in 2022 - 2023 due to the post-pandemic crisis and the tense conflict between Russia and Ukraine, led the central bank to release foreign reserves. By contrast, in the period 2012 - 2021, the exchange rate was relatively stable, even during the Covid-19 pandemic, thanks to the government's efficient control of the epidemic. This reduced the need to intervene in foreign exchange markets; Vietnam's foreign reserves remained stable and increased steadily. This outcome is supported by Sanusi et al. (2019), Andriyani et al. (2020), Jacob (2020), Tran and Dang (2022), and Salan et al. (2023).

Additionally, inflation insignificantly influences foreign reserves, as supported by Niaz et al. (2014) and Akpan (2016). Furthermore, the money supply positively affects the dependent variable, consistent with the findings of Gajurel (2022), Tran and Dang (2022), and Sunaryo (2023). One interpretation is that increasing the money supply would decrease the value of domestic assets. Accordingly, the need to switch to foreign assets increases, thereby necessitating a greater holding of foreign reserves. Finally, the results indicate a contrasting effect of GDP on foreign reserves in the short run versus the long run. Specifically, GDP has a positive short-run impact on Vietnam's foreign reserves, consistent with prior studies such as Akpan (2016), Jena and Sethi (2021), and Tran and Dang (2022), which highlight that larger economic size tends to be associated with increased trade and financial obligations, thereby prompting monetary authorities to accumulate more reserves as a precautionary measure.

In contrast, the long-run effect is adverse, contrary to conventional theoretical expectations. Structural characteristics of the Vietnamese economy may explain this unexpected result. As GDP grows, the country may experience rising imports and outward investment activities, leading to capital outflows that reduce the need or ability to accumulate reserves. This interpretation is supported by Egger and Winner (2006), who argue that capital-abundant economies are more likely to engage in international investment. Additionally, economic development may ease access to global financial markets, thereby reducing the perceived need of maintain large reserves. This highlights the importance of considering country-specific dynamics when analyzing reserve accumulation behavior.

## **5. Conclusion and recommendations**

### **5.1. Conclusion**

This research aims to explore the drivers of Vietnam's foreign reserves, with particular focus on international factors. ARDL-ECM is used to evaluate the short- and long-run

relationships between Vietnam's international reserves and six independent variables: exports, FDI, the exchange rate, inflation, money supply, and GDP. Secondary data is gathered quarterly from the 1st quarter of 2005 to the 3rd quarter of 2023.

In the long term, exports exhibit a positive relationship, while the exchange rate negatively affects foreign reserves. Meanwhile, FDI is an insignificant driver of Vietnam's reserves holdings. For domestic factors, while inflation has a positive but insignificant impact, money supply and GDP are both key determinants of international reserves in Vietnam. On the other hand, in the short run, all three international variables and GDP significantly affect Vietnam's foreign reserves. Meanwhile, the other factors have little effect on the volatility of Vietnam's reserves.

### **5.2. Policy implication**

The findings bring several policy implications to strengthen foreign reserves management in Vietnam, especially in the context of increasing external volatility.

First, promoting exports remains a key priority. Specifically, it is essential to enhance the competitiveness of Vietnamese exports by investing in technology and digital transformation. Export markets should be further diversified to reduce dependence on a few major partners. Moreover, domestic enterprises need to effectively capitalize on the benefits from Free Trade Agreements (FTAs) to expand market access. Beyond this, enhancing logistics infrastructure and supporting green, value-added exports can contribute to more sustainable, resilient trade performance, thereby improving reserve accumulation.

Second, measures to stabilize the exchange rate are crucial. Policymakers should avoid persistent current account deficits, which could lead to currency depreciation and reserve depletion. Tools such as interest rate adjustment or short-term capital flow monitoring can help attract foreign investment while limiting exchange rate volatility. Vietnam may consider adopting a managed float regime with adequate reserve buffers to respond more effectively to external shocks.

Third, the significant impact of money supply on reserves highlights the importance of coordinated monetary policy. Authorities can utilize open market operations, adjust reserve requirement ratios, or implement interest rate policies to support macroeconomic liquidity. At the same time, improving sterilization mechanisms and forecasting models is necessary to balance inflation control with reserve adequacy. This coordination becomes even more critical in the context of the U.S. interest rate tightening cycle, which could trigger capital outflows and currency pressure.

Fourth, although FDI was statistically insignificant in the long run, it remains economically relevant. Vietnam should focus not only on attracting foreign direct investment, but also on increasing FDI retention by encouraging reinvestment of earnings and reducing excessive profit repatriation. Policies that direct FDI toward high-tech and long-term sectors can improve its contribution to reserves.

Fifth, regarding GDP, while it shows a positive effect in the short run, its long-run negative relationship suggests that economic expansion must be accompanied by prudent external debt management and balanced growth. Authorities must carefully evaluate large-scale investments abroad to ensure they do not drain foreign exchange reserves. At the same time, tax reduction policies or productivity incentives may be used to stimulate domestic growth in a way that complements reserve stability.

Particularly, the Vietnamese government must recognize that maintaining excessively high foreign reserves can entail significant opportunity costs. Therefore, regular assessments of the optimal reserve level are essential to avoid the inefficiencies of over-accumulation.

Finally, in the longer term, Vietnam could explore the establishment of a stabilization or reserve fund, modeled on international best practices. Such a fund would help optimize reserve use, enhance transparency, and protect against future external shocks. Given emerging global trends such as de-dollarization, geopolitical fragmentation, and supply chain shifts, a more strategic and forward-looking reserve policy will be critical to safeguarding Vietnam's macroeconomic stability in the years ahead.

## SCIENTIFIC CONTRIBUTION

The manuscript clearly identifies a research gap; the manuscript extends or refines existing theories; the manuscript provides new datasets or empirical evidence; the manuscript presents statistically and practically significant findings; the manuscript opens new directions for further research; the manuscript offers policy/managerial/technological implications.

## AUTHOR CONTRIBUTIONS

CRedit: **Hoang Thanh Hien**: Conceptualization, Methodology, Writing - Original Draft, Supervision; **Vo Thi Hong Thuy**: Investigation, Validation, Visualization, Resources, Data Curation; **Huynh Thi Dieu Linh**: Writing - Review & Editing, Software, Formal Analysis.

## ACKNOWLEDGMENTS

Acknowledgments should concisely address all the contributions of the organizations and individuals that have enabled the research to be carried out (with their permission). Any conflict of interest should be mentioned.

## FUNDING

This research received no external funding.

## NO CONFLICT OF INTEREST STATEMENT

All authors declare that they have no conflict of interest.

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