

-RESEARCH ARTICLE-

THE IMPACT OF MACRO ECONOMIC FACTORS ON THE FED FUNDS RATE IN SOUTH EAST ASIAN EMERGING MARKETS

Nyoman Dyota Pramudita

Master of Science, University of Essex,
Colchester, United Kingdom

E-mail: nyoman.pramudita@binus.ac.id
<https://orcid.org/0000-0001-9647-9260>

Ivander

Master of Engineering, Binus University,
Jakarta, Indonesia

E-mail: ivander001@binus.ac.id
<https://orcid.org/0000-0003-1670-6043>

—Abstract—

Recent studies and policymakers must emphasize the importance of macroeconomic issues in determining the federal funds rate. Consequently, this article examines the impact of macroeconomic parameters like as gross domestic product (GDP) growth, exports, inflation, population growth, and foreign direct investment (FDI) on the fed funds rate in south Asian emerging nations. From 2011 through 2020, the article extracts secondary data from secondary sources such as World Development Indicators (WDI) and Central banks. In addition to using the robust standard error and the fixed effect model (FEM) to test the relationship, the article employs the robust standard error and the Fixed Effect Model (FEM). The results demonstrated that GDP growth, exports, inflation, population growth, and FDI positively and substantially affect the fed funds rate in south Asian emerging countries. Using understudied macroeconomic indicators, this article advises policymakers on changing the country's fed funds rate.

Keywords: GDP growth, exports, inflation, population growth, fed funds rate, south Asian emerging economics

Citation (APA): Pramudita, N. D., Ivander. (2022). The Impact of Macro Economic Factors on The Fed Funds Rate in South East Asian Emerging Markets. *International Journal of Economics and Finance Studies*, 14 (1), 340-357. doi:10.34111/ijefs. 20220015

1. INTRODUCTION

The economy of any country is a combination of multiple sectors. Each sector plays its unique role in the development of the economy. The banking sector is considered the backbone of the economy as almost every economic sector is associated with it. The whole banking industry is based on whether it's exchange or interest rate. One of the actual rates in the banking industry is the federal funds rate [Gomez, Landier, Sraer, and Thesmar \(2021\)](#). The federal funds rate is the interest rate charged by banks to other institutions for overnight loans of surplus cash from reserve accounts. Banks must maintain a reserve equal to a certain percentage of their deposits in a Federal Reserve account. Calculated as a percentage of a bank's total deposits, a reserve requirement is the amount of money a bank must maintain in its Fed account. Financial institutions must maintain non-interest-bearing accounts with Federal Reserve banks to ensure they have adequate funds to cover withdrawals from depositors and other obligations. Any excess funds in their reserve account are available for lending to other banks in need beyond the required minimum. The end-of-day balances in a bank's account are averaged across two-week reserve maintenance periods to determine if the bank meets its reserve requirements. If a bank expects to have higher end-of-day credits than necessary, it might lend the surplus to an institution that forecasts a balance shortage. The federal funds rate, or fed funds rate, is the maximum interest rate a lending bank can charge. Literature proposed that fed interest rating plays a vital role in developing the economy [\(Rudebusch, 2018; Vicondoa, 2019\)](#).

The relationship between the economy and the Fed's interest rate is vital and typical. Interest rates are primarily determined by economic factors such as GDP growth, inflation, exports, population growth, and foreign direct investment. Like banks, a significant portion of the economy plays a crucial role in GDP expansion. Interest is the cornerstone of the entire banking process. Moreover, inflation is another critical economic element that influences the performance of the banking industry [Mukhlis, Hidayah, and Retnasih \(2020\)](#). In addition, exports also passed through the banking system, where the interest rate played a significant role.

Moreover, FDI is a significant contributor to the economy. Before making an investment, international and national actors secure the highest possible return through the banking system [Assoumou-Ella, Bastidon, and Bonijoly \(2022\)](#). Thus, a significant change in Fed interest rates will significantly impact the economy. The nations of the South Asian Pacific consist of both developed and developing economies. South Asia's socio-economic outlook differs considerably from that of other economies throughout the globe. 1% of the world's wealthiest individuals hold 20% of global income and 54% of global wealth. South Asia has a more significant proportion of multidimensional poverty and global income than other regions. With a 1.3% share of the overall GDP, it provides shelter for 22% of the worldwide population [Yadav and Iqbal \(2021\)](#). [Figure 1](#) illustrates the loan interest rate in South Asia. Myanmar has a higher lending interest

rate, at 14.83%, than Thailand, with the lowest rate, at 3.29%. The present study will examine the FED funds rate in South Asian Pacific economies due to the fast fluctuations in lending interest rates.

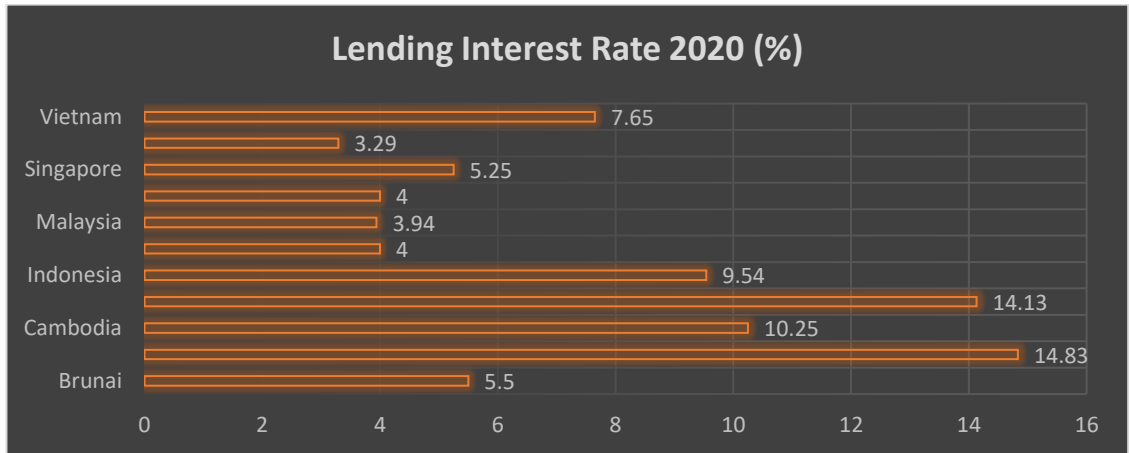


Figure 1: Lending Interest Rates in South Asia Economies

1) McGowan and Nosal (2020) and Schulhofer-Wohl and Clouse (2018) investigated whether FED funds have an association or impact on the excess reserves of the country (as a whole). In contrast, the present study will compare the FED funds rate with macroeconomic factors such as GDP growth, inflation, exports, population growth, and foreign direct investment in South Asian emerging economies. 2) while being one of the most examined issues alongside the federal funds rate and economic determinants, it has not yet realized its full potential as numerous of its facets remain to be investigated. 3) The equation containing the fed funds rate, the growth of the gross domestic product, inflation, exports, population growth, and foreign direct investment with the most current date set has never been tested in South Asian emerging economies, which include Brunei, Myanmar, Cambodia, Timor, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. 4) G. M. Afonso, Armenter, and Lester (2018) examined whether bank funds distribution affects FED funds, whereas the current study will examine the FED funds in several economic conditions and examine the equation using a new data set. 5) Afonso, Armenter, and Lester (2019) worked on the FED funds market model, whereas the current study will test the FED with some of the core economic factors, including GDP growth, inflation, exports, population growth, and foreign direct investment, and compare the equation to a new set of South Asian emerging economies. 6) Aboura (2022) examined the FED about digital money, whereas the current study will examine economic issues using a new data set of South Asian emerging economies. The significance of the study is that 1) it will highlight the importance of FED funds for the economic factors of the country, mainly South Asian emerging economies; 2) it will assist professionals in revising their policies regarding the economy, particularly FED, about the improvement of South Asian emerging

economies; and 3) it will also aid researchers in exploring additional aspects of FED's impact on the country's economy.

The paper is divided into different phases; the first phase is about the introduction, and after an introduction, the second phase of the study deals with evidence regarding the fed funds rate, gross domestic product growth, inflation, exports, population growth, and foreign direct investment in the light of the past studies. The third phase of the survey will spotlight the methodology applied to collect the data regarding fed funds rate, gross domestic product growth, inflation, exports, population growth, and foreign direct investment and analyze its validity. In the fourth phase, the results will be presented. The study implications, the conclusion, and future recommendations will be presented in the last and final phases.

2. LITERATURE REVIEW

Recent studies and policymakers must emphasize the importance of macroeconomic issues in determining the federal funds rate. Consequently, this article examines the impact of macroeconomic parameters like GDP growth, exports, inflation, population growth, and FDI on the fed funds rate in south Asian rising nations. Due to its impact on economic conditions, the relevance of gross domestic product is acknowledged internationally. To capture a nation's economic output, it is required to sustain and maintain gross domestic product growth. [Vicondoa \(2019\)](#) investigated the gross domestic product and private savings comparable to investments and related to federal funding. Expanding the gross domestic product is typically helpful for estimating the value of finished goods and services, their market value, and their monetary worth. The minor alterations affect the money in the financial sector of the gross domestic product. In a similar [Vlah Jerić, Zoričić, and Dolinar \(2020\)](#) investigated the atypical patterns of gross domestic product growth rates that directly influence the sometimes artificially maintained fed funds. Positive increase in the gross domestic product indicates a nation's economic health. Any depreciation in the value of monetary funds means unfavorable changes in the growth of the gross domestic product. Globally, the importance of gross domestic product is being acknowledged due to its influence on economic conditions. It is essential to sustain and maintain GDP growth to capture a country's economic output. The growth of a country's gross domestic product indicates its financial health. Any fall in the value of money denotes a slowing of the economic expansion pace. In addition, [Vlah Jerić et al. \(2020\)](#) examined the inflation and gross domestic product projections that stimulate the efficiency and bias of fed funds. Significant growth in the gross domestic product must be managed because it directly affects economic health. Economists use the GDP to determine whether or not a nation is experiencing a recession or economic expansion.

Additionally, investment decisions are contingent on the improvement of gross domestic product growth, as negative GDP growth has a direct impact on stock values. In addition,

Lovcha and Perez-Laborda (2018) examined the relationship between long memory, inflation persistence, and monetary policy shocks concerning the significance of fed funds. Numerous corresponding components in the GDP have direct and indirect effects on economic instability and Fed funds. International investors are interested in the monetary policies created in response to fluctuations in gross domestic product. Technology, natural resources, physical capital, and human resources have been selected as proxy components directly impacting GDP.

Most countries in the world are experiencing an inflation rate upsurge. These unfavorable swings and devaluation of money increase prices and affect the federal funds rate. Tweneboah and Alagidede (2019) enumerated the relationship between inflationary dynamics, inflation targeting, and dollarization regarding the viability of fed fund rates. When inflation rates are falling, and economic growth is low, the fed funds face a massive devaluation of their money's worth. This devaluation of currency diminishes the value of Federal Reserve funds and increases the number of foreign credits obtained.

In addition, Miyajima and Yetman (2019) explored the utility of fed funds with inflation targets in implementing flexible price allocations. While evaluating inflation data, monetary policy is formulated, and the new currency is issued, emphasizing economic value. The excessive amount of newly minted currency has a detrimental effect on the importance of money as inflation rates increase in the majority of the world's nations. These unfortunate currency fluctuations and devaluations increase prices and affect the federal budget. The Fed funds rate has fluctuated in reaction to various macroeconomic conditions, but inflation has substantially impacted interest rates.

When fed funds interest rates increase, credit rates for consumers also increase, resulting in defaults. Forgoing in view: Tran (2018) investigated the transmission channels of monetary policies and inflation to eliminate the barriers in fed fund rates. There are specific inflation targets that have detrimental effects on employees and individuals. Although more excellent inflation rates impact businesses, lower inflation rates strengthen the Fed funds rate on the open market. Similarly, Banerji and Achuthan (2019) examined the rise of inflation unrelated to the rising patterns in federal funds that muddled business cycles. This stability increases the value of money and diminishes the value of current credits in the fed funds rate. Fed funds have changed in response to various macroeconomic circumstances, but inflation has significantly affected increasing interest rates. When fed funds interest rates rise, consumer credit rates will increase proportionately, resulting in defaults.

Many countries' financial conditions depend on export levels. These exports contribute to developing critical monetary policies for the management of Fed funds. However, federal funds are designated for specific measurements kept for imports and exports. On the other side, increased exports enable governments to invest more money to get

optimal results. Consequently, [Gözüör and Can \(2017\)](#) investigated the causal relationships between economic growth, economic globalization, and export diversification related to the Fed funds rate. These results are based on effective policies or exports, excluding policies that negatively impact the fed funds. In addition, [Searle \(2020\)](#) analyzed the export potential for various products that effectively achieve fed fund goals. Due to growing investment and profit inflows, rising exports have a beneficial effect on the economic climate. Due to increased investments, imports have also seized a portion of federal funds, although rising taxes have lowered earnings and federal funds. The financial situations of many nations are dependent on their export levels. These exports contribute to the formulation of vital monetary policies for managing federal funds. Even though federal funds are assigned for specific quantities preserved for import and export operations, these monies cannot be used for domestic purchases.

On the other hand, increasing exports allows governments to invest more money to get maximum results. Immediate harm is caused by the absence of import regulations, which is mitigated by higher exports. These exports may comprise a mixture of locally developed and foreign direct investment-aided products. [Lahrech, Faribi, Al-Malkawi, and Sylwester \(2018\)](#) evaluated the performance of exports affecting emerging markets and assisting policymakers in maintaining the fed funds rate. The considerable increase in exports at higher prices to foreign countries dramatically increases the compounding of cash. When exports increase, investors anticipate making investments in developed and developing nations. These investments support an increase in exports through the utilization of innovative equipment. In addition, [Shittu, Hassan, and Nawaz \(2018\)](#) highlighted the significance of export growth, which directly impacts economic growth and motivates strategies to maintain the fed funds rate. The Fed funds are directly affected by the absence of import policies, assisted by increased exports. These exports may include various products resulting from local efforts and foreign direct investments.

As a result of rapid population growth, several nations face immense challenges. Due to a lack of infrastructure, the expanding population cannot contribute to the economic situation. Population expansion is favorably correlated with economic growth because individual efforts are more consistent in augmenting federal funding. In this context, [Miyakoshi and Shimada \(2019\)](#) analyzed the population expansion and its favorable disposition toward immigrants, who optimistically contribute to maintaining federal coffers. The per capita GDP growth is essential for the independent contribution to the federal finances. These funds are administered and maintained via monetary policies intended to control population increase.

Similarly, [Searle \(2020\)](#) highlighted the development and population growth and their consequence on the governance of fed funds. The contribution of population growth to economic growth and federal funds is more significant. Due to a lack of priority placed on population growth, slight mishandling of Fed funds could be disastrous for the

monetary system as population growth causes substantial challenges in numerous nations. There are insufficient facilities for the rising non-economically productive population. Individual efforts are more consistent in increasing Federal Reserve funds. Therefore, economic expansion is positively correlated with population growth. Due to the rise in the education population, the fed funds rate target has been raised multiple times.

Additionally, several sectors depend on the people. Nonetheless, the population is becoming a significant problem due to the rising unemployment rate. In addition, [Balie and Horn \(2021\)](#) investigated the effects of population growth on municipal revenues, which contribute to net migration and natural development in monetary policy. Investors will consider investing in a country when there are more human resources and a growing educated population. This investment is essential for the maintenance and viability of federal funding. [Vicondoa \(2019\)](#) highlighted the unexpected and expected shocks of population growth and its dissemination to emerging economies. The relationship between the monetary fund and the fed funds rate is direct because interest rates are imposed over industrial sectors when the population plays a significant role. Consequently, the education population expansion leads to successive increases in Fed Funds rate objectives. Numerous industries are likewise dependent on the people, but on the other hand, the population is a huge issue due to the rising unemployment rate.

The world is aware of the federal funds rate due to the growing impact of foreign direct investment. Due to a lack of investment and policies, many industrialized nations cannot sustain the Fed's funds. These investments are vital to both industrialized and emerging countries, as a little shift in the exchange rate causes the fed funds to fluctuate. In this regard, [Hsieh, Boarelli, and Vu \(2019\)](#) examined the effects of economic policy uncertainty and clarity on the outflows of FDI for federal funds. When foreign direct investments are more significant, the Federal Reserve achieves significantly more funds in the respective countries. In addition, [Kumari and Sharma \(2017\)](#) emphasized the foreign direct investment factors essential for the sustainability of fed funds rates. It is dependent on the higher rates on assets that attract foreign direct investment, and FDI is linked to federal funds that want higher returns. Due to the expansion of federal reserves, the fed funds rate is boosted. This increase often affects the overall interest rate. Due to the expanding impact of foreign direct investment, the federal funds rate is well-known internationally. Due to a lack of investment and policy, many developed nations cannot support the Federal Reserve's funds. Because a small shift in the exchange rate increases the fed funds, these investments are essential for both developed and developing nations. In addition, [Bermejo Carbonell and Werner \(2018\)](#) discussed the significance of foreign direct investment's contribution to economic growth and financial resources. When economic interest rates are increased, there is a tendency for the dollar to strengthen. This strengthening of the dollar ultimately affects the value of a country's currency. This leads to inflation, currency devaluation, and diminished fed reserves. [Lakdawala \(2019\)](#)

highlighted the effects of monetary policy and economic activity on the typical shift in fed fund rates. Increases and decreases in fed funds rates are directly related to dollar exchange rate fluctuations that affect other currencies. Frequent changes in the dollar exchange rate of some nations also give investors the impression of danger. The risk-taking elements consider the region with the most fluctuating prices to be the most conducive to attracting foreign direct investment.

3. RESEARCH METHODOLOGY

The article investigates the role of GDP growth, exports, inflation, population growth, and FDI on the fed funds rate in south Asian emerging economies such as Brunei, Myanmar, Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. The article has extracted the secondary data from secondary sources such as WDI and Central banks from 2011 to 2020. In addition to using the robust standard error and FEM to test the relationship, the paper also employs the total standard error. The equation is given as under:

$$FFR_{it} = \alpha_0 + \beta_1 GDPG_{it} + \beta_2 INF_{it} + \beta_3 EXP_{it} + \beta_4 POPG_{it} + \beta_5 FDI_{it} + e_{it} \quad (1)$$

Where;

FFR	=	Fed Funds Rate
i	=	Country
t	=	Time Period
GDPG	=	Gross Domestic Product Growth
INF	=	Inflation
EXP	=	Exports
POPG	=	Population Growth
FDI	=	Foreign Direct Investment

The present research has used the fed funds rate as the predictive variable and measured the interest rate of banks and credit institutions. In addition, the article has also taken five macro-economic factors as the predictors of the study such as GDP growth measured as the annual percentage growth in GDP, inflation measured as the annual percentage growth in inflation, and exports measured as the exports of goods and services (% of GDP), population growth measured as the percentage growth in population and FDI measured as the FDI inflows (% of GDP). These measurements and their sources are mentioned in [Table 1](#).

The article has employed descriptive statistics that exposed the details of all the constructs used in the article, such as the standard deviation, mean, maximum, and minimum values. The article has also applied the correlation matrix to check the directional linkage between the constructs. The research has also applied the variance

inflation factor (VIF) to examine the multicollinearity, and the equations for VIF are given below:

Table 1: Variables with Measurements

S#	Variables	Measurement	Sources
01	Fed Funds Rate	Interest rate of banks and credit institutions	Central Banks
02	Gross Domestic Product Growth	GDP growth (annual percentage)	WDI
03	Inflation	Inflation (annual percentage)	WDI
04	Exports	Exports of goods and services (% of GDP)	WDI
05	Population Growth	Population growth (annual percentage)	WDI
06	Foreign Direct Investment	FDI net inflows (% of GDP)	WDI

$$R^2_Y \quad \rightarrow Y_{it} = \alpha_0 + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + e_{it} \quad (2)$$

$$j = R^2_Y, R^2_{X1}, R^2_{X2}, R^2_{X3}, R^2_{X4}, R^2_{X5} \quad (3)$$

$$Tolerance = 1 - R_j^2 \quad VIF = \frac{1}{Tolerance} \quad (4)$$

In addition, the research has also applied the Hausman test to check the appropriateness of the model. If the probability value is lower than 0.05, FEM is appropriate and vice versa. The equation for the Hausman test is given as under:

$$H = (b_1 - b_0) (Var(b_0) - Var(b_1)) (b_1 - b_0) \quad (5)$$

Moreover, the Hausman test exposed that the probability value is less than 0.05, so telling the FEM is appropriate. Thus, FEM is applied in the study because the significant characteristic of FEM is that it is a suitable model when the Hausman test probability value is lower than 0.05. In addition, FEM can control the issues related to models such as heteroscedasticity and auto-correlation [Abe, Taniguchi, Kawachi, Watanabe, and Tamiya \(2021\)](#). The equation for the model is given as under:

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + u_{it} \quad (6)$$

In equation (6), subscript (i) shows the "individual country" that makes a difference between the countries according to their characteristics. The FEM equation with variables used is shown below:

$$FFE_{it} = \beta_{1i} + \beta_2 GDPG_{it} + \beta_3 INF_{it} + \beta_4 EXP_{it} + \beta_5 PG_{it} + \beta_6 FDI_{it} + u_{it} \quad (7)$$

Finally, the article has also used the robust standard error to verify the FEM results regarding the linkage among variables. It is a suitable model when the cross-sections (countries) are more than the time series (years) [Altyar, Habeeb, and Sedeeq \(2020\)](#). The current study has taken eleven emerging countries and ten years of data. Thus, cross-sectionals are more than the time series. Hence, this is a suitable model for the study. The equation is given as under:

$$FFE_{it} = \beta_1 GDPG_{it} + \beta_2 INF_{it} + \beta_3 EXP_{it} + \beta_4 PG_{it} + \beta_5 FDI_{it} + \varepsilon_{it} \quad (8)$$

4. FINDINGS OF THE STUDY

Utilizing descriptive statistics, the article revealed the specifics of all the article's constructs, including the standard deviation, mean, maximum, and minimum values. The average value of FFE was 9.152 percent, whereas the average value of GDPG was 4.91 percent. In addition, the results revealed that the average value of INF was 3.182%, and the average value of EXP was 9.201%. In addition, the data showed that the average value of PG was 5.532%, and the average value of FDI was 4.092%. These outcomes are presented in [Table 2](#).

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
FFE	110	9.152	1.021	7.271	15.102
GDPG	110	4.911	0.281	3.292	5.192
INF	110	3.182	0.172	2.901	6.718
EXP	110	9.201	1.281	7.291	17.291
PG	110	5.532	1.011	2.019	9.112
FDI	110	4.092	0.212	2.910	8.190

The article has also applied the correlation matrix to check the directional linkage between the constructs. The results indicated that GDP growth, exports, inflation, population growth, and FDI positively and significantly impact the fed funds rate in south Asian emerging economies. These results are given in [Table 3](#).

Table 3: Matrix of Correlations

Variables	FFE	GDPG	INF	EXP	PG	FDI
FFE	1.000					
GDPG	0.439	1.000				
INF	0.319	0.711	1.000			
EXP	0.092	0.172	0.192	1.000		
PG	0.672	0.519	0.719	-0.292	1.000	
FDI	0.715	0.271	0.129	0.365	0.349	1.000

The VIF was also utilized to investigate multicollinearity. According to the results, the VIF values are less than five, and the reciprocal of VIF is more than 0.20. These results demonstrated that there is no multicollinearity concern. [Table 4](#) provides these results.

Table 4: Variance Inflation Factor

	VIF	1/VIF
GDPG	2.093	0.477
INF	3.019	0.331
EXP	1.903	0.525
PG	1.829	0.547
FDI	2.102	0.576
Mean VIF	2.189	.

In addition, the research has also applied the Hausman test to check the appropriateness of the model. If the probability value is lower than 0.05, FEM is appropriate and vice versa. The Hausman test results exposed that the probability value is less than 0.05, and exposed the FEM is appropriate. These results are given in [Table 5](#).

Table 5: Hausman Test

	Coef.
Chi-square test value	4.123
P-value	0.002

The results of FEM indicated that the GDP growth, exports, inflation, population growth, and FDI have a positive and significant impact on the fed funds rate in south Asian emerging economies. The results also exposed that with the one percent change in GDPG, the FFE will also change by 0.679 percent in the same direction. The findings also indicated that if there is a one percent increase in INF, the FFE will increase by 1.901 percent and vice versa. In addition, the results also exposed that with the one percent change in EXP, the FFE will also change by 0.724 percent in the same direction. The findings also indicated that if one percent increase in PG, the FFE will also increase by 0.519 percent and vice versa. Finally, the results also exposed that the FFE will change by 0.483 percent in the same direction as the one percent change in FDI. The findings also indicated that 56.1 percent of the changes in FFE are due to the GDPG, INF, EXP, PG, and FDI. These results are given in [Table 6](#).

The results of robust standard error indicated that the GDP growth, exports, inflation, population growth, and FDI have a positive and significant impact on the fed funds rate in south Asian emerging economies. The findings also indicated that 51.1 percent of the changes in FFE are due to the GDPG, INF, EXP, PG, and FDI. These results are given in [Table 7](#).

Table 6: Fixed Effect Model

FFE	Beta	S.D.	t-value	p-value	L.L.	U.L.	Sig
GDPG	0.679	0.193	3.52	0.007	0.903	1.892	**
INF	1.901	0.709	2.68	0.023	1.021	3.123	*
EXP	0.724	0.244	2.97	0.015	1.291	2.099	*
PG	0.519	0.219	2.37	0.036	1.992	3.390	*
FDI	0.483	0.192	2.52	0.029	0.200	1.902	*
Constant	5.872	2.712	2.17	0.044	0.136	1.943	*
R-squared		0.561	Number of obs		110		
F-test		2.328	Prob > F		0.121		
*** $p < .01$, ** $p < .05$, * $p < .1$							

Table 7: Robust Standard Error

FFE	Beta	S.D.	t	P>t	L.L.	U.L.
GDPG	0.890	0.192	4.635	0.000	0.432	1.903
INF	1.291	0.291	4.421	0.000	1.029	2.991
EXP	0.710	0.299	2.375	0.021	0.172	1.999
PG	0.207	0.012	17.250	0.000	0.092	1.377
FDI	1.902	0.539	3.529	0.006	1.088	2.987
_cons	2.820	0.362	7.790	0.000	3.721	8.558
R-squared		0.511	Number of obs		110	

5. DISCUSSIONS

Results demonstrated a favorable relationship between GDP growth and the fed fund rate. These findings are corroborated by [Lee and Werner \(2018\)](#), who argue that when a country's GDP growth is strong, the need for raw materials, resources, technology, labor, and management likewise increases to produce more and of a higher quality. In this case, when there is a high demand for production factors and the potential for increased profits, enterprises may seek loans from banks to recoup their losses. In this instance, financial institutions have a greater need for funds. Therefore they boost the fed fund rate to avoid a financial crisis.

Consequently, GDP growth raises the Fed funds rate. These findings concur with [Blazsek, Escribano, and Licht \(2021\)](#), who found that as production, manufacturing, and trading activities are stimulated, the demand for multiple financial services also grows. Therefore, all financial institutions may require funds immediately to achieve an even greater return. Due to the increasing demand for overnight loans, the fed funds rate could rise in this circumstance.

The data also revealed a positive relationship between inflation and the fed fund rate. These results concur with (Taylor, 2019), who investigates the phenomenon of rising prices during an inflationary time. Due to the increase in the prices of goods and services utilized as economic resources, corporations require loans to finance their internal and external operations. This stimulates the operations of financial institutions and raises demand for Federal Reserve funds, which carry a significantly higher interest rate. Therefore, inflation adds positively to the fed fund rate. These results are also consistent with Eldomiaty, Saeed, Schulhofer-Wohl and Clouse (2018); Searle (2020), who found that during an inflationary period, the rate of cash reserves for commercial banks and other financial institutions rises due to the increase in the cost of living and the acceleration of economic practices. The rising rate of cash reserves raises the need for overnight unsecured loans by enterprises in the financial sector, increasing the fed funds rate. These findings are also corroborated by Akbar (2019), who notes that exposure to an inflationary period raises the need to engage in financial activities. Therefore there may be an increase in the fed funds rate to give overnight loans.

The results demonstrated a positive relationship between exports and the fed fund rate. Hu and Jung (2018), who investigate the effect of exports in affecting the fed fund rate, support these findings. According to this study, the country strives to grow exports by promoting the usage of new raw materials, technology, and other resources to meet the international market's demands. To adopt innovation-based high-quality resources, raw materials, and technologies, a greater quantity of loans from commercial banks or other loan-providing organizations is necessary. When the demand for loans exceeds the available cash, the Fed Fund is required, and its rate rises. Under Bakari, Mabroukib, and Othmani (2018), exports boost economic activities such as infrastructure development, technological processes, industrial movements, and transportation infrastructure. The growth and stimulation in these economic sectors require additional investment to meet export demands. With the need for extra investment, loans and cash withdrawals may increase. As a result, the demand for fed funds increases, and the fed funds rate rises. Therefore, export growth increases the Fed funds rate.

The results demonstrated a favorable relationship between population increase and the federal funds rate. Ali, El-Adaway, and Dagli (2020) support these findings, which sheds insight on the effects of population expansion on the fed fund rate. When there is a vast population in an economy or a significant rise in population, the number of economic and social activities likewise increases. Numerous economic activities rely on the resources acquired with borrowed funds. Therefore, the increasing trends in borrowing compelled financial institutions to obtain overnight loans.

Consequently, the fed fund rate rises. Results demonstrated a favorable relationship between FDI and the fed fund rate. These results are supported by Alola and Alola (2019), who explains that when more individuals or firms are attracted to the domestic country and continue to invest heavily in the various projects within the domestic

country, this gives rise to the manufacturing, constructive, trading, and development activities within the country, and the increase in these practices encourages the borrowing and system and financial institutions have to take over. Thus, the rise in FDI increases the fed fund rate.

6. IMPLICATIONS

Because of considerable contributions to literature, the present study has great theoretical significance. This research is about the influences of macro-economic factors like GDP growth, inflation, exports, population growth, and FDI on the fed fund rate. The researchers and scholars have addressed the fed fund rates and examined the impacts of macro-economic factors like GDP growth, inflation, exports, population growth, and FDI on the fed fund rate. But the effects of macro-economic factors like GDP growth, inflation, exports, population growth, and FDI on the fed fund rate have been examined at different times and with diverse opinions. The present removes this literary gap by analyzing the impacts of GDP growth, inflation, exports, population growth, and FDI on the fed fund rate. This study examines the relation direction among macro-economic factors like GDP growth, inflation, exports, population growth, FDI, and fed fund rate in South East Asian emerging markets. That is in itself a distinction in literature. As the financial sector comprises institutions like banks, saving and loans institutions, and credit-providing firms, which play a significant role in any economy, this article has excellent empirical significance because of its focus on the fed funds rate among financial institutions. The report guides the policymakers regarding adjusting the fed funds rate in the country using understudy macro-economic factors. The financial institutions can have guidance from this study for forming their policies for the performance of basic like deposits, withdrawals, loans, and their return, etc. as this study describes that the increase in economic activities affects the basic functions of financial institutions and thus, the rate of fed funds. The study suggests that the macro-economic factors like GDP growth, inflation, exports, population growth, and FDI helps to anticipate the fed fund rate.

7. CONCLUSIONS AND LIMITATIONS

The study aimed to examine the impact of macroeconomic variables such as GDP growth, inflation, exports, population growth, and FDI on the fed fund rate. Southeast Asian emerging markets were surveyed to collect quantitative data on macroeconomic indicators such as GDP growth, inflation, exports, population growth, FDI, and the fed fund rate and their relationship. The study revealed that macroeconomic variables such as GDP growth, inflation, exports, population growth, and FDI positively affect the fed fund rate. The data demonstrated that the nation's GDP is expanding rapidly. The rising demand for financial services compels the financial institution to offer overnight loans and raise the fed funds rate.

Likewise, the increased demand for financial operations in an inflationary climate may increase the fed funds rate for overnight loans. According to the results, to export specialized goods and services, local businesses must expedite the design and production of export goods and the provision of services to overseas clients. This increases the requirement for investment capital, which ultimately leads to an increase in the fed fund rate when required from financial institutions. Similarly, population growth raises the need for loans that might provide financial resources for household and economic endeavors. Additionally, the change in FDI improves economic processes. As a result, the growth in financial institution assets increases the fed fund rate.

There are certain limitations associated with this study. Future research is anticipated to overcome these constraints. To study the fed fund rate, this study focuses solely on macroeconomic activity such as GDP growth, inflation, exports, population growth, and FDI. The fed fund rate can also be affected by various other variables, including technical improvements, the management of financial institutions, and marketing trends. Due to the absence of these variables, the study's scope is restricted. Future authors must widen their perspectives and include these variables in their research for complete research. This study also investigates the effects of GDP growth, inflation, exports, population growth, and FDI on the fed funds rate in South East Asian emerging markets. This study's concentration on the financial sector applies to all economies. The authors must examine the relationship between GDP growth, inflation, exports, population growth, FDI, and the fed fund rate for various economic regions.

REFERENCES

- Abe, K., Taniguchi, Y., Kawachi, I., Watanabe, T., & Tamiya, N. (2021). Municipal long-term care workforce supply and in-home deaths at the end of life: Panel data analysis with a fixed-effect model in Japan. *Geriatrics & Gerontology International*, 21(8), 712-717. doi:<https://doi.org/10.1111/ggi.14200>
- Aboura, S. (2022). A note on the Bitcoin and Fed Funds rate. *Empirical Economics*, 1-27. doi:<https://doi.org/10.1007/s00181-022-02207-7>
- Afonso, G., Armenter, R., & Lester, B. (2019). A model of the federal funds market: yesterday, today, and tomorrow. *Review of Economic Dynamics*, 33, 177-204. doi:<https://doi.org/10.1016/j.red.2019.04.004>
- Akbar, A. B. (2019). An Analysis The Effect Of Exchange Rate, Inflation And Interest On Stock Return. *Jurnal Education and Economics*, 2(4), 501-506.
- Ali, G. G., El-Adaway, I. H., & Dagli, C. H. (2020). A system dynamics approach for study of population growth and the residential housing market in the US. *Procedia Computer Science*, 168, 154-160. doi:<https://doi.org/10.1016/j.procs.2020.02.281>
- Alola, A. A., & Alola, U. V. (2019). The dynamic nexus of crop production and population growth: housing market sustainability pathway. *Environmental*

- Science and Pollution Research*, 26(7), 6472-6480.
doi:<https://doi.org/10.1007/s11356-018-04074-1>
- Altyar, A. R., Habeeb, F. J., & Sedeeq, M. M. (2020). The impact of knowledge and human resource management on the economic growth of Arab countries: A panel GMM and robust standard error approach. *Polish Journal of Management Studies*, 21(1), 48-60. doi:<https://doi.org/10.17512/pjms.2020.21.1.04>
- Assoumou-Ella, G., Bastidon, C., & Bonijoly, B. (2022). Fed tapering announcements: Impact on Middle Eastern and African financial markets. *Research in International Business and Finance*, 59, 101558. doi:<https://doi.org/10.1016/j.ribaf.2021.101558>
- Bakari, S., Mabroukib, M., & Othmani, A. (2018). The six linkages between foreign direct investment, domestic investment, exports, imports, labor force and economic growth: new empirical and policy analysis from Nigeria. *Journal of Smart Economic Growth*, 3(1), 25-43. doi:<https://doi.org/10.25229/beta.337367>
- Balie, Q., & Horn, A. (2021). The impact of population growth on municipal revenue: Implications for South African municipalities. *Development Southern Africa*, 38(6), 1046-1058. doi:<https://doi.org/10.1080/0376835X.2021.1975534>
- Banerji, A., & Achuthan, L. (2019). What the Fed Has Forgotten: The Inflation Cycle Is Not the Business Cycle. *Challenge*, 62(4), 242-252. doi:<https://doi.org/10.1080/05775132.2019.1632000>
- Bermejo Carbonell, J., & Werner, R. A. (2018). Does foreign direct investment generate economic growth? A new empirical approach applied to Spain. *Economic geography*, 94(4), 425-456. doi:<https://doi.org/10.1080/00130095.2017.1393312>
- Blazsek, S., Escribano, A., & Licht, A. (2021). Co-integration with score-driven models: an application to US real GDP growth, US inflation rate, and effective federal funds rate. *Macroeconomic Dynamics*, 1-21. doi:<https://doi.org/10.1017/S1365100521000365>
- Gomez, M., Landier, A., Sraer, D., & Thesmar, D. (2021). Banks' exposure to interest rate risk and the transmission of monetary policy. *Journal of Monetary Economics*, 117, 543-570. doi:<https://doi.org/10.1016/j.jmoneco.2020.03.011>
- Gözüör, G., & Can, M. (2017). Causal linkages among the product diversification of exports, economic globalization and economic growth. *Review of Development Economics*, 21(3), 888-908. doi:<https://doi.org/10.1111/rode.12301>
- Hsieh, H.-C., Boarelli, S., & Vu, T. H. C. (2019). The effects of economic policy uncertainty on outward foreign direct investment. *International Review of Economics & Finance*, 64, 377-392. doi:<https://doi.org/10.1016/j.iref.2019.08.004>
- Hu, Y., & Jung, H. (2018). The impact of US real effective exchange rates and short term interest rates on China's exports. *The Journal of the Convergence on Culture Technology*, 4(4), 155-160.

- Kumari, R., & Sharma, A. K. (2017). Determinants of foreign direct investment in developing countries: a panel data study. *International Journal of Emerging Markets*. doi:<https://doi.org/10.1108/IJoEM-10-2014-0169>
- Lahrech, A., Faribi, A., Al-Malkawi, H.-A. N., & Sylwester, K. (2018). The impact of the global financial crisis on Moroccan exports: A gravity model approach. *African Journal of Economic and Management Studies*. doi:<https://doi.org/10.1108/AJEMS-03-2018-0075>
- Lakdawala, A. (2019). Decomposing the effects of monetary policy using an external instruments SVAR. *Journal of applied econometrics*, 34(6), 934-950. doi:<https://doi.org/10.1002/jae.2721>
- Lee, K.-S., & Werner, R. A. (2018). Reconsidering monetary policy: An empirical examination of the relationship between interest rates and nominal GDP growth in the US, UK, Germany and Japan. *Ecological Economics*, 146, 26-34. doi:<https://doi.org/10.1016/j.ecolecon.2017.08.013>
- Lovcha, Y., & Perez-Laborda, A. (2018). Monetary policy shocks, inflation persistence, and long memory. *Journal of Macroeconomics*, 55, 117-127. doi:<https://doi.org/10.1016/j.jmacro.2017.10.006>
- McGowan, J., & Nosal, E. (2020). How did the fed funds market change when excess reserves were abundant? *Economic Policy Review*, 26(1). doi:<https://doi.org/10.2139/ssrn.3634992>
- Miyajima, K., & Yetman, J. (2019). Assessing inflation expectations anchoring for heterogeneous agents: analysts, businesses and trade unions. *Applied Economics*, 51(41), 4499-4515. doi:<https://doi.org/10.1080/00036846.2019.1593317>
- Miyakoshi, T., & Shimada, A. (2019). Which countries show favour towards negative, zero or positive population growth? *Applied economics letters*, 26(4), 295-301. doi:<https://doi.org/10.1080/13504851.2018.1467548>
- Mukhlis, I., Hidayah, I., & Retnasih, N. R. (2020). Interest Rate Volatility of the Federal Funds Rate: Response of the Bank Indonesia and its Impact on the Indonesian Economic Stability. *Journal of Central Banking Theory and Practice*, 9(1), 111-133. doi:<https://doi.org/10.2478/jcbtp-2020-0007>
- Rudebusch, G. (2018). A review of the fed's unconventional monetary policy. *FRBSF Economic Letter*, 27, 1-5.
- Schulhofer-Wohl, S., & Clouse, J. A. (2018). A Sequential Bargaining Model of the Fed Funds Market with Excess Reserves. doi:<https://doi.org/10.21033/wp-2018-08>
- Searle, G. H. (2020). Population growth and development: an outcome of Sydney's metropolitan governance. *Australian Planner*, 56(2), 65-72. doi:<https://doi.org/10.1080/07293682.2020.1739095>
- Shittu, W. O., Hassan, S., & Nawaz, M. A. (2018). The nexus between external debt, corruption and economic growth: evidence from five SSA countries. *African Journal of Economic and Management Studies*. doi:<https://doi.org/10.1108/AJEMS-07-2017-0171>

- Taylor, J. B. (2019). Inflation targeting in high inflation emerging economies: Lessons about rules and instruments. *Journal of Applied Economics*, 22(1), 103-116. doi:<https://doi.org/10.1080/15140326.2019.1565396>
- Tran, N. (2018). The long-run analysis of monetary policy transmission channels on inflation: a VECM approach. *Journal of the Asia Pacific Economy*, 23(1), 17-30. doi:<https://doi.org/10.1080/13547860.2018.1429199>
- Tweneboah, G., & Alagidede, P. (2019). Dollarization, inflation targeting, and inflationary dynamics in Ghana. *Journal of African Business*, 20(3), 358-375. doi:<https://doi.org/10.1080/15228916.2019.1581011>
- Vicondoa, A. (2019). Monetary news in the United States and business cycles in emerging economies. *Journal of International Economics*, 117, 79-90. doi:<https://doi.org/10.1016/j.jinteco.2018.12.002>
- Vlah Jerić, S., Zoričić, D., & Dolinar, D. (2020). Analysis of forecasts of GDP growth and inflation for the Croatian economy. *Economic research-Ekonomska istraživanja*, 33(1), 310-330. doi:<https://doi.org/10.1080/1331677X.2019.1632727>
- Yadav, A., & Iqbal, B. A. (2021). Socio-economic scenario of South Asia: An overview of impacts of COVID-19. *South Asian Survey*, 28(1), 20-37. doi:<https://doi.org/10.1177/0971523121994441>