

# Analysis of the Effect of Inflation, Interest Rate, Exchange Rate, and National Income on Financial Deepening in Indonesia From 2000 to 2020

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## ABSTRACT

This study aims to examine several factors that influence inflation, interest rates, currency exchange rates, and national income on financial deepening in Indonesia for the period 2000-2020. This research was conducted using time-series data in the form of quarters from 2000 to 2020. The analysis results for this model uncovered that the variables of currency exchange rate and national income had a significant effect on financial deepening. Meanwhile, the inflation and interest rates variables did not significantly affect financial deepening.

**Keywords:** Financial deepening, currency exchange rates, national income.

## 1. INTRODUCTION

The development of the financial sector cannot be separated from economic development in a country. The economy's financial sector has an important role in increasing economic growth. The economic growth of a country will be determined by the development of the financial sector because it involves the planning and implementing policies to move the wheels of the Indonesian economy. Here, financial deepening is needed to improve the financial sector to play a significant role and shows an increase in the role and activities of financial services for economic growth in a country region [1].

However, the impact of the COVID-19 pandemic as a health problem then transitioned into a social and economic problem at a very fast tempo. Referring to the World Bank's report July 2020 Indonesian Economic Prospect Edition, "The long road to recovery", Indonesia's economic performance only grew by zero percent [2]. Still, there is a second-worst scenario, where the Indonesian economy experiences a contraction of -2 percent (minus two percent), which is influenced by the external environment in the form of a worse global recession plus more stringent Large-Scale Social Restrictions (PSBB) in the nation's capital

and many countries areas, which directly affect gross domestic product [3].

Then, the extraordinary socioeconomic pressure (under high pressure) demands an immediate arrangement by reformatting the state budget posture that is adaptive to the economic turbulence impacted by the pandemic. Also, economic activity is interrupted from two sides at once, both on the demand side and on the supply side [3]. The accumulation of the spread of the COVID-19 pandemic directly and severely suppressed the regional economy, causing investment to weaken, business cessation, and impacting on state financial management so that the state budget was revised twice, and national economic recovery efforts were made. Efforts to suppress the impact of COVID-19 are the success of steps in handling the COVID-19 problem, which is a determining factor that greatly influences its various risks on the economy and the financial sector; thus, consistency and cooperation of all components of the nation are required.

Moreover, inflation is an important economic indicator; the rate of change is always tried to be low and stable not to cause macroeconomic diseases, which will later impact instability in the economy [4]. Inflation is also the price of an item increase within a certain period in an economic area. The increase in prices in inflation occurs from period to

period, and the rate of increase varies from one region to another [5].

Next, the interest rate is the price or fee paid by the borrower of money to the lender to use money in a period, divided by the amount borrowed. From the lender's point of view, the price or fee charged is compensation for delaying consumption over the loan period [6]. The interest rate should be used as a weighted average of the interest rates of financial wealth that gives the rate of return [25].

Meanwhile, the Rupiah exchange rate against the US dollar plays a central role in international trade because the Rupiah exchange rate against the US dollar allows us to compare the prices of all goods and services produced by various countries [28]. When a country's economic conditions change, it is usually followed by a substantial change in the exchange rate. The Rupiah exchange rate also compares the value or price of the Rupiah currency with other currencies. A stable exchange rate is needed to achieve a conducive business climate for improving the business world [7].

In this case, the policy of financial deepening certainly has several risks and shocks faced by the financial sector. The greater the ratio, the greater the ratio is shown, and the more efficient the financial system allocates and mobilizes funds to accelerate the country's economic growth. The component in the financial deepening ratio consists of broad money or M2 divided by GDP [1]. Then, the role of financial institutions in determining the ratio of the money supply as a source of funds is a strong supporting factor in the effectiveness of financial deepening. The greater the amount of money circulating in the community, the greater the impetus for the success of financial deepening [8].

In developing countries, where money markets and tax systems are not well developed, the effect of inflation on the distribution of income is often used to increase the percentage of government revenue to national income [27]. The higher the income, the greater the incentives received by the community in economic activities. This high income ultimately impacts the higher demand for goods and services in the economy. In the context of macroeconomics, income is defined as the total goods and services (output) produced by a country's economy in a certain period. High income indicates that the output produced by the economy is increasing [9].

Indicators that can affect the money supply in a country also include interest rates. When interest rates increase, it will indirectly reduce the money supply in society, which tends to prefer to save rather than carry out consumption activities. In addition, Indonesia needs to prepare to maintain

financial depth in preparing for all risks that occur if the exchange rate is unstable or experiencing shocks. Fluctuating exchange rates then will affect the company's decision to invest.

Furthermore, inflation is one of the variables that will impact the economic growth of a country. Each variable has its relationship and influence to achieve stability and good economic growth, and it is necessary to determine the efficiency of the financial sector precisely determined. To deepen the financial sector, namely increasing the ratio of domestic savings to income, the composition of national income consists of consumption goods and investment goods; in general, it is said that investment spending is more influenced by interest rates than consumption expenditure [26]. Thus, this study aims to determine the effect of interest rates, national income, exchange rates, and national income on financial deepening in Indonesia.

This research on financial deepening has not been done by many previous researchers. Several studies that examine financial deepening used the interest rate variable only. From the results of those studies, there was a positive and significant relationship between the interest rate and financial deepening. As research conducted [10], the results of hypothesis testing revealed a positive and significant effect on financial deepening and interest rates. However, another study [11] gave different results. The results of their research suggested that the interest rate by the financial deepening had a negative relationship, while financial deepening has increased every year due to decreases in the SBI rate. As an indication of improvement in the economy in Indonesia, low-interest rates will provide an alternative for investors to invest through stocks that are relatively more profitable so that companies will invest with ease. From some of these descriptions, it is requisite to conduct research related to financial deepening in Indonesia to know the development of the Indonesian state because the higher the financial ratio, the deeper the financial sector, signifying that Indonesia's development is getting faster. Viewed from the financial sector in Indonesia, financial deepening is one of the important steps in developing a country's financial market.

Based on the above phenomenon, the researchers are interested in conducting a study titled "Analysis Of The Effect Of Inflation, Interest Rate, Exchange Rate, And National Income On Financial Deepening In Indonesia From 2000 To 2020."

## 2. LITERATURE REVIEW

### a. Financial Deepening

Financial deepening is a reference used to indicate an increase in the role and activities of financial services in the economy. Increasing the role and activities of financial services leads to more diverse choices of financial services that the public can access with a wider scope [12]. Overall, it will reduce the value of currency purchasing power, thus causing the financial sector to decline.

### b. Inflation

Inflation is a condition in which the prices of an item increase within a certain period in an economic area. The increase in prices in inflation occurs periodically, and the rate of increase differs from one region to another. 5]. The increase in the price of goods in inflation occurs in all goods that have been determined, not just one or two goods. Thus, if the increase only occurs in one or two goods, it is not called inflation. The impact of inflation is not only on the real sector but also on the financial sector [13]. In achieving a deeper and more active financial sector, inflation must be stable [14]. However, another study stated a negative relationship between inflation and financial deepening. The smaller the inflation rate, the higher the value of financial deepening [15].

### c. Interest Rates

The real interest rate considers inflation so that the interest rate calculation reflects the actual cost of borrowing (Mishkin, 2008) as the nominal interest rate minus the inflation rate [23]. About the role of interest rates on financial deepening, according to the monetary policy transmission (Bank Indonesia, 2019), the relationship between macroeconomic policy and interest rates is that Bank Indonesia as a regulator can use its policy to lower interest rates to encourage economic activity. When interest rates are lowered, the demand for credit from companies and households will increase because loan interest rates have decreased. A decrease in credit interest rates will reduce the company's cost of capital in investing, thereby attracting people to invest in stocks rather than in banking.

### d. Currency Exchange Rate

The exchange rate can be defined as the price of a foreign currency against domestic money [16]. The exchange rate used is the middle rate of the Rupiah against the US dollar. If the dollar is weakening against the Rupiah and is predicted to strengthen again in the future, and when other investment

alternatives are considered less promising, investors tend to invest their funds in dollars. Otherwise, if the domestic currency depreciates against foreign currencies, exports will increase because the price of goods sold domestically will be cheaper than that sold abroad. This leads to an increase in the competitiveness of a country's export products in the international market. Furthermore, an increase in exports will have implications for an increase in foreign exchange reserves in the form of foreign exchange into the country so that it will drive to an increase in the money supply and economic growth. In contrast, the exchange rate depreciation will increase the money supply and economic growth, which is an indicator of measuring the deepening of the financial sector [1].

### e. National Income

The value of this national income is a description of national economic activities in a certain period [17]. The national income of a country will determine the level of demand for goods and services, both domestically produced and imported products. Income is also an incentive that people get from their business activities. The higher the income, the greater the incentives received by the community in economic activities. High income indicates that the output produced by the economy is increasing. In general, the higher the people's income, the more financial deepening [1].

## 3. RESEARCH METHODS

The type of data in this research used secondary data in the form of time series from 2000 to 2020, consisting of data on financial deepening, inflation, real interest rates, currency exchange rates, and national income sourced from the World Bank. Using multiple regression analysis to approach the Ordinary Least Square (OLS), the formulation of its estimators [18] is:

$$FD_t = \beta_0 + \beta_1 INF_t + \beta_2 IR_t + \beta_3 EXCH_t + \beta_4 NI_t + et$$

FD	: Financial deepening 2000- 2020 (%)
INF <sub>t</sub>	: Inflation in Indonesia (%)
IR <sub>t</sub>	: Indonesia's interest rate (%)
EXCH <sub>t</sub>	: The Rupiah against the USD (Rupiah / US \$)
NI <sub>t</sub>	: National income (Rupiah)
e	: Error term (error factor)
β <sub>0</sub>	: Constants

$\beta_1, \beta_2, \beta_3, \beta_4$  : Regression coefficient of an independent variable

t : year t

The dependent variable (Y) in this study was financial deepening in Indonesia, while the independent variables (X) consisted of inflation, interest rates, currency exchange rates, and national income. The type of data used in this study was secondary data in time-series form (2000–2020). Data on inflation, interest rates, currency exchange rates, and national income were obtained from World Bank.

In the regression model, BLUE (Best Linear Unbiased Estimator), the researchers first tested the classical assumptions on the equation model from the regression results. The classical assumption test includes the multicollinearity test to determine whether there is a perfect or definite relationship between one or more independent variables in the model. The test used in this study was the VIF test. A normality test was then conducted to determine whether the residuals of a regression model were normally distributed, and the test used was also the Jarque-Bera test. Next, the autocorrelation test determines whether the past residual value influenced the present or future residual value. In this case, the test used the Breusch Godfrey test. After that, a heteroscedasticity test was conducted to determine whether the error variance was constant,

and the test employed the White test. In addition, the model specification test was conducted to test the CLRM (Classical Assumptions Linear Regression Model) about the linearity of the model, and the test employed the Ramsey Reset test [19].

The regression results were conducted using a partial significance test (t-test), simultaneous significance test (F-test), and the coefficient of determination. Partial testing was carried out using the t-test to investigate the estimated parameters with a certain confidence level partially and significantly affect the independent variables. Simultaneous testing was then carried out with F-test to see whether the independent variables affected the dependent variable simultaneously. The coefficient of determination describes how much the independent variables together can explain the dependent variable [20].

## 4. RESULTS AND DISCUSSION

### a. Results

Following are the study results by forming statistical test results:

**Table 4.1**

**Statistical Test Results**

Dependent Variable: FD

Method: Least Squares

Date: 12/09/21 Time: 19:24

Sample: 2000 2020

Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-0.059031	0.189152	-0.312083	0.7590
IR	0.220184	0.197085	1.117205	0.2804
EXCH	0.001094	0.000608	1.798703	0.0910
NI	-1.94E-11	4.65E-12	-4.167129	0.0007
C	39.10676	6.114634	6.395600	0.0000
R-squared	0.594104	Mean dependent var	41.89035	
Adjusted R-squared	0.492630	S.D. dependent var	4.775590	
S.E. of regression	3.401650	Akaike info criterion	5.490655	
Sum squared residue	185.1395	Schwarz criterion	5.739351	

Log-likelihood	-52.65188	Hannan-Quinn criter.	5.544628
F-statistic	5.854733	Durbin-Watson stat	0.612922
Prob(F-statistic)	0.004238		

**Source:** Secondary  
Data 2021,(E-  
Views9)

**Source:** Secondary Data 2021(E-Views9)

The multicollinearity test results can be seen below:

**Table 4.2**

**VIF Test Results**

Variable	VIF	Criteri a	Conclusion
INF	0.7590	< 10	Non multicollinearit y
IR	0.2804	< 10	Non multicollinearit y
EXC H	0.0910	< 10	Non multicollinearit y
NI	0.0007	< 10	Non multicollinearit y

**Source:** processed Secondary Data, 2021

Then, the following are the validity test results on the significance of the independent variables' effect:

**Table 4.3**  
**The Validity Test Results of the  
Independent Variables' Effect**

Variable	Sig.t	Criteri a	Conclusion
INF	0.7590	> 0.10	no significant effect
IR	0.2804	> 0.10	no significant effect
EXC H	0.0910	< 0.10	significant effect $\alpha =$ 0.10
PN	0.0007	< 0.01	significant effect $\alpha =$ 0.01

**Source:** secondary data, processed

### **b. Discussion**

The following are the results of the study by forming a multiple linear regression model:

$$FD_t = 39.10676 - 0.059031 INF_t + 0.220184 IR_t + 0.001094 EXCH_t - 1.94E - 11 NI_t$$

Based on the results of statistical tests with the OLS Model (Ordinary Least Squares) regarding the influence of inflation, interest rates, currency exchange rates, and national income on financial deepening in Indonesia in 2000-2020, the value of the constant based on the regression results was 39.10676. It means that the variables of inflation (INF), interest rates (IR), currency exchange rates (EXCH), and national income (NI) were constant or no change, whereas the amount of financial deepening was 39.10676.

The coefficient of inflation variable (INF) from the regression results was 0.059031, with a probability of 0.7590. It indicates that the inflation variable (INF) had no significant effect on financial deepening in Indonesia. It is not by the theory and data that have been described. In the inflation data, it can be seen that inflation in Indonesia fluctuated even in 2000-2020. It decreased by 1.598798 to -0.45613, while financial deepening has increased every year because declining inflation will hamper economic growth and prompt an economic crisis.

The coefficient of the interest rate (IR) variable from the regression results was 0.220184, with a probability of 0.2804. It denotes that the interest rate (IR) variable had no significant effect on financial deepening in Indonesia. It is not by the theory and data described in the previous chapter [22]. Interest rate data showed that interest rates in Indonesia fluctuated even from 2009 to 2012, decreasing by 6.5% to 5.75%, while financial deepening increased every year because the decline in SBI interest rates was an indication. With the improvement of the economy in Indonesia, a low-interest rate will provide an alternative for investors to invest their capital through relatively more profitable stocks so that companies will find it easier to invest [11].

The coefficient of the currency exchange rate (EXCH) variable from the regression results carried out was 0.001094 with a probability of 0.0910 compared to a significant level of 10%, so the probability was smaller than the significant level. It shows that the currency exchange rate (EXCH) variable had a positive and significant effect on financial deepening in Indonesia. It means that if the currency exchange rate (EXCH) increases by 1% (percent), financial deepening will also increase by 0.001094%. In this case, the interest rate is one of the macroeconomic variables that quite effectively create financial deepening in Indonesia. It illustrates that the condition of the exchange rate has increased. The results of this study are supported by research, which found that the exchange rate had a positive and significant effect on financial deepening [21].

The coefficient of the National Income (NI) variable from the regression results was  $-1.94 \times 10^{-11}$  with a probability of 0.0007 compared to a significant level of 1%, so the probability was smaller than the significant level. It signifies that the NI variable had a positive and significant effect on financial deepening in Indonesia. In other words, if NI increases by 1%, financial deepening will also increase by  $-1.94 \times 10^{-11}$  %. Increasing national income will reduce the financial deepening ratio. It indicates that high income does not encourage an increase in the financial sector's deepening ratio. This result is not by the theory that can be explained that an increase in GDP will have implications for the

greater level of monetary liquidity in the economy, namely the greater the output produced will increase the volume of people's economic transactions so that it will increase the money supply needed by the community in the economy [1].

In addition, from the regression results, the significant simultaneous test (F-test) obtained the F prob. value of  $0.004238 < 0.05$ . It explains that the variables of inflation (INF), Interest Rates (IR), currency exchange rates (EXCH), and National Income (NI) together affected financial deepening in Indonesia or the model used by this research.

The regression results were also carried out to find the value of the coefficient of determination. Calculations were done to get the value of  $R^2$  of 0.594104. It explains that the inflation (INF), interest rates (IR), currency exchange rates (EXCH), and national income (N) variables could explain the variation of the financial deepening in Indonesia by 59.41%, while the remaining 40.59% were explained by other factors not included in the model.

Based on Table 4.2 above, the VIF test results to see the test multicollinearity revealed the outer result of the inflation (INF) variable of 0.7590, the interest rate (IR) variable of 0.2804, the currency exchange rate (EXCH) variable of 0.0910, and the national income variable (NI) of 0.0007. Each variable VIF was  $< 10$ , so there was no multicollinearity between variables.

Based on Table 4.3 above, the results of the effect validity test have been proven that the independent variables with a significant influence on the variable financial deepening (FD) in Indonesia during 2000-2020 are the exchange rate (EXCH) and national income (NI) variables. The exchange rate variable had a coefficient of 0.001094. The pattern of the relationship between the exchange rate (EXCH) and financial deepening was linear. Hence, if the exchange rate (EXCH) increases by 1 Rupiah/US\$, the financial deepening will also increase by 0.001094%. On the contrary, if the exchange rate decreases by 1 Rupiah/US\$, financial deepening will also decrease by 0.001094%.

Moreover, the national income (NI) variable had a coefficient of 0.001094 and a significant and negative effect on the financial deepening variable. Then, the national income variable had a coefficient of  $-0.0761 \times 10^{-9}$ , showing that the effect of national income on financial deepening was negative; it had a non-unidirectional relationship. The relationship pattern between the independent variables of national income and financial deepening was linear. Thus, if national income increases by 1 Rupiah, financial deepening will decrease by  $0.194 \times 10^{-9}$  %. In

contrast, if the exchange rate decreases by 1 Rupiah, financial deepening will increase by  $0.194 \times 9\%$ .

## 5. CONCLUSION

Based on the regression analysis results using the method Ordinary Least Square (OLS) with four independent variables (inflation, interest rates, currency exchange rates, and national income) and one dependent variable, financial deepening, it shows that the validity test of the independent variables' effect produced inflation (INF) and interest rate (IR) variables with no significant effect on financial deepening. Meanwhile, the currency exchange rate (EXCH) and national income (NI) variables significantly affected financial deepening.

Suggestions from researchers for future research are that it is necessary to increase financial literacy to the public so that confidence in the banking system can increase. Thus, productivity in the financial market will increase, and liquidity and state income will also feel a positive impact. Creating a sound financial system will also encourage the pace of economic growth. In addition, testing and analyzing financial deepening by adding independent variables or modifying the right variables to get better and more accurate conclusions in the future compared to current research is recommended.

## RESEARCH CONTRIBUTION

The results of this study are expected to contribute as follows:

For the university, the results of this study are expected to be useful and provide a positive contribution as data input and the university.

For students, this research is expected to motivate students to learn more and as a reference to give birth to a new young generation.

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