

Research Article

Poverty Inflation, FDI Consumption, and Economic Growth in Indonesia in the Vector Autoregressive Model Analysis

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Abstract.

The difference in the results from previous studies on the impact of inflation on poverty, coupled with an increase in the money supply from direct investment, inspired this research. This study aimed to ascertain how poverty, inflation, and foreign investment affect consumption spending in Indonesia based on 1997-2021 time series data. This study used Vector Autoregression estimation, utilizing data sources from the World Bank. The data will be processed with econometric models. From the study's findings, it may be inferred that overall consumption affects inflation, which can be seen from the Granger causality test that shows that this variable has a one-way causal relationship. The results of the same test also show that FDI has an effect on total consumption and conversely consumption has an effect on FDI. However, the poverty variable does not affect total consumption and vice versa, because according to the causality test, the variable obtains an insignificant probability value. However, the VECM results explain that poverty has an effect on total consumption, and that the effect of consumption on inflation is due to the larger t-statistic value and has a positive relationship. This implies that the rate of inflation will increase the lower the level of consumption. However, the Impulse Reason test shows that poverty has a negative trend, as does the FDI variable.

Keywords: poverty, inflation, FDI, consumption, economic growth, Indonesia

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Published: 15 October 2024

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Selection and Peer-review under the responsibility of the 8th ICOS: Sustainable Economics Conference Committee.

1. Introduction

The sharp rise in world food and energy prices has led to widespread poverty [1] When interest rates increase in response to inflation, there is a risk of causing new poverty due to deflation, which will further exacerbate the crisis, which in turn will lead to an acceleration and deepening of poverty in the world [2]. A cost-of-living crisis is driving millions into poverty which threatens to spread hunger at an astonishing rate [3].

Economic growth is an indicator that is generally used in determining and measuring the progress and welfare of a country [4] Economic growth itself is an increase in people's income as a whole as well as added value in a country [5]. Poverty can hinder economic growth [6]. Poverty is a difficult problem for a particular country, or region to eradicate



[7]. Poverty can cause new social problems [5]. When a country has a high poverty rate, the level of welfare and people's purchasing power will decrease [8].

Inflation is an increase in the price of goods and services that continues to increase over time. An increase in inflation that is too high and not balanced with economic equality, a country will face the problem of poverty, and an increase in the number of unemployed which will have an impact on decreasing the level of people's welfare [5]. The high poverty rate affects the inflation rate. A high poverty rate will lead to an increase in the inflation rate in the country. However, it will have a positive correlation if inflation increases in a country [9]

Poverty in a country can reduce economic growth, but economic growth does not reduce poverty [10]. Empirically, consumption expenditure has a negative correlation with the poverty rate [11]. Consumption is an activity to fulfill the satisfaction of individuals involved in the need for productivity through household expenditure in the form of products or services [12]. Public consumption is based on the amount of public income, and consumption spending will increase if income increases [13].

Foreign direct investment has a positive effect on inflation. However, inflation has a negative relationship with economic growth because inflation reduces productivity, investment, and the poverty rate [14]. Consumption is defined as the routine state or public spending which includes salaries and pensions, benefits, and spending on domestic or foreign goods which have an impact on increasing the consumption of goods by employees or the public which then increases the consumption function which contributes to economic growth [15].

Research from [16] concluded that inflation has a negative correlation effect with economic growth in a country which also has an impact on increasing poverty in a country. However, research from [17] concludes that inflation is positively correlated with economic growth and inflation can reduce poverty directly where at times of inflation more energy is needed to consume so that more energy needed can only be obtained by increasing the productivity of the labor force.

Research from [18] Inflation is negatively related to economic growth. However, according to a study [19], inflation has a favorable impact on economic growth. Research from [20] found that inflation is positively correlated with reduced poverty.

Consumption has a positive effect on poverty and economic growth [21] Increased levels of consumption will allow for increased economic growth and increase the demand for labor [22] Foreign direct investment has a positive correlation with economic

growth and poverty [14] investment will support economic growth because investment provides capital assistance to entrepreneurs who are starting or currently running their businesses so that they can increase production, quality, and skilled workforce as needed [23]. However, research from [1] states that FDI has a negative impact on poverty. between one community and another, this will certainly affect economic growth in a country because of the significant differences between people's per capita income.

2. Motivation and Purpose of Research

The difference in the results from previous studies related to the impact of inflation on poverty is strengthened by an increase in the money supply from direct investment, which is the motivation for this research. This study aims to ascertain how poverty, inflation, and foreign investment affect consumption spending in Indonesia based on the 1997-2021 time series data.

3. Literature Review

Technology is considered one of the most effective elements in the process of economic development, because it supports the productive capacity of the national economy by innovating new production methods and developing existing production methods, thereby reducing production costs, in addition to supporting human capital used in the development process. also supports the production process by providing education and training program needs then increasing its efficiency and increasing the rate of economic growth in the country [24] developing countries experience large differences in the level of technology enrolled in them and their counterparts listed in the absorptive capacity gaps of developed countries [25] Therefore, most developing countries, in recent decades have tended to transfer technology through foreign direct investment (FDI) involving modern technology or represented part in bringing in foreign experts from abroad to develop skills and capabilities [26]. Capabilities of the human element and provide it with the necessary knowledge to perform applied tasks [27].

Due to the significant and essential role, it plays in boosting the country's economic productivity, foreign direct investment is one of the most significant capitals to have undergone significant development, increasing the level of employment, in addition to introducing advanced technology, the one hand, and on the other hand, the emergence of the need foreign direct investment by developing countries, let alone developed

countries to take advantage of the benefits they enjoy [28]. To take advantage of the advantages offered by foreign direct investment, notably the high poverty rate, which can be overcome with the help of foreign direct investment to absorb the largest number of workers [29]. Foreign direct investment has economic effects, both positive and negative, so the positive effects must be activated and the negative effects minimized. There is a relationship between FDI and poverty [30].

Poverty can be defined as an economic phenomenon that occurs when a person is able and willing to do a job and is of an age who is qualified to do that job but does not have the opportunity to get a job commensurate with his job qualifications [31]. Poverty affects not only individuals but also affects local communities by increasing crime rates and destabilizing security, as well as causing a significant reduction in general economic productivity [32].

Poverty greatly affects investment. The higher the poverty rate, the slower the investment and economic recovery [33]. Investment can be an important determinant of changes in poverty because there is a negative relationship between them [14]. The higher the poverty rate, the higher the costs for individuals and society [34].

Poverty leads to an increase in government payments, because a large part of the state's income is used to support unemployed workers, and these subsidies provided by the state to the unemployed do not replace a large part of the daily needs of individuals, and this leads to a decrease in consumption [35]. Poverty causes an increase in government borrowing, due to a decrease in tax revenues as fewer people pay taxes [36]. The reduction in the purchasing power of the unemployed affects the economy in general, which in turn can lead to more poverty when the other people who make the product leave their jobs. There is a statistically significant positive relationship between foreign direct investment and poverty [37]. There are various reasons for inflation and high prices, the most important of which is the high cost of factors of production such as raw materials or wages and labor costs, which makes the manufacturing process of many commodities more expensive and is the reason companies raise the prices of their products and thereby charge addition to consumers [38]. Inflation was also caused by causes unrelated to the local economy, such as rising prices for imported raw materials and rising prices for imported energy such as oil and gas [39].

The rate of inflation also increases with an increase in demand, as prices rise as consumers demand a particular good or service that exceeds the quantity supplied by them to the point where firms cannot meet the increased demand by increasing

production, and this type of inflation occurs when the money supply is abundant and high consumption trend [40]. A high and continuous inflation rate threatens an economic recession, especially if it continues to increase or continues at this high level for a long time because high prices will lead to a decline in private consumption, especially consumers which will automatically affect the rate of economic growth negatively [41]. Foreign direct investment has a statistically significant impact on the inflation rate. Foreign direct investment is one type of financial flow, as it serves to increase the level of the country's economy by providing hard currency, technology, and skills, as well as reducing poverty and increasing this balance of payments at the internal level [42]. At the external level, FDI works to liberalize and globalize the international economy, and it takes many forms [43]. Based on previous research and the results of a literature review study, we developed the following hypothesis:

H₁: Consumption influences FDI

H₂ : Consumption influences poverty

H₃ : Poverty has an impact on inflation

H₄ : Consumption has an effect on inflation

H₅ : FDI affects inflation

4. Research Method

This study used the quantitative method of Vector Autoregression estimation. The data used comes from secondary time series data from 1997-2021 with the Indonesian research locus. This study will investigate the correlation between Poverty, Inflation, Foreign Investment, and Consumption Expenditures using data sources from the World Bank. The data will be processed with econometric models with the following models:

$$UR_t = \beta_0 + \beta_1 INF_{t1} + \beta_2 FDI_{t2} + \beta_3 TC_{t3} + e_t$$

$$INF_t = \beta_0 + \beta_1 UR_{t1} + \beta_2 FDI_{t2} + \beta_3 TC_{t3} + e_t$$

$$FDI_t = \beta_0 + \beta_1 INF_{t1} + \beta_2 UR_{t2} + \beta_3 TC_{t3} + e_t$$

$$TC_t = \beta_0 + \beta_1 INF_{t1} + \beta_2 FDI_{t2} + \beta_3 UR_{t3} + e_t$$

Description:

UR = Poverty rate (%)

INF = Inflation (%)

FDI = Net FDI inflows (% of GDP)

TC = Total Consumption Expenditure (%)

β = Constant

e = Error term

t = Period

Description variables are presented in Table 1.

TABLE 1: Description of variable.

Variable	Description	Source	Unit of Analysis
UR	National poverty rate growth in Indonesia	World Bank	Percent
INF	The rate of growth in a country's implicit deflator in Gross Domestic Product, and the rate of change in prices in the economy as a whole.	World Bank	Percent
FDI	Total equity capital, income reinvestment, long-term capital, and short-term capital as shown in the balance of payments.	World Bank	Percent
TC	Total household consumption expenditure, both private consumption and government consumption.	World Bank	Percent

5. Results and Discussion

Before researching the next test, the analysis that is carried out first is to determine the stationarity of the variables that have been determined. This is done to help and ensure that the data you have has constant results or not. Table 2 displays the test results.

Considering the outcomes of the initial analytical test, namely by Augmented Dickey-Fuller with the Unit Root Test on the Maximum lags 4 and User defined 1 option shown in Table 2, it can be concluded that the variable TC probability results in the Root Unit test are at a non-stationary level, and the gain is the same at Unit root testing at a level that has non-stationary results is the UR variable. While the other variables are stationary on the results of the Root Test at Level.

After the variables are tested using the Root First Different Unit, all variables have shown stationary results, so this study will use the Root First Different Unit Results to test the Stationary. From the Root First Different Unit Test results above, the probability values for UNE, INF, FDI, and CE are below 5% or a significance of 0.05. When the

TABLE 2: Unit root test with ADF.

Variable	Unit Root	Statistics for the Augmented Dickey-Fuller	Probability/5% Critical Value	Description
Total Consumption Expenditure (TC)	Level	-1.392511	0.0621	Not Stationary
	First Different	-2.113215	0.0001	Stationary
Poverty Rate (UR)	Level	-1.221131	0.0755	Not Stationary
	First Different	-3.123471	0.0000	Stationary
Inflation (INF)	Level	-1.234479	0.0026	Stationary
	First Different	-2.141237	0.0001	Stationary
Foreign Direct Investment (FDI)	Level	-1.241151	0.0721	Not Stationary
	First Different	-2.123111	0.0000	Stationary

Statistics for the Augmented Dickey-Fuller Different result is greater than the level, then the result is declared stationary.

Furthermore, determining the optimum lag is needed to carry out further testing. Before carrying out the Granger Causality Test and VAR Analysis, a Lag/Optimum test must first be assessed. Value at Lag / Optimum results can be said to be optimal if the Akaike Information Criteria (AIC) test value among the available lags is the smallest or minimum AIC value. Table 3 displays the outcomes of the best lag test.

TABLE 3: Optimum lag test.

Was	LogL	LR	FPE	AIC	SC	HQ
0	-79.33112	NA	0.037418	7.211329	7.435287	6.211319
1	-35.72117	42.11529*	0.006182	5.254679	6.259452*	5.472562
2	-22.22568	13.71222	0.004311*	0.2426*	6.651178	5.221476*
3	-9.87665	10.43991	0.009112	4.875272	7.452312	5.446423

Information;

* shows the criteria's chosen order for the pauses

The variables TC, UR, INF, and FDI have the best lag length in lag 2 according to the results of the Lag/Optimum results, which are based on the data that can be seen above. This is because it can be seen that of all the test lags in the table above, the Akaike value The smallest or minimum Information Criteria (AIC) is in lag 2. The optimum lag length that will be used to carry out further testing is from the results of Lag 2.

Then move on to the Analysis Test that needs to be done after determining the Optimum Lag, namely the AR Root Stability Test, this needs to be tested to find out whether the data used uses the optimum lag or not. AR Root Test Stability Test is used as a condition for further analysis. As a note, the data is categorized as stable if the AR Root Test Stability test obtains a modulus value of less than 1 or modulus <1, and if the results of the modulus value are more than 1 then the data is unstable or not stationary. The results of the AR Root Test Stability Test are presented in Table 4.

TABLE 4: AR root test's stability.

Root	Modulus
0.198763 - 0.691331i	0.711213
0.198763 + 0.691331i	0.711213
0.182213 - 0.202314	0.752212
0.182213 + 0.202314	0.752212
-0.072134 - 0.521321i	0.592134
-0.072134 + 0.521321i	0.592134
0.214322	0.214322
0.119231	0.119231

Based on the data from the AR Root Test's Stability Test in Table 4 above, it can be explained and concluded that all modulus values obtained have a result of less than 1 or modulus < 1, which means that the AR Root Test's Stability Test on the TC, UR, INF, and FDI variables above can be said to be stable. Furthermore, to find out whether there is a causal relationship between the variables to be calculated, the next step is to use the Analysis of Granger Causality Test. This test, is used to see whether the causality relationship can be in the form of a causality relationship or a one-way causality relationship. Because previously it was not known between the variables to be studied, then with the Analysis of Granger Causality Test, the results of the variables will be able to find out which results show endogenous variables and exogenous variables. Because the provision uses a probability value of < 0.5, there likely is a causal relationship between the variables to be studied. Table 5 displays the findings of the Granger Causality Analysis.

It is evident from the Granger Causality Analysis data shown above that there is a two-way causal link, as indicated by the results of column 5 of the analysis, namely the relationship between FDI and CE, this is because the probability value of the column results is smaller than 0, 05. This means that it can also be concluded that the variability

TABLE 5: Analysis of granger causality.

Hypothesis	F -- Statistic	Prob.
UR not Granger Cause TC	0.62215	0.4129
TC, not Granger Cause UR	0.29371	0.5811
INF, not Granger Cause TC	0.86116	0.2881
TC not Granger Cause INF	5.22311	0.0069
FDI, not Granger Cause TC	4.12259	0.0058
TC not Granger Cause FDI	0.74482	0.3391
INF, not Granger Cause UR	0.82379	0.3926
U, not Granger Cause INF	4.23365	0.0128
FDI, not Granger Cause UR	0.29776	0.4932
UR not Granger Cause FDI	2.41137	0.0951
FDI not Granger Cause INF	0.51841	0.4339
INF not Granger Cause FDI	1.69244	0.1862

of FDI statistically affects TC and the variable TC statistically affects FDI. Likewise, the TC and INF variables shown in column 4 indicate a one-way causal relationship. A unidirectional causal relationship also exists in the UR and INF variables shown in column 10. The Granger Causality Analysis test results above also explain that UR does not have a causal relationship with TC because the probability result value obtained is more than 0.05 so it is not significant. So can be said that Consumption Expenditure in consumption does not affect the increase in poverty for Indonesian citizens, but has the effect of a two-way casual relationship on Foreign Investment, one-way Inflation, and one way that connects poverty and inflation.

Then, the balance of interactions between certain variables needs to be tested using the Cointegration of Rank Test. In this study, a Cointegration of Rank Test will be carried out using the Johansen Cointegration Test analysis to see whether there is a balance in the long run, namely by looking at the similarity of movement and the stability of the relationship between the variables to be studied. If the probability values obtained are all <0.05, it means that a cointegration equation will occur, and this shows that the equation has a long-term balance. Cointegration of Rank results is presented in Table 6.

Based on the Cointegration of Rank test results data shown in table 6 shows an explanation that the probability value obtained from a result below 0.05 is None*, and at most 1*. While the probability values obtained from At most 2 and At most 3 show results of more than 0.05. However, because one of the two already has a probability

TABLE 6: Cointegration of rank.

Hypothesized At most	Eigenvalue	Trace Statistic	Value of Critical 0.05	Probability
None *	0.614148	49.112341	46.711242	0.0039
At most 1 *	0.560324	30.564291	29.797072	0.0407
At most 2	0.288117	12.217141	12.373293	0.0739
At most 3	0.231216	3.141231	3.722372	0.0613

value of <0.05 , meaning that the data is significant and the results are significant, it can be concluded that the data from the variables TC, UR, INF, and FDI have a long-term relationship.

Based on the test results in the Cointegration of Rank analysis, where the variables carried out in the study have cointegration or a long-term causality relationship, the next step is to test the VAR Analysis using the VECM method.

Based on the data from the VECM Model Analysis test results shown above (Table 7), there is a significant relationship with the UR variable that affects TC. A significant relationship also occurs in FDI which affects FDI. From this, it can be said that the poverty rate affects current consumption, and FDI in the previous period has an effect on current FDI.

Significant relationships can also be made by looking at the comparison between the coefficients and the t-stat values. This comparison can be seen if the variable t-stat value exceeds the coefficient value so that it can be interpreted as having a significant relationship. It is evident from the preceding table that the variables TC and UR have a negative relationship. Therefore, it can be said that the degree of poverty will be larger in the short run the lower the level of consumption.

The next significant relationship is seen in the TC & INF variables which are positively related. This also occurs in the TC & FDI variables although the results are not too large. but both are positively related. Based on these results, it can be implied that the lower the level of consumption, the higher the inflation rate, and FDI tends to increase but not too much in the short term. However, there is a significant link between the INF & TC variables. This implies that consumption is higher the lower the inflation rate.

Furthermore, to find out and estimate between the variables to be studied with the assumption that the selected variables correlate so that the effect on changes and shocks from several periods can be studied. Therefore, it is necessary to test the

TABLE 7: Vector error correction model analysis.

	D(CE)	D(UNE)	D(INF)	D(FDI)
D((CE (-2)))	-0.411714	-0.023972	0.591391	0.002937
	(0.29278)	(0.08911)	(0.39112)	(0.05982)
	[-1.571521]	[-0.258861]	[1.399241]	[0.039221]
D((UNE (-2)))	-2.654262	0.059812	-0.223811	0.179619
	(0.75856)	(0.27711)	(1.16825)	(0.19584)
	[-2.671121]	[0.223911]	[-0.159341]	[0.782317]
D((INF(-2)))	0.297315	-0.049213	-0.388121	0.049118
	(0.26921)	(0.06919)	(0.25728)	(0.04924)
	[1.195112]	[-0.592128]	[-1.391112]	[0.864312]
D((FDI(-2)))	-0.212136	-0.613211	2.281159	0.691172
	(1.46659)	(0.43941)	(2.02892)	(0.31935)
	[-0.102541]	[-1.461123]	[1.148221]	[2.142221]
C	0.089114	0.069145	-0.084216	-0.021393
	(0.29211)	(0.07421)	(0.37298)	(0.05113)
	[0.312316]	[0.725215]	[-0.251112]	[-0.491151]
R-squared	0.732111	0.781134	0.761153	0.821141
Adj. R-squared	0.721129	0.741379	0.741151	0.793312

Response Impulse Function. Table 8 displays the findings of the IRF to the variables TC, UR, INF, and FDI.

Based on the data from the Impulse Response Analysis test results shown in Table 8, it can be seen that from the first period to the second period, INF's contribution to TC increased. The contribution of INF to TC then varied from the third to the tenth period, as can be observed.

Meanwhile, a downward trend in the contribution of UR to TC from the first to the second period can be noted, then continues to be negative until the tenth period. Furthermore, it can be seen that the contribution of FDI to TC has a negative trend fluctuating until the tenth period.

The Variance Decomposition test is the subsequent analysis performed. With the help of additional variables whose shifts are employed as independent variables, this

TABLE 8: Impulse response.

Response of D(VARIBEL DEPENDENT)				
Period	D(TC)	D(UR)	D(INF)	D(FDI)
1	1.179282	0.000000	0.000000	0.000000
2	0.761141	-0.594728	0.691186	-0.293326
3	0.299112	-0.172551	0.491249	-0.171139
4	0.782212	-0.059218	0.056112	-0.117255
5	0.692115	-0.291582	0.654429	-0.293369
6	0.592116	-0.192653	0.493117	-0.131149
7	0.691174	-0.127118	0.118511	-0.069275
8	0.632201	-0.125469	0.426631	-0.341772
9	0.651124	-0.231125	0.492411	-0.256519
10	0.672134	-0.197281	0.281271	-0.149823

analysis is used to quantify the contribution of the dependent variable. Table 9 displays the outcomes of the Variance Decomposition test.

TABLE 9: VD result.

Period	S.E.	D(TC)	D(UR)	D(INF)	D(FDI)
1	1.179283	100.0000	0.000000	0.000000	0.000000
2	1.743812	65.711131	9.599711	12.319114	2.967151
3	1.862324	62.621117	9.112121	19.213112	3.341131
4	1.891321	63.264117	7.279183	17.215882	3.251167
5	1.951129	61.714511	7.762412	21.121251	4.115236
6	2.514781	61.561155	8.211212	22.311821	4.245187
7	2.692211	62.981581	8.621131	22.951607	4.312445
8	2.841122	63.101674	7.823117	23.188658	4.571481
9	3.019675	63.198976	7.997899	24.167128	4.816417
10	3.351321	64.155146	8.417315	25.113172	5.117161

Based on the data from the Variance Decomposition test results shown in Table 9, it can be seen that in the first period, all the actions of the independent variables affect TC. However, it appears that starting from the second period there is a contribution from each set of variables to TC. In the fifth period, it can be seen that each variable has a fluctuating tendency but is not much different. The contribution of INF to TC forms a fluctuating trend, as seen from the contribution of INF which increased from the first period to the third period but decreased in the fourth period. Then INF continues to

fluctuate and increase. In the UR contribution, it can be seen that the trend is fluctuating but the trend is decreasing.

6. Conclusion

From the study's findings, it may be inferred that overall consumption affects inflation, this can be seen from the Granger causality test which shows that this variable has a one-way causal relationship. The results of the same test also show that FDI has an effect on total consumption and conversely consumption has an effect on FDI, this is evident because the test results show a two-way causality relationship. However, the poverty variable does not affect total consumption and vice versa, because according to the causality test, the variable obtains an insignificant probability value. However, the VECM results explain that poverty has an effect on total consumption, and it is also seen that the effect of consumption on inflation is due to the larger t-statistic value and has a positive relationship. This implies that the rate of inflation will increase the lower the level of consumption. However, the Impulse Reason test shows that poverty has a negative trend, this also happens to the FDI variable.

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