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The Use of Simultaneous Equation Model (SEM) in Understanding the Dynamic Relationships Between Economic Openness and Real Disposable Personal Income on Inflation: the Indonesian Experience

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Keywords
Disposable Income
Inflation
Openness
SEM
TSLS

Abstract
This paper examines the relationship between the degree of economic openness and real disposable personal income on inflation in Indonesia for a twenty-one-year period (2000Q1–2021Q3). The Simultaneous Equation Model (SEM) technique and the TSLS–Two Stage Least Squares (TSNLS and ARMA) method and long-term dependence for quarterly data from March 2001 (2001Q1) to September 2021 (2021Q3) were used to analyse and test the data. The study shows that the variables degree of openness of the economy (lopen) and real disposable personal income (ldpi) had a significant effect on inflation (linf) with a significance level of 5%. Interestingly, the estimates tend to show an appropriate sign and magnitude of the economic coefficient significance. The study has some implications. It explains the openness of the Indonesian economy and the real disposable personal income of the Indonesian population to recent inflation. Additionally, choosing appropriate policy actions to increase the competitiveness of Indonesia's export products both competitively and comparatively are discussed. If the permanent disposable income of people in Indonesia increases, the consumption demand for certain goods and services will also increase. When the demand for an item is high, the raw materials to be used also become scarce and this can cause inflation. In the context of fiscal stabilization, the Government is expected to be able to provide permanent non-cash subsidies that can help people generate permanent income independently and sustainably so that it has an impact on smoothing their consumption path over time.

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1. Introduction

The characteristics of Indonesia as a Small and Open Economy, adopting a free foreign exchange system and coupled with the application of a free-floating exchange rate system cause exchange rate movements in the market to be very vulnerable to the influence of economic and non-economic factors. Because of an increasingly more open economy, Indonesia's economic system is getting more special attention from the actual world financial situation. The degree of openness could affect modifications in the trade fee which must be maintained in its balance. The growing degree of openness may even affect the inflation of a country (Sheikh et al., 2016).

This open economy brings an economic impact, namely the occurrence of international trade between countries in the world. Economic and financial openness is one of the requirements for a nation to develop and compete in the era of globalization (Fazal et al., 2019). This interaction between countries through international trade in the form of goods and services has existed for a long time because it benefits an economy through specialization that produces several kinds of advantages, including absolute advantage, competitive advantage, and comparative advantage. The development of this global interaction can be seen in the capital traffic and the increasing volume of international transactions due to financial liberalization and technological improvements in countries in the world.

Determination of the exchange rate system is an important thing for the economy of a country because it is a tool that can be used to avert the economy in a country from global economic turmoil. The determination of the exchange rate system is based on several considerations, namely the openness of a country's economy to the international economy, the level of independence of a country in regulating its national economic policies, and the economic activities of a country. In addition, the exchange rate has a role in facilitating economic transactions between countries (Nwala, 2008). In line with this function, the exchange rate policy is also used by a country as one of its economic policies. The development of the rupiah exchange rate or the demand and supply of foreign exchange always fluctuates. Fluctuations in the supply and demand of foreign exchange will have an impact on the economy of a country. The influence of fluctuations in demand and supply of foreign exchange will be even greater if a country adopts an open economic system, including Indonesia, where free trade, namely export and import activities, will often occur.

Figure 1: The relationship graph between the lopen variable and linf

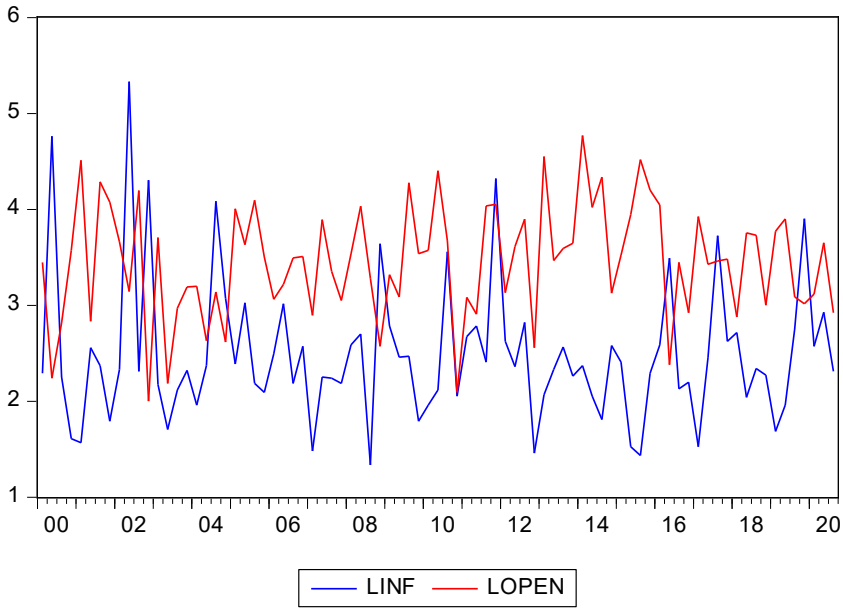
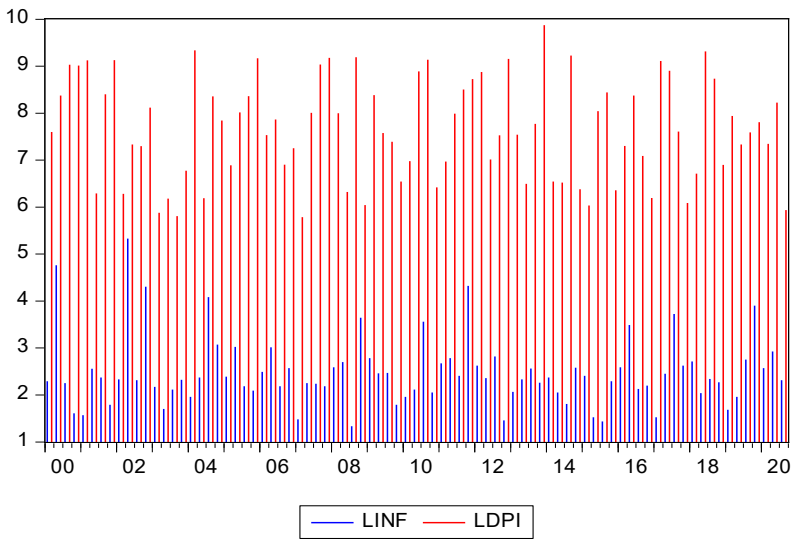


Figure 2: The relationship graph between the ldpi variable and linf



The argument is simple: the greater the degree of monetary openness, the less influence the national government has in the home economic state of affairs, and the less weight citizens will apply to financial results whilst casting their ballots. The extent of economic openness is an extensive indicator of the scale of this "noise" element, within the experience that extra international interdependence will boost the effect of forces past governmental manipulation in determining

monetary effects (Gräbner et al., 2021). Therefore, economic openness can be a policy measure to regulate the flow of goods and services as well as the flow of capital internationally, either in the form of limiting or loosening international relations between countries. The implementation of economic policies aims to achieve better development and movement of the economy. Scheve (2020) argued that, as excessive levels of monetary openness are associated with less risky economic growth in advanced commercial democracies, this affects many macro-socioeconomic indicators that not only enhance economic growth in the era of globalization but can also lead to economic consequences such as inflation and unemployment problems.

The effect of monetary openness on the home economy has become a favorite topic in every clinical community and the wider public. The applicable debates use a great range of terms to explain the extent of international financial integration: terms such as "trade openness", "monetary integration", "change liberalization", and "globalization" are broadly used while the overall increase in financial openness over the last many years is addressed. The same declaration holds for the monetary dimension, wherein terms like "monetary openness", "financial integration" and "monetary globalization" are used often and regularly interchangeably.

Analogous to these phrases and ideas, a plethora of measures of economic openness had been advanced. These measures normally emphasize extraordinary additives of economic integration. Consequently, the definition is no longer most effective; however, the dimension of openness has changed considerably during the last three long terms, and a corresponding loss of consensus on the way to a high-quality measure of monetary openness has been extensively recounted. At the same time, a great deal of econometric studies distracts the underlying debate on the dimension of economic openness via employing the most popular measures with scant in-depth motives or justifications for doing so.

These physical games show that there isn't an exceptional sizeable variant in outcomes, while unique forms of economic openness are considered; however, consequences may additionally change within a positive conceptual dimension as distinctive symptoms are constructed in significant techniques. To attain a fuller concept of the empirical evaluation of monetary openness, it estimates an additional entire regression equation in the next step. In doing so, it augments the baseline specification by way of explicitly including measures for one-of-a-kind forms of financial openness in every single model (Caporale et al., 2010).

At the same time, specifying increased regressions with a couple of openness indicators, or equipping brilliant robustness tests with exclusive signs, can provide

recommendations regarding how unique types of financial openness relate to GDP boom or other variables. With the useful resource of using a cutting-edge growth regression framework, we have verified how excellent forms of financial openness, as well as special signs and symptoms, seize the impact of openness on monetary growth in special techniques (Jansson, 2020). From this finding, it follows that researchers are well-counselled to inspire their choice of openness indicator rigorously, because one-of-a-kind study questions may also entail exclusive conceptions of financial openness.

Nations that borrow excessively are international locations that lack a preliminary commitment to monetary coverage. Therefore, the negative relationship between inflation and openness is more potent among them (Wynne & Kersting, 2007). Openness is empirically essential as a determinant of inflation only for closely indebted nations. The absence of initial commitments in economic coverage and the debt disaster can be essential determinants of inflation. The traditional view is that inflation is decreasing in a greater open trading economy and so the resulting data is both strong and poor. However, the outcomes of the evaluation of the KOF index by the middle for market studies of the Zurich Federal Polytechnic school suggest that the new brand monetary globalization degree is a better and broader proxy index for openness.

2. Literature Review

Gräbner et al. (2021) viewed the index of the diploma of economic openness, as the total exports and imports of goods and services as a percent of GDP. Hau (2002) argued that index of the degree of monetary openness is described as exports plus imports of GDP. The index of the diploma of economic openness is defined as the variety of imports and exports of goods and services (from the stability of bills records) divided with the aid of GDP. The index of the diploma of economic openness is an alternate mechanism that dominates international locations in wearing out their worldwide trade activities or in this situation, exports and imports. Via economic openness, the kingdom is given the finest possibility in all sectors of its financial system to specialize in the matters which might be greatly beneath its control, to make its citizens around the world wealthy.

According to Xin and Smyth (2010), an increase in the index of the degree of economic openness causes the exchange rate to depreciate. Economic openness will increase export and import activities that a country can freely enter. Increasing trade openness can be accomplished through reducing tariffs or increasing quotas.

The lower prices of goods, initially, will increase exports and result in an appreciation of the exchange rate. However, this in the long term will affect the price increase of goods that can be exported, or tradable goods, resulting in a decrease in the trade balance. Under these conditions, the rupiah exchange rate will depreciate. This is following the theory of the balance sheet approach to payment. The decline in the trade balance will result in a decrease in the performance of the current account balance (showing a negative balance) which will have an impact on a negative BOP position. A negative BOP indicates that the demand for the domestic currency is weakening or depreciating.

The degree of economic openness, with the more open the economy of a country, is marked by the greater value of trade in goods and services to national income which results in changes in the rupiah exchange rate. This is because goods are increasingly free to enter and leave a country. Research conducted by Fernández-Albertos (2006) showed that there is a significant positive relationship between the index of the degree of economic openness and the exchange rate. It is supported through the municipal disposable personal profits estimation idea. Disposable personal profits are the total amount of income after taxes and government transfers. Therefore, it consists of the rebate bills. It shows what disposable non-public profits might have been without the rebates. Note the pointy increase in disposable non-public income when rebates had been mailed or deposited in humans' bank debts. Disposable private profits then started to turn down as general payments declined, and eventually returned to the trend that was prevailing.

Disposable income is calculated as the sum of additional income earned, self-rented income, nominal capital income, and transfers minus taxes. The strongest motive that determines the size of the use of variable disposable income is an important factor determining purchasing power, ability to save, and even living welfare. This is because the greater a person's tax-free income, the more needs and wants they can fulfill. The holistic gender quality responsive approach in disposable personal profits is calculated for the total (Taylor, 2009). The individuals and their personal expendable profits are the analytical unit on the approach taken. The reason is that the measure is meant to capture the economic circumstances of the people, regardless of their family reputation.

Beginning with the income variable, disposable earnings are defined and calculated as earned income, self-hired income, nominal capital income, and transfers minus tax. This variable was selected due to it providing a higher measurement of the real marketplace consumption opportunities and the economic

widespread of the individual compared to using earned profits or self-employed profits prior to tax. Disposable non-public-private profits were calculated for the individual. No equivalent scales (to account for household size) have been used, as this approach investigated the private financial reputation and not the person's financial popularity primarily based on their household's monetary status.

In essence, the pastime of making picks may be visible from the elements, particularly in phases of the use of available sources and in phrases of ingesting the goods produced. Each person has to consider the best manner to use the sources he has. This business objective is to maximize the income so people can be appreciated for using the assets they have. Furthermore, with the earnings received from the usage of the resources they have, each individual will decide the kinds and portions of products to be bought. With the profits he earns, every individual can't expect to have all the products and offerings they want (Lotfalipour et al., 2013). Consequently, individuals have to make selections regarding the issues they must solve, namely utilizing the use of their profits, what items and services are to be purchased, and in what portions so that the purchase and use of those goods and services will offer maximum pride.

Person disposable personal earnings is the analytical unit. The motive for using the individual's disposable personal income is that it can show fluctuations in income through the years, while household income cannot. The methodological choice of the use of a person's disposable earnings as a reference isn't a common method for gender hollow research, however, it may be useful (Vu, 2011). The real disposable personal income gap is experienced by women in every background, at every age to all levels of education, although the amount of income and inequality varies in each woman's background. The wage gap in educational background is an interesting matter to be analysed in the next study. Education is an effective tool for increasing income but not the most effective tool against the gender pay gap. In some cases, the gender pay gap is greater at higher levels of education.

The subprime loan disaster that began in Indonesia in 2008 has made disposable non-public earnings (DPI) and inflation extra vital, as there is a consensus that the difference between the two variables in Indonesia morphed into one of the fundamental elements that brought on the global economic crisis that in turn brought on the global financial disaster, by no means took place in advance. This article's objective is to construct upon this literature by way of considering the function of a fundamental yet considerably little noted factor, the credential of monetary openness, at least theoretically, which can also affect the link a few of us have with the economic system and the electoral fortunes of governing politicians

(Cai, 2010). Contemporary measures of monetary openness, generally understood due to the fact the degree to which non-domestic actors can or do participate in a home financial system, may be grouped into approaches: first, in keeping with the sort of openness "real" or "financial" they suggest to a degree, and consistent with the assets carried out in composing the openness credential, even though the theoretical predictions regarding the effect of economic openness on increases may be much less on closer inspection. In particular, on the subject of economic openness, this vast theoretical conviction has guided numerous components of the econometric literature.

3. Methodology

After examining various literature reviews from several papers, journals, and previous research, a structural model of two equations is obtained. It is proposed as follows:

$$linf = \beta_0 + \beta_1 lopen + \beta_2 ldpi + u_1 \quad (1)$$

$$lopen = \beta_3 + \beta_4 linf + \beta_5 ldpi + \beta_6 ler + u_2 \quad (2)$$

where:

linf = inflation

lopen = degree of openness of the economy

ldpi = real disposable personal income

ler = exchange rate

The variables ldpi and ler are exogenous, so they are not correlated with u_1 and u_2, respectively. To find out whether linf is correlated with u_2 or not, it can be done by substituting equation (2) into equation (1) so that the reduced form equation (equation (3)) for linf is as follows:

$$linf = \beta_0 + \beta_1(\beta_3 + \beta_4 linf + \beta_5 ldpi + \beta_6 ler + u_2) + \beta_2 ldpi + u_1$$

$$linf - \beta_1\beta_4 linf = \beta_0 + \beta_1\beta_3 + \beta_1\beta_5 ldpi + \beta_1\beta_6 ler + \beta_2 ldpi + \beta_1 u_2 + u_1$$

$$(1 - \beta_1\beta_4)linf = (\beta_0 + \beta_1\beta_3) + (\beta_1\beta_5 + \beta_2)ldpi + \beta_1\beta_6 ler + (\beta_1 u_2 + u_1)$$

$$linf = \alpha_1 + \alpha_2 ldpi + \alpha_3 ler + v_1 \quad (3)$$

where:

$$\alpha_1 = \frac{\beta_0 + \beta_1\beta_3}{1 - \beta_1\beta_4}, \alpha_2 = \frac{\beta_1\beta_5 + \beta_2}{1 - \beta_1\beta_4}, \alpha_3 = \frac{\beta_1\beta_6}{1 - \beta_1\beta_4}, v_1 = \frac{\beta_1 u_2 + u_1}{1 - \beta_1\beta_4}$$

In equation 3, the parameters 1, 2, and 3 are called the reduced form parameters and the unbiased OLS parameters. Through the same method as above, the reduced form equation for the lopen variable can be obtained.

In Equations (1) and (2), it can be seen that linf and lopen are endogenous variables. u_1 and u_2 are structural error terms. 0 and 3 are intercepts. ldpi and ler are exogenous variables. To determine which equation can be estimated, we use the order condition formula: K – k ... m – 1. The results obtained are as follows:

Equation 1

K (number of exogenous variables in the simultaneous equation = 2 (ldpi, er)
k (number of exogenous variables in the particular equation = 1 (ldpi)
M (number of endogenous variables in the simultaneous equation = 2 (inf, open)
m (number of endogenous variables in the particular equation = 2 (inf, open)
= K – k...m – 1
= 2 – 1 = 2 – 1 = 1 = 1, then the equation is just identified.

whereas

Equation 2

K (number of exogenous variables in the simultaneous equation = 2 (ldpi, er)
k (number of exogenous variables in the particular equation = 2 (gdp, er)
M (number of endogenous variables in the simultaneous equation = 2 (inf, open)
m (number of endogenous variables in the particular equation = 2 (inf, open)
= K – k...m – 1
= 2 – 2 < 2 – 1 = 0 < 1, then the equation is unidentified.

In addition, through Equations (1) and (2), it can also be seen that the instrument variables (IV) for linf are ldpi and ler. This instrument variable (IV) is also K, which is an exogenous variable in the simultaneous equation (variables that are located only on the right, in both Equations 1 and 2).

3.1. Simultaneous Equation Models

This study contributes to the literature by estimating the simultaneous equation model of time series data to examine the relationship between the degree of economic openness and ldpi to inflation, to test the exogenous hypothesis, and to draw indirect conclusions on the justification hypothesis. Using the simultaneous equation model,

both the inverse effect of the degree of economic openness on inflation and the endogeneity of inflation arising from unobserved heterogeneity can be estimated.

A two-stage maximum estimation method and complete information were used to estimate the model. Using the simultaneous equation model estimated in this paper provides more insight into the relationship between the degree of economic openness and ldpi to inflation, than the single equation model is able to provide, and the estimation results are also more efficient due to better control for unobserved heterogeneity.

3.2. The Data

The type of data used in this study is secondary data in the form of data based on time series. The research approach used in this research is Simultaneous Equation Models (SEM) with EViews where the research results are presented in the form of mathematical calculation results. The data taken are from the period from March 2001/ 1st Quarter to 2021 September/ 3rd Quarter (83 quarters). This time limitation is based on the consideration that during this period there was a significant development in competitiveness, labour costs, and other rental costs, causing the price of raw materials to fluctuate up or down. Details of the types and sources of data used are as follows.

Table 1: Types of Data Used

Variables	Definition	Obs	Mean	Std. Dev	Min.	Max.
linf	Quarterly change in log-transformed Inflation (%)	83	2.48479	0.74104	1.33500	5.33126
lopen	Quarterly change in log-degree of economic openness $\frac{\text{export + import}}{\text{GDP}} \times 100\%$	83	3.45070	0.59879	2.00148	4.76898
ler	Quarterly change in log-transformed average of the daily policy rate (Rp/ USD)	83	11.0294	2.14383	4.80402	15.1640
ldpi	Quarterly change in log-transformed real disposable personal income (PI – Tax)	83	7.65936	1.09167	5.78382	9.87580

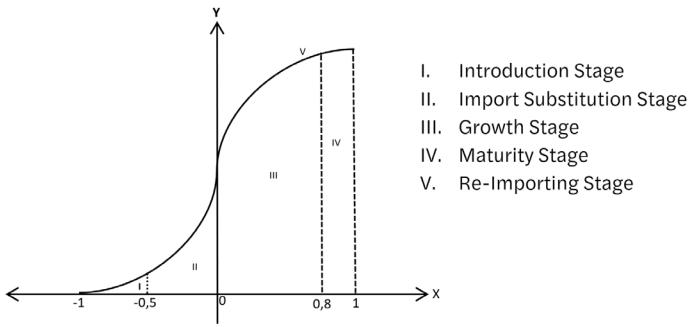
Table 2: Sources of Data Used

Data Source	Data Used	Period
Indonesian Bank	The value of inflation and deflation that occurred in Indonesia	2001: Q1-2021: Q3
UN Comtrade	Total export value and total import value of all Indonesia state goods	2000-2021
Indonesian Bank	Exchange rate value (Rp/ USD)	2001: Q1-2021: Q3
Indonesian Bank	Degree of Economic Openness (%)	2001: Q1-2021: Q3
Central Bureau of Statistics (BPS)	GDP (Gross Domestic Product) Real Disposable Personal Income	2001: Q1-2021: Q3

3.3. Data Processing and Analysis Method

This research uses Microsoft Excel 2019 and EViews software as data processing tools. For the analysis method Simultaneous Equation Models (SEM) analysis is used. The terms of the trading specialization index lie between -1 and +1. If the value is positive (above 0 to 1), then product I has strong competitiveness and the country has the potential to export that product. Vice versa, if the value of the trade specialization index is negative (below 0 to -1), then product I has no competitiveness, and the country tends to be an importing country. In Figure3, the Trade Specialization Index curve is following the product life cycle theory.

Figure 3: ISP curve according to Product Life Cycle



Description:
X-axis: Business strength or market share
Y-axis: Market attractiveness

Based on Figure 3, the ISP index can be used to identify the growth rate of a commodity product in trade which is divided into 5 stages as follows (Ministry of Trade, 2008):

-1.00 up to -0.50 : the introduction stage, where Indonesia is a newcomer as an importer

-0.49 up to 0.00 : import substitution stage, where a country shows very low competitiveness and imports more than exports

0.01 up to 0.80 : growth stage, where a country produces goods on a large scale and begins to increase exports

0.81 up to 1.00 : maturity stage, where goods from Indonesia have been standardized and the country is a net exporter

0.99 up to 0.00 : the stage of re-importing, where the industry in Indonesia is unable to compete in its domestic market with other countries and domestic production is less than domestic demand.

4. Results and Discussion

After using the Order Identification equation formula, namely K – k ... m-1, it can be seen that only Equation 1 can be identified and Equation 2 cannot, due to it being classified as unidentified where the value of K – k < m-1. The next step that can be done in Eviews is to estimate Equation 1 using the TSLS–Two Stage Least Square (TSNLS and ARMA) method. In equation 1, linf is affected by lopen and ldpi, so the equation specification box is filled with the formula: linf c lopen ldpi, and the instrument list column is filled with Instrument Variable (IV) which has been explained in the Econometric model's section, namely ldpi ler. After this was completed, the following results were obtained.

Table 3: The effects of degree of openness of the economy and real disposable personal income on inflation in Indonesia 2000Q1-2020Q3 using TSLS - Two Stage Least Square (TSNLS and ARMA) method

Independent Variables	linf
Constant	3.991 (0.784)***
lopen	-0.537 (0.207)**
ldpi	0.045 (0.075)**
R-squared	0.942
Adjusted R-squared	0.915
S.E. of regression	0.714
F-statistic	28.664
Prob(F-statistic)	0.009
Sum squared resid	40.790
Durbin-Watson stat	2.057

Notes: $linf = \beta_0 + \beta_1 lopen + \beta_2 ldpi + u_1$. Instrument specification: LDPI LER. Std. Error is in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 % levels. Coefficient divided by Std. Error is equal to t-Statistic

From equation 1, the variables that affect the log (inflation) are the lopen and ldpi variables. This can be seen from the Prob value (p-value) of lopen and ldpi which are 0.0114 and 0.0383 respectively at a significance level of 5% (0.05). In addition, the t-statistic value of the open variable is -2.58, which is smaller than the t-table (≤ -1.96) and the t-statistic value of the ldpi variable is 0.59, which is greater than the t-table (≥ 1.96) in the critical values analysis of the t-distribution 2-tailed. That is, in this regression, the variables lopen and ldpi are statistically significant and can explain the linf. In addition, the open and ldpi variables are also economically significant. This can be seen from the magnitude of each coefficient and has a statistical sign that is in accordance with what is expected. From the table above, the following equation can be obtained:

linf = -0.536lopen** + 0.045ldpi** + ε
(0.207) (0.075)

n= 83, R^2= 0.942

* Significance at 10 percent

** Significance at 5 percent

*** Significance at 1 percent

The interpretation of the relationship between lopen and ldpi with linf is that if the degree of openness of the Indonesian economy increases by 1%, inflation will decrease by 0.536%, and if there is an increase of 1% in real disposable personal income of the Indonesian people, inflation will increase by 0.045%. The interpretation of the standard error of the open variable is 0.207 with a coefficient of -0.536. The value of this coefficient ranged between -0.536 - 0.207 (0.05) = -0.546 to -0.536 + 0.207 (0.05) = -0.525 with the significance level of 5% or confidence level of 95%. So, in 95% of the cases, the slope will be in the range of -0.546 to -0.525. This can also be applied to find out the standard error of the LDPI variable, which is 0.075 with a coefficient of 0.045. The value of this coefficient ranged between 0.045 - 0.075 (0.05) = 0.041 to 0.045 + 0.075 (0.05) = 0.048 with the significance level of 5% or confidence level of 95%. So, in 95% of the cases, the slope will be in the range of 0.041 – 0.048.

From the results in Table 3 above, it can be seen that the R-squared (R^2) is 0.942 X 100% = 94.2%. That means this model is a good one because the independent variables here cumulatively explain 94.2% of the dependent variable. Adjusted R-squared is more acceptable = 0.915 X 100% = 91.5%. The independent variables given cumulatively determines 91.5% of the dependent variable. The more the value of R-squared or Adjusted R-squared, the more fit/ good the model. In addition, when viewed from the F-statistic which is greater than the F-table (3.78) which is

28.66, and the Prob value (F-statistic) which is smaller than the 1% (0.01) level of significance, which is 0.0096. That is, the model is great enough and statistically significant. These variables (c, lopen, and ldpi) are statistically jointly significant in explaining the linf. Therefore, the H_0 that all of the explanatory variables are relevant is rejected.

The Durbin-Watson stat. value from the table above is 2,057. Based on the Statistical Textbook in Basic Econometrics by Damodar Gujarati, using a significance level of 5% (0.05), the number of independent variables (k') parameters is 2, and the number of observations (n) is 83, namely from 2001Q1 – 2021Q3 so that the figure is close to that in the table, n is selected as 85, then the lower bound (dl) is 1,600 and the upper bound (du) is 1,696. In the Durbin Watson d statistic table, it can be concluded that the DW value of 2,057 is included in the zone of indecision; therefore it may conclude to reject or not reject H_0.

Table 4: Demand Theory Between Openness and Inflation

Research Hypothesis Demand Theory							
H_0				H_1			
Open ↑		Inflation ↑		Open ↑		Inflation ↓/ Deflation	
Indo-nesia exporter	Demand	Item does not exist/ constant	Price ↑	Indo-nesia importer	Demand	Lots of stuff	Price ↓

From the regression results table above, it can be seen that from equation 1, the effect on inflation is the degree of openness of the Indonesian economy and the real disposable personal income of the Indonesian people. The open variable is the economic degree of Indonesia, where the formula is total exports plus imports of all goods divided by the amount of GDP. The unit is measured in %. When the number is getting closer to 100% then the country's economy is more open and vice versa. The closer to 0%, in decimal units means the country's economy is heading to closed. One example is the economic system that was implemented by the South Korean state, where there is no trading activity.

The negative sign of the lopen variable indicates that the degree of openness of the Indonesian economy will affect the decline in inflation. This is following the theory of demand, namely that the more goods imported into Indonesia, the prices of goods in Indonesia will decrease because when many people want to buy or have the intention to buy, there so much supply that the price goes down. Therefore, it

rejects H_0 and accepts H_1 and Indonesia is therefore classed as an importing country. However, if the sign associated with lopen is positive, it means that more and more goods are exported out of Indonesia, and the price of goods in Indonesia will increase because when many people want to buy or have an intention to buy so there is demand, but the goods are scarce so the price goes up. Another reason is the real conditions in the field, namely low competitiveness, for instance, labour costs, rental costs, and expensive raw material costs, such that no one wants to buy.

In addition, this is also supported by trading theory. If the Rupiah exchange rate weakens, the price of goods in Indonesia will also get cheaper. For example ,in America (USD), the exchange rate of 1 USD was originally equal to Rp. 12,000 – Rp. 14,500 so that Americans who originally could only buy 1 item for 1 USD, can now buy 1.2 items. Based on the theory of normal goods, the more goods people have, the more satisfied a person will be, so they will buy a lot of goods when the exchange rate from Indonesia weakens. When an exchange rate depreciates/ weakens, for example, in Indonesia, its exports will increase so that the sign of the variable is positive. The next relationship that occurs is between real disposable personal income and inflation. When the Indonesian people have a lot of money/ high income, which causes the value of their GDP to be high, the demand for an item will also be high, which causes an indirect price increase (condition of inflation).

The next step is to estimate the reduced form equation and perform an endogeneity test using the LS-Least Squares (NLS and ARMA) method. Instrument Variables (IV) used are ldpi and ler. The aim is to test whether the linf variable is an endogenous variable or not, because sometimes, in theory, the variable is endogenous but in reality, the data is not an endogenous variable. After the linf forecast (linff) value is known and entered into Equation 2, the following results are obtained.

Disposable profits are used for consumption and saving. If the maximum of the earnings is used for intake, then most effectively a small component is used for saving and vice versa (Thomas, 2012). In developed international locations, 65% of earnings are used for intake and the remaining 35% is used for saving. This is in the assessment of growing international locations that use the maximum (90% or extra) in their disposable earnings for consumption.

$$Y_d = C + S$$

$$Y_d = \bar{C} + cY_d + S$$

$$(1 - c)Y_d = \bar{C} + S$$

so that,

$$S = -\bar{C} + (1 - c)Y_d$$

There are two proxy measures of exchange openness, namely (1) traditional and (2) broader financial globalization, primarily based on the KOF index (Lane, 1997). The traditional degree indicates high quality and large-scale courting among trade openness and inflation which contradicts Romer's speculation. However, the new measure of economic globalization indicates that extra financial globalization will lower inflation, therefore, supporting the speculation. The broader measures of monetary globalization together with flows, stocks, overseas direct investment, import obstacles restrictions, global exchange taxes, common tariff charges, and capital accounts are intently associated with theoretical openness. The output of the financial system is determined by consumption and investment (Zakaria, 2010). According to Keynes, intake is prompted through disposable profits. Someone's decision to consume depends on their disposable income and also the desire to use or shop for those earnings. If someone's profits are used absolutely for intake needs, then the individual has no extra income that may be used in the future.

Table 5: Endogeneity test linff variable using Least Squares method

Independent Variables	lopen
Constant	7.434 (0.724)***
linff	-1.863 (0.245)***
ldpi	0.084 (0.046)*
R-squared	0.440
Adjusted R-squared	0.426
S.E. of regression	0.454
F-statistic	31.389
Prob(F-statistic)	0.000
Sum squared resid	16.474
Durbin-Watson stat	2.293

Notes: Std. Error is in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1% levels. Coefficient divided by Std. Error is equal to t-Statistic

Based on the endogeneity test above, it can be seen that the linear forecast (linff) variable is significant, so it can be concluded that theoretically and in real terms, this variable is truly endogenous. Next, we perform an endogeneity test on the open variable. With the same steps as above and after the open forecast (lopenf) value is known and entered into Equation 1, the following results are obtained.

Consumption has a close relationship with the level of financial savings where financial savings are part of profits that are not always eaten up or spent. Interest rates affect public intake spending via financial savings. The higher the hobby rate, the greater the amount of cash stored, so the smaller the quantity of money spent for consumption. Conversely, the lower the hobby price, the larger is the decrease in the amount of money saved, and the extra the quantity of money used for intake. So, the connection between intake and interest quotes has the opposite path wherein growth in hobby costs will lessen people's consumption styles (Lane, 1997). Adjustments in interest rates create effects on household consumption. These consequences are substitution effect and profits impact. The substitution impact for a boom inside the hobby charge is that if there is a boom in interest rates, families tend to reduce consumer spending and grow their financial savings, while the earnings impact for growth in interest prices occurs if there is a decrease in hobby rates. Here households generally tend to increase intake spending and decrease savings. The interest rate also can be considered as earnings that can be acquired from making financial savings (Wynne & Kersting, 2007).

Table 6: Endogeneity test lopenf variable using Least Squares method

Independent Variables	linf
Constant	3.991 (0.791)***
lopenf	-0.537 (0.209)**
ldpi	0.045 (0.076)
R-squared	0.762
Adjusted R-squared	0.531
S.E. of regression	0.721
F-statistic	3.297
Prob(F-statistic)	0.042
Sum squared resid	41.601
Durbin-Watson stat	2.154

Notes: Std. Error is in parentheses. *, **, and *** Denote statistical significance at the 10, 5, and 1%t levels. Coefficient divided by Std. Error is equal to t-Statistic.

Based on the endogeneity test above, it can be seen that the open forecast variable (lopenf) is significant, so it can be concluded that in theory and reality the open variable is truly endogenous. So, we reject the Null hypothesis: H_0: δ_1 =

$\delta_2 = ... = \delta_K = 0$ (Indonesia is an exporting country) and we accept the Alternative hypothesis: H_1: $\delta_1 \neq \delta_2 \neq ... \neq \delta_K \neq 0$ (Indonesia is an importing country).

In relative contrast to countrywide earnings, if the proportion of public consumption expenditure increases, there is a tendency for the percentage of quasi money to lower because it is used for consumption purposes. Although there has been also an increase in quasi-cash in the same period, the proportion expansion will be smaller than the share growth in consumption (Zakaria, 2010). On the other hand, if the proportion of public intake expenditure decreases, there is an inclination for the share of quasi cash to grow so that the connection between intake and the amount of quasi money is the opposite. The main factors that affect and determine the amount of expenditure for consumption are disposable earnings as the main aspect, permanent earnings and income in line with the life cycle, wealth and different everlasting elements along with social elements and expectations approximating future monetary situations (Lotfalipour et al., 2013). The permanent profits approach and the lifestyles cycle technique rely on families dividing their cutting-edge and destiny consumption based totally on their envisioned long-time period consumption ability. Families attempt to maintain consumption with the aid of saving a number of their profits for retirement. Earnings set apart in the shape of financial savings or time deposits are reflected in the amount of quasi-money to be had in the banking quarter. Similarly, families choose their degree of consumption based on their wealth.

This is in line with the theory of life cycle implications by Friedman (1957), which uses consumption as a variable and requires that a person's consumption be smooth or at least constant over time, rather than following a similar line to income, because people will have a difficult life in the future if they spend excessively. Furthermore, the permanent income hypothesis, which uses variable income as a metric, says the same thing. People consider not only their current income, but also their long-term wealth and future earnings when making consumption decisions. Temporary income, such as THR (Eid al-Fitr allowance), donations, etc., has a lower impact on consumption than permanent income. If people expect their income to rise in the future, they will save less and consume more. What affects people's spending is not their current income and future income, but permanent income. People will not adapt their spending until income changes are regarded as permanent and constant, therefore temporary income will have little effect on consumption. Temporary loss of income will not affect consumption, but rather people will borrow from their savings or loans.

5. Conclusions

Based on the results and discussions conducted to answer the objectives of this study, the following conclusions are reached:

1. After estimating Equation 1 using the TSLS – Two Stage Least Square method, the variables that affect the log (inflation) are the lopen and ldpi variables. This can be seen from the Prob value (p-value) of lopen and ldpi which are 0.0114 and 0.0383 respectively at a significance level of 5% (0.05).
2. The negative sign of the open variable indicates that the degree of openness of the Indonesian economy will affect the decline in inflation. This is following the theory of demand, namely that the more goods imported into Indonesia, the prices of goods in Indonesia will decrease because when many people want to buy or have the intention to buy, there are so many things available that the price goes down.
3. If disposable income and consumption in Indonesia increase, inflation will decrease. If there is an increase in intake, the money supply, and the alternate rate will depreciate even as interest fees fall. It is going to have an impact on increasing inflation in Indonesia. Growth in disposable earnings will grow people's actual shopping power to be able to have an impact on growing consumption and vice versa.
4. The next relationship that occurs is between real disposable personal income and inflation. When the Indonesian people have a lot of money/high income, which causes the value of their GDP to be high, the demand for an item will also be high, causing an indirect price increase (condition of inflation).

5.1. Suggestions

Some suggestions related to the results of this study are as follows:

1. Due to Indonesia's status as an importing country in the degree of economic openness, it is necessary to increase the comparative advantage of desired export products. In addition, supporting measures and policies are needed, such as rejuvenation of plantation areas, increasing the legal status of business land ownership, and infrastructure development aimed at increasing production and productivity of commercial quality in the international market.
2. In the context of fiscal stabilization, the Government is expected to be able to provide permanent non-cash subsidies such as providing seminars, technology facilities/ infrastructure, digital economic skills assistance, and

opening integrated job vacancies that can help people survive independently and sustainably in the long term after the Covid-19 pandemic. Thereby, people will be generating permanent income which has an impact on their smoothing consumption path over time.

3. Efforts that should be made to improve Indonesia's ability to process export products to increase competitive advantage are the development of further studies related to technology absorption from upstream, and on-farm to downstream. In addition, the government and related institutions also need to provide information transparently and sustainably regarding the trend of export demand in the world market to develop potential market share and new export destination countries.
4. As an effort to increase the specialization of trade in competitive Indonesian export products, steps and policies are needed, such as increasing the quality and quantity of products in the downstream industry and the establishment of institutions aimed at regulating state industry regulations, supporting Indonesia in carrying out export production on a large scale and increasing value-added products in the international market. To be able to enter the maturity stage in trading on the international market, Indonesia is expected not only to produce on a large scale and increase its export volume, but also, there must be standardization of patents on how to produce quality products so that Indonesia can become a net exporter in the international market.

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