

# Factors Affected the Decline of Indonesian Coffee Competitiveness in Export Market During 2009-2018

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## ABSTRACT

This research is intended to develop model that is able to map the most related and affecting factors to the decline of Indonesian coffee export market share. This research used a quantitative approach based on time-series data. The analysis using time series techniques included variables that represented related factors and phenomena, to describe general patterns or trends, as evidenced by regression analysis. The produced model showed that all but one independent variable strongly affected the dynamic of Indonesian coffee exports. It turns out that the less coffee demands from major importing countries made the harvest being reallocated to developing Indonesia's local markets. This explains why the steady coffee harvest did not increase the export volume. The findings also revealed the importance to adopt GVC and sustainable (green) aspects to recover the decline.

**Keywords:** Indonesian Coffee, Export Market, Market Share.

## 1. INTRODUCTION

The adoption of GVC in ASEAN is the best and most thorough according to the OECD that linkages with multinational firms, in fostering their supply capacity and ability to innovate as well as facilitating the adoption of current product standards and certifications [1]. The less adoption of GVC by Indonesia agricultural MSME gives difficulties for exporting when environmental friendly/green products (SDGs) policies applied by G7 countries restricted many commodities to enter their market without proper green certifications [2]. Indonesian coffee is a golden product that becomes valuable export commodities, which makes Indonesia a leading world coffee producer [3]. Coffee commodities also have significant role as main livelihood for coffee producers that about 95% are MSMEs. However, there are set-backs on the Indonesian coffee market in 2009-2018 by the decline of its export market-share is almost forty percent [4] amidst the fact that the world coffee price and national coffee harvest fluctuating but steadily increasing. The decrease affected a lot on coffee exports from Indonesia that reduced by 30% in 2018 [5]. Not only

that Indonesia lost potential income for its GDP from coffee export, but also in the same time the gap is filled by Vietnam which then becomes the second-largest coffee exporter in the world [6]. Though the cultivated land is only 45% of Indonesia, but it is able to produce three times more [7].

The purpose of this study is to create an analytical model that can map the relationships and measure the influence of the MSMEs' coffee producer on the growth of the coffee export value. The study is significant to understand the phenomena that the decrease of the coffee export is not in line with the volume of the coffee harvest, though fluctuated but keep growing steadily. The factors that are predicted to influence the export values are the increase/ decrease of coffee (harvest) production volume each year, the volume of coffee exports, world coffee prices (in USD), and MSME agricultural loans.

The analysis model used a multiple linear regression statistical test to obtain parametric scientific answers regarding the declining trend in the value of Indonesian coffee export during 2009-2018. In appraising the contribution of a sector to the value of export, many researchers tend to pay attention to productivity [8, 9],

effect of exchange rates [10, 11] and human resources readiness [12, 13]. While most researchers considered inflation rates as the most affecting factors [14]. Based on coffee commodities value chains, four factors were selected for mapping its relation and effects to the decline of Indonesia coffee export value [15]. Those factors that become independent variables are annual coffee harvest (95% produced by MSMEs), coffee export volume, world coffee prices [16], and MSMEs agriculture loans [17].

**2. METHODS**

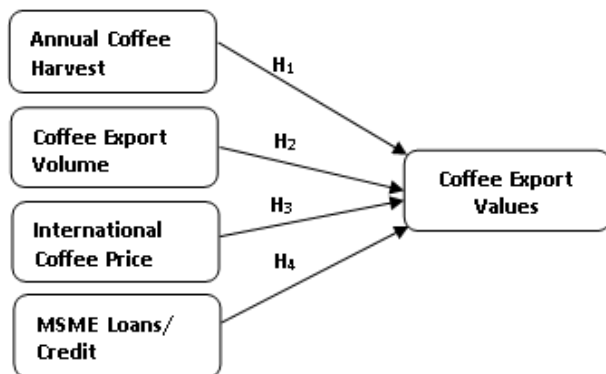
This research used a quantitative approach based on time-series data. Quantitative forecasting methods using time series were widely used for research objects that were fixed and not dynamic, and generally divided into two types of methods, namely causal and time series [18].

The analysis using time series techniques included variables that represented related factors and phenomena to describe general patterns or trends as evidenced by regression analysis [19]. The time series technique is an inexpensive quantitative method widely used in research to analyze classified past data based on reliable data sources (valid). Hence, the time series model is preferred and has been used in many applications such as Economic Forecasting, Budget Analysis, and Quality Control and Logistics Inventory Studies, and more [20].

**3. RESULTS AND DISCUSSION**

**3.1 Research Framework and Operational Variables**

A mapping model developed refers to the selected research variables presented in the figure 1, which illustrate strong relationship and influence on the growth of Indonesian coffee export values includes the affected factors (hypotheses).



**Figure 1.** Research Framework.

These factors operationalized into research variables, as follow:

- 1) The dependent variable, namely the growth of the value of coffee exports during the period 2009-2018 with units of ten trillions of rupiah.
- 2) Independent variables, which can explain the dependent variable.
  - a) Indonesian annual coffee export value, during the period 2009-2018 with units of ten thousand of USD;
  - b) Coffee harvest volume, during the period 2009-2018 with units of ten thousand of ton;
  - c) International coffee price, during the period 2009-2018 in Cent USD/pound; and
  - d) UMKM agricultural loans, during the period 2009-2018 with units of ten trillion rupiahs.
  - e) The proposed four research hypotheses according to the results of the operationalization of the variables include:

H1: Increased coffee harvest of MSME production affects the increase of Indonesian coffee exports' value.

H2: The development of UMKM coffee export volume affects the increase of Indonesian coffee exports' value.

H3: The development of world coffee prices affects the increase of Indonesian coffee exports' value.

H4: The development of MSME investment loans affects productivity and contributes positively to the increase Indonesian coffee exports' value.

The type of secondary data used was time-series data, in the form of statistical data for the last ten years of the 2009-2018 period, which includes the value of Indonesian coffee exports as the dependent variable. The four influential factors become independent variables. Data collection was carried out by browsing at each publisher's institution site, by agreeing to the provisions of public data disclosure and using open-source data for non-commercial purposes. The collected data then were arranged into groups according to the type and period. This study utilized quantitative analysis to map the relationships and effects between the dependent and independent variables using multiple linear regression analysis. Equation (1) is a multiple linear regression.

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \dots \quad (1)$$

Where:

Y =Dependent variable, which is Indonesia annual coffee export value (ten trillion Rp)

$\alpha$  =Constant

$\beta$  =Regression Coefficient

$X_1$ =Coffee Harvest Volume (ten thousand Ton)

$X_2$ =Coffee Export Volume (ten thousand Ton)  
 $X_3$ =International Coffee Price (USD)  
 $X_4$ =MSMEs Agricultural Loans (ten trillion Rp)  
 $\varepsilon$  =Error

The stages of multiple linear regression analysis carried out include:

- 1) Testing classic assumptions
  - a) Normality test, using the Kolmogorov-Smirnov test, with the Skewness and Kurtosis tests, as well as plot data distribution charts;
  - b) Autocorrelation test, to find out there is no autocorrelation between the linearity test and the Durbin Watson coefficient;
  - c) Multicollinearity test, by looking at the value of tolerance and VIF; and
  - d) Heteroscedasticity test, using the Glejser test by checking the significance of t, as well as the results of the scattered-data plot.
- 2) Hypothesis Statistics Test
  - a) The research hypothesis test carried out by referring to the statistical testing of the regression model parameters (t-test and F test) and testing the coefficient of the determinant (R Square).
  - b) The determinant coefficient, used to check the magnitude of R Square, which explains the ability of all independent variables to explain the dependent variable.
  - c) Test F (Simultaneous Test), used to test whether the independent variables together have a significant influence on the dependent variable. The parameters of the test results at  $\alpha = 5\%$ , if  $F_{count} \leq F_{table}$  or the significance of test  $F > 0.05$  then  $H_0$  can be accepted, meaning that the independent variables tested simultaneously do not affect the dependent variable.
  - d) Test t (Partial Test), to test whether the independent variables partially (individually) have a significant influence on the dependent variable. The parameters of the test results at  $\alpha = 5\%$ , if  $t_{test} < t_{table}$  or the significance value of  $t_{test} > 0.05$  then  $H_0$  can be accepted, meaning that based on the test results, the independent variable partially does not influence the dependent variable.

**3.2 Description of Statistical Analysis**

Based on the results of multiple linear regression using SPSS version 22, the statistical analysis results are as follows:

1) The determinant coefficient (B)

The linear regression obtained an adjusted R Square value of 0.665, which means that the independent variable can explain the variance of the dependent variable by 66.5%, while the other 33.5% explained by other factors. The model summary can be seen in table 1.

**Table 1.** Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.902 <sup>a</sup>	.814	.665	2.107

Based on table 1, the research model is reliable to predict the relationship between the growths of coffee export value as the dependent variable to the development of independent variables (coffee harvest volume, coffee export volume, export prices, and MSME agricultural loan) used in the model.

2) F Test Results (Simultaneous Test)

From the table 2, for a 5% confidence level, the calculated F value of 5.461 obtained with a significance of 0.045. Comparing with the table F value where  $df_1 = k-1 = 3$  and  $df_2 = n-k = 10-4 = 6$ , the F table value of 4.76 is obtained. Because  $F_{count} > F_{table}$  and significance of the F test  $0.045 < 0.05$  then  $H_0$  is rejected, meaning that the tested independent variables simultaneously influenced the dependent variable.

**Table 2.**Anova

Model	Df	F	Sig.
1 Regression	4	5.461	.045 <sup>b</sup>
Residual	5		
Total	9		

3) t-Test Results (Partial Test)

From the table 3, for a 5% confidence level, it was obtained the constant value of the regression equation (B), t-test, and significance for each independent variable. T-test analysis compares the t-test of each independent variable with the t table. T table value is obtained from t table with the formula:  $t_{table} = (\alpha / 2; n-k-1 \text{ or } df \text{ residual value})$ , then t table (0.25; 5) is obtained with a value of 2.571.

**Table 3.** Coefficients

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
1 (Constant)	-87.496	108.021	-.810	.455
Harvest	.321	1.326	.242	.819
Export	2.115	.513	4.126	.009
Price	25.485	9.075	2.808	.038
Loan	5.428	1.635	3.320	.021

Hence, referring to the t-test results for each independent variable, the analysis is as follows:

- Harvest volume, as an independent variable (H1), obtains t-test of  $0.242 < t_{table} 2.571$  and

significance value of t-test  $0.819 < 0.05$  then  $H_0$  is accepted, meaning based on test results, Harvest variable does not influence the export value variable.

- Export volume, as an independent variable ( $H_2$ ), obtains t-test of  $4.126 > t$  table  $2.571$  and a significance value of t-test of  $0.009 < 0.05$  then  $H_0$  is rejected, meaning that based on test results, the export volume variable partially influences the export value variable.
- International Coffee Price, as an independent variable ( $H_3$ ), obtains t-test value of  $2.808 > t$  table  $2.571$  and significance value of t-test  $0.038 < 0.05$  then  $H_0$  is rejected, meaning based on the test results, the variable coffee price partially influences the variable export value.

MSME agriculture loans, as the independent variable ( $H_4$ ), obtains t-test  $3.320 > t$  table  $2.571$  and significance value t-test  $0.021 < 0.05$  then  $H_0$  is rejected, meaning based on the test results, the MSME Loan variable partially influences the export value variable.

### 3.3 Interpretation of Statistical Analysis

Based on the results of the statistical analysis description, the equation of the multiple linear regression referring to obtained determinant coefficients are as seen in (2).

$$Y = -87,496 + 0,321 X_1 + 2,115 X_2 + 25,485 X_3 + 5,428 X_4 \quad (2)$$

Referring to the above equation and the results of the statistical test significance, it is believed that an increase in coffee export volume, international coffee prices (in USD) and MSME loans, either jointly or individually (partially), contribute positively and significantly to the increase and decrease value of coffee export in the 2009-2018 period. Regardless of having a positive relationship, surprisingly coffee harvest did not affect nor had a meaningful contribution to the increase of coffee export value.

Despite quite stable cultivation areas and stagnant productivity, during 2009-2018 the coffee production was slightly increasing. However, at the same time, the export volume was significantly decreasing by 30% in 2018 (from 416 tons in 2017 to 294 tons in 2018). Aside from the reduced potential income of Indonesia's GDP from coffee export, the most important fact is 95% of landowners and farmers are MSMEs.

The decline in coffee exports in the long term possibly causing a collapse in coffee prices at the farmer level. Without proper and systematic solutions, the phenomena can lead to negative economic impacts for the coffee-producer green MSMEs [21]. According to the USDA-GAIN report, Indonesian coffee consumption during 2018-2019 increased to 4.3 million coffee bags (a

bag@60 kg), based on high consumer demands for fresh roasted, soluble, and Ready to Drink (RTD) products. While consumption for 2019-2020 production year is forecast for 4.9 million bags based on continued high consumer demand [22]. The trend explains the significant increase in MSMEs' agricultural loans from 2000-2018. In spite of the fact that increasing loans have the same directions with the export values, the loan mostly utilized for cultivation aspects (productions) rather than to create added values from post-production in terms of roasting, branding, packaging, marketing, and distributing [23].

## 4. CONCLUSIONS

The research model has successfully answered the question of the influence of the coffee harvest (production) to the value of exports in the 2009-2018 period. Less coffee demands of major importing countries creates booming on domestic coffee demand. The adoption of the SDGs principles by the global industry, such as Nestle and Starbucks, should create new marketing channels. Likewise, the shift in consumer behavior to have more concerns with environmentally friendly products is an opportunity not a burden to coffee export. Other coffee producer country like Viet Nam, implement GVC principles in terms of sustainability certification from green NGOs like UTZ and Fairtrade. The certification assists coffee-producers MSMEs to improve their coffee competitiveness in global market.

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