IMPACTS OF AGRICULTURAL PRODUCTION AND IMPORT ON VIETNAM'S INFLATION IN THE PERIOD 1990-2010

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Vietnam's CPI reveals the actual inflation rate in early months of 2011. Inflation, if it is not properly curbed, will profoundly affect the national economy. One of the most obvious adverse effects of inflation is that it menaces the life of low-income people. Being a purely agricultural country (i.e. more than 70% of population is agriculture-dependent) with a high trade deficit, impacts of inflation in Vietnam are very serious.

In this paper, the linear regression model is employed to analyze impacts of agricultural production and import on CPI from 1990 through 2010. The results show that these two factors profoundly influence Vietnam's inflation rate. Additionally, violations of necessary assumptions in the study are also tested using 5% significance level. The research can provide policy-makers with a useful reference for controlling inflation in Vietnam in the future.

Keywords: Import, agricultural production, inflation, trade deficit

1. Problem

Vietnam's economy is gradually regaining its health after the recent crisis. However, structural weaknesses and difficulties of the national economy have become more evident. As some economic experts put it, Vietnam's economy in 2011 would witness a lot of challenges; inflation rate would reach around 17% and the per capital income may be around USD1,160 in current price.

However, Vietnam still needs a high investment rate of around 40% of GDP to maintain its growth. Thus, it is necessary to expedite the economic restructuring and enhance the effectiveness of investments. High inflation rate is threatening the national economic stability in 2011. Since Vietnam's inflation has structural trait, it is very difficult to control, especially when price of foodstuff has incessantly risen in early months, and import showed no downward trend in the last months of 2011.

Based on the aforementioned analyses and forecasting, this paper tries to examine effects of agricultural production and import on Vietnam's inflation in the period 1990-2010.

2. Results

In the paper, the linear regression model with three variables is employed to facilitate analyses. Based on the results, the author also tests for violations of assumptions in the model such as heteroskedasticity, multicollinearity, autocorrelation, or normal distribution residual.

The linear regression model is as follows:

$Y = \beta_0 + \beta_1 X1 + \beta_2 LN(X2) + \beta_3 LN(X2)^2$

Where,

Y: CPIs in the period 1990-2010

X1: Agricultural production which is represented by the index of agricultural growth

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(including agriculture, forestry, and fisheries) in the period 1990-2010

LN(X2): Logarithm of import value

LN(X2)^2: Log of import value squared in the period 1990-2010

β_0, β_1, β_2, β_3: evaluation coefficients

This is the linear regression function between inflation and agricultural growth and import in the period 1990-2010.

With the support of EVIEWS software, the following results have been produced:

Table 1: Regression results

Dependent Variable: Y				
Method: Least Squares				
Sample: 1990 2010				
Included observations: 21				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	1467.738	216.5945	6.776432	0.0000
X1	-5.655813	1.911997	-2.958065	0.0088
LNX2	-153.8292	36.56139	-4.207421	0.0006
LNX2^2	7.600255	1.909594	3.980038	0.0010
R-squared	0.757424	Mean dependent var		113.5790
Adjusted R-squared	0.714617	S.D. dependent var		18.75483
S.E. of regression	10.01907	Akaike info criterion		7.616501
Sum squared resid	1706.491	Schwarz criterion		7.815458
Log likelihood	-75.97326	F-statistic		17.69372
Durbin-Watson stat	1.362054	Prob(F-statistic)		0.000018

Source: GSO data processed with EVIEWS

Table 1 shows that most of evaluation coefficients are statistically significant and imply economic significance. The determination coefficient (R^2 = 0.7574) and the F-statistic (17.69) are quite large. Yet, other values such as Akaike info criterion (7.61) and Schwarz criterion (7.81) are relatively small.

In order to test whether or not the model violates several assumptions, the following tests will be run.

a. Testing for heteroskedasticity:

It is hypothesized that:

H_0: The variance is constant

H_1: The variance is not constant

By running EVIEWS software, we have the following results:

With F-statistic=1.788 smaller than F-table=3.284 and the statistical significance at 5%, the null hypothesis is not rejected. It means that the variance is constant.

b. Testing autocorrelation (Durbin-Watson test)

It is hypothesized that:

H_0: There is no autocorrelation.

H_1: There exists autocorrelation.

By running EVIEWS software, we have the following results:

The Durbin-Watson stat of 1.362 implies no autocorrelation. In general, if the Durbin-Watson stat ranges between 1 and 3, no autocorrelation exists.

c. Testing multicollinearity

The subordinate regression model and the univariate regression model are employed to explain X1 in light of remaining variables.

Calculate R^2 and F of the model:

Table 2: Variance testing results

White Heteroskedasticity Test:				
F-statistic	1.788506	Probability		0.175786
Obs*R-squared	7.843497	Probability		0.165074
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Sample: 1990 2010				
Included observations: 21				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-243911.3	189391.3	-1.287870	0.2173
X1	4653.289	3756.115	1.238857	0.2344
X1^2	-22.53633	18.06336	-1.247627	0.2313
LNX5	1589.082	5879.271	0.270286	0.7906
LNX5^2	-161.3872	461.9688	-0.349346	0.7317
(LNX5^2)^2	0.397918	0.828263	0.480425	0.6379
R-squared	0.373500	Mean dependent var		81.26145
Adjusted R-squared	0.164666	S.D. dependent var		148.9935
S.E. of regression	136.1749	Akaike info criterion		12.90071
Sum squared resid	278154.2	Schwarz criterion		13.19915
Log likelihood	-129.4575	F-statistic		1.788506
Durbin-Watson stat	2.342603	Prob(F-statistic)		0.175786

Source: GSO data processed with EVIEWS

Table 3: Autocorrelation testing results

Dependent Variable: Y				
Method: Least Squares				
Sample: 1990 2010				
Included observations: 21				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	1467.738	216.5945	6.776432	0.0000
X1	-5.655813	1.911997	-2.958065	0.0088
LNX2	-153.8292	36.56139	-4.207421	0.0006
LNX2^2	7.600255	1.909594	3.980038	0.0010
R-squared	0.757424	Mean dependent var		113.5790
Adjusted R-squared	0.714617	S.D. dependent var		18.75483
S.E. of regression	10.01907	Akaike info criterion		7.616501
Sum squared resid	1706.491	Schwarz criterion		7.815458
Log likelihood	-75.97326	F-statistic		17.69372
Durbin-Watson stat	1.362054	Prob(F-statistic)		0.000018

Source: GSO data processed with EVIEWS

Test the null hypothesis (H_0): R2 = 0 (i.e. X1 does not have any linear correlation with remaining variables)

In case H_0 is accepted, no multicollinearity exists.

By running EVIEWS software, we have the following results:

Table 4: Multicollinearity testing results

Dependent Variable: X1				
Method: Least Squares				
Sample: 1990 2010				
Included observations: 21				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	104.3762	2.434693	42.87035	0.0000
LNX2	-0.064093	0.250626	-0.255732	0.8009
R-squared	0.003430	Mean dependent var		103.7576
Adjusted R-squared	-0.049021	S.D. dependent var		1.245544
S.E. of regression	1.275707	Akaike info criterion		3.415271
Sum squared resid	30.92115	Schwarz criterion		3.514749
Log likelihood	-33.86035	F-statistic		0.065399
Durbin-Watson stat	1.738066	Prob(F-statistic)		0.800906

Source: GSO data processed with EVIEWS

With F-statistic=0.0653 smaller than F-table=4.43742 and the statistical significance at 5%, the null hypothesis is not rejected. It implies that there is no multicollinearity. Additionally, since R^2 = 0.003 < 0.88, multicollinearity is not serious. Moreover, the t-stat is not statistically significant.

d. Testing normal distribution residual

Based on residuals of the subordinate regression model, the test for the normal distribution residual is conducted using EVIEWS software.

It is hypothesized that:

H_0: Residual observes standard normal distribution.

H_1: Residual does not observe standard normal distribution.

By running EVIEWS software, we have the following result:

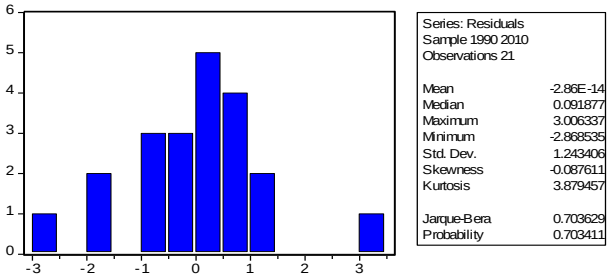

Figure 1: Residuals in Vietnam's CPI in the period 1999-2010

Source: GSO data processed with EVIEWS

The table shows the Jarque-Bera value of 0.7036 and its probability of 0.703411, which is much larger than 0.05 (Sig=5%). Accordingly, the null hypothesis is not rejected, in other words, the residuals follow the standard normal distribution.

In brief, in this linear regression model for Vietnam's inflation on the basis of agriculture and import, there is no heteroskedasticity, autocorrelation, multicollinearity, and there is standard distribution residual. All variables of the model have the statistical significance at 5% and do affect inflation. Additionally, many other factors also affect inflation and have yet to be included in the model, such as bank's interest rate, exchange rate, and world economic health, etc. Accordingly, some suggestions to reduce Vietnam's inflation can be suggested.

3. Recommendations

Firstly, Vietnam's government should continue to pursue the agriculture-rural-peasants policy to enhance the produce's value and promote the close collaboration among the government, experts, peasants, and enterprises. Through the aforementioned analyses, if the agricultural sector is enhanced, inflation will go down. This means that the amount of produce in the market helps reduce inflation.

Secondly, the government should continue to attract both foreign and domestic investments in agriculture. The private sector should be treated as the keynote component of the economy. Administrative procedures should be reformed to facilitate the development of agricultural enterprises. Peasants should be provided with credits to improve their agricultural production, and thereby boosting the supply of farm products in the market and stabilizing the market price in the long term.

Thirdly, policies on economic restructuring should be continued to facilitate the modernization of agricultural production zones. It is also advised to zone modern agricultural production areas based on their comparative advantages.

Fourthly, the government should continue to pursue export promoting policies, especially for agricultural products such as rice, coffee, rubber, shrimps, and catfish, and carry out the program of "Vietnamese use Vietnam's products". It is also a good opportunity for Vietnamese enterprises to improve their trade marks and reduce the pressure of trade deficit at the present time.

Fifthly, it is necessary to control trade deficit through appropriate exchange rate mechanism. Based on aforementioned analyses, importing is one of the factors for high inflation in the future. Additionally, the government should facilitate the import of modern equipment to better serve agricultural production during this difficult period of time.

4. Conclusion

In sum, the research findings show that inflation depends on many factors such as agricultural production, industry, service, export, import, exchange rate, monetary policy, fiscal policy, health of world economy, etc. The statistical significance at 5% is for agricultural production and imports.

The aforementioned recommendations are not enough. The author hopes that more measures will be imposed to reduce inflation rate to a single-digit level in the coming years. Besides economic growth, it is also advised to pay attention to environment, culture, politics, and society■

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