

The Role of Tariff in Promoting Economic Growth: A Case Study of Vietnam

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Abstract In theory, it was conforming to the accepted standard the open economies grow faster than the closed economies, and respectable economic development level could be achieved. Tariff is one of the key determinant to control the open of the economies. This paper investigates the dynamic impact of tariff on the economic growth in Vietnamese economy between 1999 and 2017 empirically. Secondary data were sourced, from the World Development Indicators, Department of Statistics in Vietnam. The tests of diagnostic conducted are: unit root test, co-integration test, autoregressive distributed lag model (ARDL) and Bound test. The analysis result revealed the tariff and economic growth are co-integrated and have a long-run equilibrium relationship. The tariff was found to have positively impacted on the economic growth in both the short run and long run. Based on study findings, it is recommended that the Vietnamese Government keep and improve the tariff thanks to the positive impact of tariff on economic growth.

Keywords: *tariff, economic growth, autoregressive distributed lag model*

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1. Introduction

Trade policy reforms in developing countries typically include tariff reforms that aim to rationalize the tariff code, reduce the dispersion of tariff rates, and lower average tariffs. However, because many tariff reforms are undertaken during periods of stabilization and fiscal austerity, the potential loss of tax revenues from lowering tariff rates is commonly perceived to be an important constraint on tariff reform (see [1,2]). The relation between tariff rates and tariff reform is therefore of considerable interest. This article uses data from three developing countries - Jamaica, Kenya, and Pakistan - on items in the tariff code to examine the relation between tariff revenues and tariff rates. For each item, we calculate the ratio of import tax revenues to import value, or the "collected rate" of tariffs. Comparing these collected rates to the official, statutory rates of the tariff code, we demonstrate four facts about the relation between tariff rates and tariff revenues. The author in [3] compared the statutory ad valorem tariff rates (official rates) with the ratio of tariff revenues to import values (collected rates) for Jamaica, Kenya, and Pakistan. It identified four general features of the tariff codes, considers whether these features apply to all developing countries, and discusses four implications of these features for tariff reform. First, the collected rate for any given item in the tariff code was only weakly related to the official rate for that item. Second, the variation of collected rates around

the official rate increased with the level of the official rate. Third, the collected rates, on average, increased much less than the official rates. Fourth, the relation between official rates and collected rates was nonlinear, because the slope was lower at higher levels of the official rate.

Does protection inhibit growth? While theory may be ambiguous, late 20th century evidence certainly is not. This evidence can be found in four kinds of studies. First, the authors of a large National Bureau of Economic Research project assessed trade and exchange-control regimes in the 1960s and 1970s by making classic partial-equilibrium calculations of deadweight losses (see [4]). They concluded that the barriers imposed significant costs in all but one case. However, these standard welfare calculations have been criticized by those who have pointed out that, in such studies, protection is not allowed a chance to lower long-run cost curves, as in the traditional infant-industry case (see [5]), or to foster industrialization and thus growth, as in those modern growth models where industry is the carrier of technological change and capital deepening. Thus, economists have had to look for more late 20th century proof to support the openness fosters-growth hypothesis. Second, analysts have contrasted the growth performance of relatively open with relatively closed economies. The World Bank has conducted such studies for 41 countries going back before the first oil shock. The correlation between trade openness and growth is abundantly clear in these studies (see [6]: Table 3), but the analysis is vulnerable to two criticisms. Assigning countries to trade policy categories is always tricky, since it is hard to

measure overall openness (see [7,8]). More importantly, it is hard to isolate the effect of trade policies alone, since other policies usually change at the same time. Liberalism typically comes as a package. Thus, countries that liberalized their trade also liberalized their domestic factor markets, liberalized their domestic commodity markets, and set up better property-rights enforcement. The appearance of these domestic policies may deserve more credit for raising income while the simultaneous appearance of more liberal trade policies may deserve less. Third, there are country event studies, where the focus is on periods when trade policy regimes change dramatically enough to see their effect on growth. For example, the author in [9], [10] looked at trade opening moments in South Korea around 1960, Brazil and Colombia around 1965, and Tunisia around 1970. Growth improved after liberalization in all four cases. More recently, the authors in [11] examined the reforms and trade liberalizations of 16 countries in the 1980s and 1990s, finding, once again, the positive correlation between freer trade and faster growth. Of course, these reform episodes may have changed more than just global participation, so that an independent trade effect may not have been isolated. Fourth, macro-econometric analysis has been used in an attempt to resolve the doubts left by simpler historical correlations revealed by the other three kinds of studies. This macro-econometric literature shows that free trade policies have had a positive effect on growth in the late 20th century, especially with many other relevant influences held constant. The most famous of these is by the author in [8], but many others have also confirmed the openness-fosters-growth hypothesis for the late 20th century (see [11,12,13,14]).

This paper focuses on clarifying the positive effects of tax rates on economic growth, as a scientific basis for government policies. The structure of the study is as follows. Section 2 discussed the literature review. Section 3 described the data, the research model, and methodology of this study. The empirical analysis is presented in section 4. Section 5 covers the conclusion.

2. Literature Review

Not too numerous previous studies examining the influence of tariff on economic growth have been conducted in developing and developed countries all over the world, especially in a particular countries such as emerging market economies in Asia, including Vietnam. There exists different empirical results in the previous works consistent with the link between tariff and economic growth in various situations. The findings indicate that tariff is indeed one of the key factors to support economic growth. The relationship between tariff and economic growth used to be investigated in different way with plenty of empirical results. This paper focus in the topic in which the influence of tariff on economic growth is considered.

By analyzing a database, the author in [15] established an important finding: high tariffs were in relationship with fast economic growth before the World War II, while they had been in relationship with slow economic growth then. The paper offered interpretations for the sign switch by

controlling for novel measures of the promoting the world economic environment. Rejecting alternative interpretations based on changing export market growth or transportation cost declines, it showed how the modern negative correlation could be reversed in the world environment characterized by a moderately higher generalized tariff protection such as that which predominated before 1914. The authors showed that an increase in average tariff rates among trading partners by just one third might suffice to reverse any negative relationship between an average country's tariffs and its growth. An increase in own tariffs after 1950 hurt or at least didn't help economic growth, but it might have helped economic growth in a world where average trading partners' tariffs were moderately higher and retaliation was the best strategy. The world environment mattered. Leader-country reaction to big world events mattered.

Followed by the author in [16], the question of how openness had impact on the growth of income in the late nineteenth-century Atlantic economy was investigated. More concretely, was the correlation of tariff and economic growth driven by European offshoots? Was the correlation perhaps interpreted by the concurrent integration of intra-national markets before 1914? And what could other measures of openness tell us about the economic growth process in the nineteenth century? The author gave some findings. The results could be briefly offered as follows: O'Rourke's primary finding was not altered by changes in the sample; incorporating measures of international and intra-national market integration into the analysis again supports O'Rourke's findings, but apparently left no role for intra-national market integration; and evidence from trade-flow data suggested that there might been a pro-growth role for tariffs in a non-reciprocal trade environment.

In another point of view, the author in [17] showed that the acceleration in the United State productivity growth since 1995 was often attributed to declining prices for information technology goods, and then enhanced productivity growth in that sector. The authors investigated an alternative interpretation for these information technology price fluctuations: gains in the United State terms of trade and tariff reductions, especially for information technology products, which led to greater gains than shown by official indexes. However, the authors did not study the indexes used to deflate the domestic absorption components of GDP, and if upward biases were present in those indexes that could offset some of the effects of unmeasured export and import indexes.

Romano et. al. in [18] conducted on analyzing the factors behind the adoption of Feed-in Tariff and the authors estimated the probabilities that countries not yet adopted the Feed-in Tariff would propose it under different scenario hypotheses. The authors estimated a panel probit model on a set of forty three countries using annual data covering the period between 1980 and 2008. The authors employed the binary time series of adoption of the Feed-in-Tariff as outcome variable and control for a set of economics, environmental and generation factors. Results showed that adoption of Feed-in Tariff depended by various factors. In addition, the authors emphasized that one of the key factors was the economic growth. The frequency with which the developed countries adopt the

Feed-in Tariff was significantly higher than in developing ones and the probability to adopt Feed-in Tariff increased when income grew up.

Another study on Feed-in Tariff, Wei et. al. in [19] employed a dynamic computable general equilibrium model that includes Fit-in-Tariff, greenhouse gas, and air pollutants modules to evaluate the impacts of different subsidy scenarios. Assuming that the subsidies would continue until 2030, the results indicated that the Fit-in-Tariff would have positive effects on real GDP, employment, and emission reductions and that these benefits would increase over time. Such subsidies not only encourage the substitution of clean energy for traditional fossil energy, but also invite investment in renewable energy industries, ultimately benefiting all sectors. A sustained higher subsidy rate could contribute to the abatement of greenhouse gas, and air pollutant emissions significantly, while also stimulating real GDP and employment in the early periods of the policy, yet it would not be conducive to growth over time due to the increasing tax burden. If subsidies continued until 2050, the environmental benefits would become more pronounced while the economic benefits would gradually disappear.

In a similar topic, with a discussion on the role of tariff with the United State economy, Robert and Christoph in [20] discussed on whether the enforcement of product standards could be protectionism in disguise. This paper estimated the costs of non-compliance with the United State product standards, using a database on the United State import refusals during the period from 2002 to 2014. The authors found that import refusals decreased exports to the United States. This trade reducing effect was driven by developing countries and by refusals without any product sample analysis, in particular during the Subprime Crisis and its aftermath. The authors also provided evidence that given product standards were enforced more strictly during the crisis while the quality of imported products did not deteriorate. These results were consistent with the existence of counter-cyclical, hidden protectionism due to non-tariff barriers to trade in the United States.

Thanks to [21], it was found that despite the recognition that trade policy - in particular, tariff regimes and rules of origin - could affect the geography of production, much GPN analyses pay scant attention to the tariff context of the sector studied. The paper proposed an analytical framework to more effectively integrate these regimes into applied GPN research. The authors tested the framework, drawing on analysis of exports to the EU market in four sectors: textiles and apparel, floriculture, fisheries and leather goods. The analysis confirmed that, in the presence of high tariffs, preferences in fact seemed to impact on sourcing for the EU market.

In the opposite analysis, Kinzius et. al. in [22] proposed that a growing share of modern trade policy instruments was shaped by non-tariff barriers. Based on a structural gravity equation and the recently updated Global Trade Alert database, the authors empirically investigated the effect of non-tariff barriers on imports. Their analysis revealed that the implementation of non-tariff barriers reduced imports of affected products by up to 12%. Their trade dampening effect was therefore comparable to that

of trade defence instruments such as anti-dumping duties. It was smaller for exporters that had a free trade agreement with the importing country. Different types of non-tariff barriers affected trade to a different extent. In conclude, the author investigated the effect of behind-the-border measures, showing that they significantly lowered the importer's market access.

As we can see that, tariff and economic growth have been involved in some studies, but rarely the situation of Vietnam has been considered. For a new situation of Vietnam, with a timeliness and novelty, the author execute the study on influence of tariff on economic growth to fill the gap in empirical study.

3. Data and Methodology

3.1. Data

The study attempts to examine the causal nexus of tariff on economic growth with an evidence from Vietnam by employing a time series data spanning from 1999 to 2017 using the Autoregressive Distributed Lag (ARDL) Model. Two studied variables were employed from the World Bank which will be denoted by Tariff and GDP_{growth}.

3.2. Research Model

Tariff is one of the essential factor to determine the openness of the economy. Relating to tariff and economic growth, Umer in [23] examined the impact of trade openness on economic growth of Pakistan by employing autoregressive distributed lag (ARDL) approach over the period 1960-2011. In a similar topic, Meraj in [24] investigated the impact of globalization and openness in trade on the economic growth of Bangladesh by econometric testing using an autoregressive distributed lag model and the Granger causality test. The two different approaches for testing of co-integration were Johansen co-integration and autoregressive distributed lag. Hye and Siddiqui (see [25]) found similar results in a study of Pakistan. In their investigation, they used the 'autoregressive distributed lag' and 'rolling window regression' methods and found a relationship between exports and growth. There was a significant long run relationship between real GDP and real Exports. As we can see that, ARDL model is an ideal choice for investigating the impact of a macro variable on economic growth. Therefore, ARDL model is chosen in this paper to show the influence of tariff on Vietnamese economic growth.

Impact of tariff on economic growth has been investigated in some empirical studies in the world. In this study, we will investigate time series thanks to ARDL model. This model was proposed by Pesaran, Shin & Smith in [26]. The authors in [26] developed another method for finding cointegration among variables which is based on an ARDL model augmented by level variables. Contrary to the Engle Granger and Johansen approach, pretesting of the unit root is not needed because the test can be applied on both I(0) and I(1) variables. This is seen as a major advantage over the ARDL approach.

The mathematical form of the ARDL model used in the article is as follows:

$$D(GDP_growth)_t = \alpha_0 + \sum_{i=1}^m \alpha_i D(GDP_growth)_{t-i} + \sum_{i=1}^n \beta_i D(Tariff)_{t-i} + u_t \quad (3.1)$$

where D is the difference operator; α_i, β_i are the regression coefficients, and u_t is the residual which has a simultaneous correlation but no correlation with its lags and all independent variables. So the right side of the regression equation consists of the lags of independent and dependent variables.

The ARDL model estimation process can be summarized through the following steps:

Step 1, the stationarity of the GDP_growth and Tariff are verified.

Step 2, the optimal lag for the ARDL model is selected: This is an important step before estimating the ARDL model.

Step 3, the best ARDL model selected in the above step is estimated.

Step 4, the result of ARDL model estimation is back tested:

+ the test in which show that the model is well specified or not: Using Ramsey RESET test;

+ the test of the stability of ARDL model thanks to the cumulative sum of residuals (CUSUM: Cumulative Sum of Recursive Residuals).

+ the test the residual of ARDL model without autocorrelation thanks to Lagrange Multiplier test (abbreviated as LM test).

If the estimated ARDL model is appropriate, then the ARDL model can be used to describe the impact of tariff on economic in the short term.

Step 5, to see whether there exists a co-integration between tariff on economic growth or not, we implement the Bound Test.

Details of the ARDL model can be found in Chapter 17 of [27].

4. Results of Economic Modeling

4.1. Descriptive Statistics

Table 1 presents data description including 19 observations of each variable of Vietnam over a 19-year period from 1999 to 2017.

Table 1. Descriptive Statistics

	GDP_GROWTH	TARIFF
Mean	6.328593	9.858421
Median	6.320821	7.880000
Maximum	7.547248	19.20000
Minimum	4.773587	4.980000
Std. Dev.	0.774166	4.641968
Skewness	-0.260713	0.532729
Kurtosis	2.284849	1.923005
Jarque-Bera	0.620132	1.816971
Probability	0.733398	0.403134
Sum	120.2433	187.3100
Sum Sq. Dev.	10.78799	387.8616
Observations	19	19

4.2. Correlation Analysis

Table 2. Correlation Coefficients between Variables

	GDP_GROWTH	TARIFF
GDP_GROWTH	1	
TARIFF	0.175408 (0.4726)	1

It is evident that there may be a positive correlation existence between two variables since the correlation coefficient is 0.175408 with a not very ideal probability value of 0.4726. That probably means that the relationship between tariff and economic growth is not linear. We exceed to further study the relationship in detail.

Another test we used in the study is that the analysis needs to check the station of time series. We transform time series which are non-stationary to station ones. It means that after being transformed, times series have expectation, variance and covariance is constant over time. The time series in ARDL model must be stationary. Station character is an important concept when studying time series. However, in fact, most financial data series are non-stationary. To test the station, we use unit root tests, thanks to a common test Augmented Dicky-Fuller test (ADF test) and Phillips-Perron test. We use the unit root test with the order of lag is automatically selected according to Schwarz criterion, with none is included in test equation for GDP_growth and with intercept for tariff. ADF tests for the initial time series, and their first difference will be performed. Usually, after taking the first difference, we get the stationary time series. The use of the first difference of time series is not only to obtain stationary time series, but also the first difference series provide information about increasing or decreasing trend (depending on the sign of the difference) rather than focusing on providing information about the real value of the time series.

Table 3. ADF Stationarity test results of the time series at 5% significance

Variable	Augmented Dicky-Fuller test		Phillips-Perron		Conclusion
	Statistical value	Corresponding probability	Statistical value	Corresponding probability	
GDP_growth	0.284087	0.757	0.46978	0.8061	Non-stationary
D(GDP_growth)	- 5.58595	0.0000	- 6.61684	0.0000	Stationary
Tariff	- 2.31011	0.18	- 2.16176	0.2253	Non-stationary
D(Tariff)	- 5.52424	0.0004	- 5.54282	0.0004	Stationary

The results in Table 3 shows that both initial GDP_growth and Tariff are non-station at level, but their corresponding first different level series are station at a significance level of 5%. So that, we can put all first different level series in to ARDL model for investigation.

4.3. Discussion of Estimation Models

First of all, Hannan-Quinn information criterion value is used to choose the most appropriate model. The traditional way to select the optimal lag is to estimate the ARDL model multiple times with descending lags to 0. Among the estimated ARDL models, we choose the one with smallest Hannan-Quinn information criterion value. In this article, the authors try out up to the top five lags and selects the recommended model according to Hannan-Quinn criterion. The image depicting Hannan-Quinn's criterion value for the best twenty models, including the best model. Thanks to this Hannan-Quinn information criterion, the best ARDL selected is that ARDL(4,1).

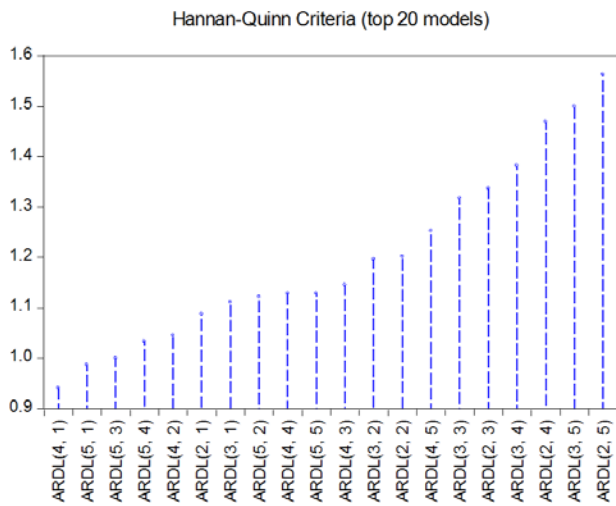


Figure 1. Hann-Quinn's Criteria for the twenty Best Models

4.4. Results of Econometric Modeling

ARDL(4,1) is estimated as in the following Table 4.

Table 4. Results of ARDL(4,1) model estimation with dependence variable of GDP_growth

Variable	Coefficient	Std. Error	t-Statistic	Probability
D(GDP_growth(-1))	-0.359199	0.319604	-1.123887	0.2981
D(GDP_growth(-2))	-0.204794	0.228738	-0.895320	0.4004
D(GDP_growth(-3))	-0.361719	0.302793	-1.194608	0.2711
D(GDP_growth(-4))	0.421725	0.164901	2.557450	0.0377
D(Tariff)	0.386798	0.076052	5.085970	0.0014
D(Tariff(-1))	0.378139	0.140537	2.690681	0.0311
C	0.397674	0.129872	3.062052	0.0183

4.1.1. Autocorrelation test

Based on the Breusch-Godfrey Serial Correlation LM Test, we have:

- The Null hypothesis H0: no first order autocorrelation
- The Alternative hypothesis Ha: existence of an autocorrelation

At this stage, autocorrelation test used for null hypothesis: "no first order autocorrelation", the

Breusch-Godfrey Serial Correlation LM Test is used. According to the results in Table 5, the p-value of the ARDL(4,1) model is far from zero. They are all larger than 0.05 so that null hypothesis is not rejected, which indicated that there is no autocorrelation between variables in the model.

Table 5. LM test for the residual of the ARDL model

F-statistic	0.320727	Prob. F(1,6)	0.5917
Obs*R-squared	0.710390	Prob. Chi-Square(1)	0.3993

4.1.2. Model Specification Test

To test for model specification of ARDL(4,1), the Ramsey Reset test is performed. In the theory, if the test result with p-value over 0.05, so the model is well specified at the significant level at 5 percent. In a result, Table 6 indicates that the test results with p-values are all over 0.05, which proved that the model is well specified.

Table 6. Model specification Test

	Value	Degree of freedom	Probability
t-statistic	1.988915	6	0.0939
F-statistic	3.955784	(1, 6)	0.0939

4.1.3. Stability Test

The next back testing is that the stability of ARDL model thanks to the cumulative sum of residuals. If the cumulative sum of the residuals is within the standard range at the 5% significance level, then it can be concluded that the residual of the model is stable and thus the model is stable.

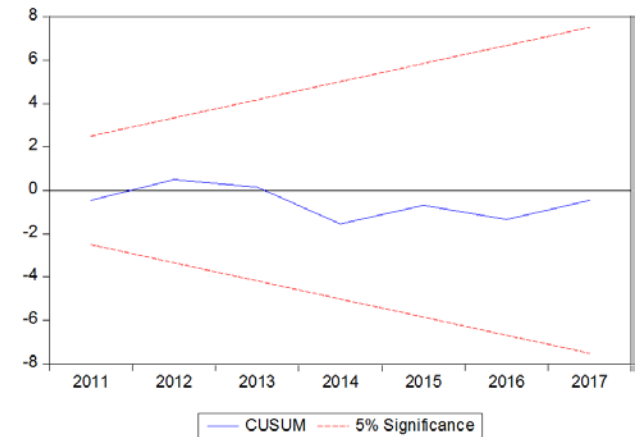


Figure 2. The cumulative sum of recursive residuals of the ARDL model at a 5% significance level

To go further to investigate the long-run relationship among the above considered variables, we use cointegration test thanks to Bound test.

Table 7. Test of long-run relationship between the variables

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	12.20580	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68

According to Table 7, the test statistic value is larger than every critical Value Bounds at every significance levels. Therefore, there exists a long run relationship between tariff and economic growth. That long-run from is presented in Table 8.

Table 8. Long-run relationship between the variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP_GROWTH(-1), 2)	0.144789	0.291059	0.497455	0.6341
D(GDP_GROWTH(-2), 2)	-0.060005	0.268075	-0.223839	0.8293
D(GDP_GROWTH(-3), 2)	-0.421725	0.164901	-2.557450	0.0377
D(TARIFF, 2)	0.386798	0.076052	5.085970	0.0014
CointEq(-1)	-1.503988	0.445519	-3.375812	0.0118
Cointeq = D(GDP_GROWTH) - (0.5086*D(TARIFF) + 0.2644)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TARIFF)	0.508606	0.143772	3.537584	0.0095
C	0.264413	0.102160	2.588228	0.0360

In the co-integration test, the co-integration regression coefficient is negative (- 1.503988) and is statistically significant at 5% (with a small probability value of 0.0118) indicating that co-integration relationship exists between variables. That is, in the long term when the system is in equilibrium, when a shock occurs, the variables in the model tend to move, "pull" the whole system "back" to the equilibrium, which means a reverse movement tendency (the negative sign of the co-integration regression coefficients) compared to those fluctuations. The co-integration equation, or equation that represents the long-run equilibrium relationship among the variables is as follows:

$$D(GDP_growth)_t = 0.5086 * D(Tariff)_t + 0.2644 + u_t \quad (4.1)$$

5. Conclusion

According to Figure 1, the estimation of the ARDL(4,1) is finally selected as the best model to discuss. Regarding the estimation results, our analysis shows the relationship of tariff and economic growth - in the case of Vietnam, we have the result in short run in the following Table 9:

Table 9. Short-run impacts of the variables on tourism development at first differential

Variables	Regression coefficients
D(GDP_growth(-1))	-0.359199 (0.2981)
D(GDP_growth(-2))	-0.204794 (0.4004)
D(GDP_growth(-3))	-0.361719 (0.2711)
D(GDP_growth(-4))	0.421725 (0.0377)
D(Tariff)	0.386798 (0.0014)
D(Tariff(-1))	0.378139 (0.0311)
C	0.397674 (0.0183)

Note: the number in () is the probability value of test of estimated coefficients' significance.

* indicateS significance level of 5%.

Thanks to results in Table 9, we can see that economic growth in the previous forth year cause a pull in itself this year. In concrete, a 1 percent of GDP_growth this year will increase itself in the next four years by 0.42 percent. This result is different among different countries. At the same time, it is important to find that tariff this year and the previous year both have positive impact on economic growth. That is, a 1 percent of GDP_growth this year will increase economic growth in the right same year by 0.39 percent and remaining a positive impact in the following year by increasing economic growth by 0.38 percent. It is a good side.

Regarding the long-run equilibrium relationship among the variables is as in equation (4.1), in which, a 1 percent of tariff will increase the economic growth in the long run by 0.5 percent, and this is obviously significant.

In conclusion, this paper investigates the impact of tariff on economic growth of Vietnam between 1999 and 2017. The empirical reveals that in the short run, there is a directional relationship running from tariff to economic growth, with a slightly lag. Results even show that there is a co-integration between variables in the long run, with a positive impact of tariff on economic growth. In order to enhance the role of monetary policy in stabilizing economic cycles, Vietnam needs to coordinate a number of solutions, including developing a reasonable medium-term expenditure plan, ensuring fiscal discipline, security, financial security, effective mechanism of operating monetary policy, improving tax system to increase stable revenue, restructuring public investment to improve the efficiency of using budget capital, managing monetary policy to meet the more timely and effective policies, in collaboration with the monetary policy to create a resonant impact rather than eliminate to achieve the general growth goal, as well as to commit the trust of the business community and people to contribute to stabilizing define economic, political and social environment.

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