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TRADE LIBERALIZATION EFFECTS ON AGRICULTURAL PRODUCTION GROWTH:
THE CASE OF SRI LANKA

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ABSTRACT

TRADE LIBERALIZATION EFFECTS ON AGRICULTURAL PRODUCTION GROWTH: THE CASE OF SRI LANKA

Examining the effects of trade liberalization on agricultural sector is an interesting empirical question. This paper provides a quantitative assessment of the trade policy impacts on agricultural sector growth in Sri Lanka based on the national data from 1960 to 2010. The Ordinary Least Square (OLS) method and the multiple regression models were employed to investigate whether the trade policy reforms increase the agricultural sector growth or not. The empirical results suggest that the trade liberalization on agricultural sector growth and eventually lead to improved agricultural productivity in Sri Lanka. Moreover, this analysis concludes that the trade openness, investment, interest rate Free Trade Agreements are significant factors that are positively related to agricultural sector growth. This research also confirms that the agricultural sector growth has made a wide contribution to total GDP to accelerate the economic growth in post-liberalization period in Sri Lanka.

Key Words: Economic Growth, Free Trade Agreements, Investments, Market Liberalization, Sri Lanka, Trade Openness

INTRODUCTION

Growth on agricultural production and productivity are crucial in achieving sustainable economic growth and poverty reduction in developing countries. The positive link between agricultural production growth and trade openness may suggest that trade liberalization goes along with economic development. Trade liberalization of economies and the complete elimination of trade barriers have become popular economic policies of developed and developing nations today while import and export tariffs, quotas, export subsidies, and technical barriers were common place during the previous decades. More recently, developing nations, like Sri Lanka, have been implementing trade liberalization policies. Further, most countries' experience on trade liberalization policies seems to indicate that the trade policy reforms achieve larger important agricultural production growth and domestic welfare gains.

The trade liberalization policy framework introduced in 1977 was suppose to increase the availability of goods and services to consumers and expanded the opportunities to agricultural sector, enhancing market competition, increasing investments, raising agricultural productivity, and output.

Traditional trade theory emphasizes that free trade based on allocative efficiency, increases social welfare assuming perfect competition. The theory further implies that free trade policies improve welfare of any economy by reducing dead weight loss associated with the characteristics of monopoly or oligopoly. Even though trade theory states that free trade increases welfare, the welfare effects of free trade have been debated. Some studies show that there is little or no evidence to suggest that trade liberalization involves accelerating agricultural production growth or per capita income. However, there is a substantial levels of empirical evidence confirming that there is a link between trade openness and growth which results from trade liberalization (Andersen and Babula

2008). Also some research shows that trade liberalization and agricultural productivity as may both feed on each other. Agricultural productivity can be gained from trade openness which results from liberalized trade policies as agricultural products need to be more competitive to get expected agricultural production levels (Mahadevan (2003). A substantial level of analysis points out that Sri Lanka may have benefitted from trade policy reforms in moving away from protectionism.

PROBLEM STATEMENT

Sri Lanka introduced liberalizing economic policies including low tariff structure, removing non-tariff barriers, and relaxing exchange rates in 1977. Actually, it was the first country to implement free trade among South Asian countries. Further, Sri Lanka has been a member of World Trade Organization (WTO) since 1994, and has implemented regional Free Trade agreements since 1995. Sri Lanka expected fast economic growth with trade liberalization policies along with these process. However, Sri Lanka's agricultural production has been growing at a very low rate in comparison to its government's expectations. Since trade liberalization occurred, the agricultural growth rate has remained approximately at an annual average of 2%. Historically, Sri Lanka has been an agricultural economy where agriculture accounted for more than 50% of the total GDP. Even though Sri Lanka introduced open market policies ahead of other developing nations like India, China, Vietnam etc, growth of agricultural production did not fare as expected. Relative contribution of agricultural sector has been decreasing to less than 19% of the total GDP (Central Bank of Sri Lanka (2008). Although relative contribution of the agricultural sector to the total GDP has declined, agriculture still accounted for about 35% of the total labor force and 23% of total exports in 2008 (Central Bank of Sri Lanka, 2008). Very few studies have examined the trade liberalization effects on agricultural production growth in Sri Lanka and those studies have

produced conflicting results. This empirical research attempts to provide a quantitative assessment of the trade policy impacts on the agricultural production growth from 1960 to 2010.

This study investigates the relationship between trade liberalization and the agricultural production growth of Sri Lanka to draw implications for policy implementation. Two specific objectives are given below.

1. To assess the contribution of international trade openness to agricultural production growth in conjunction with other economic factors such as investment and interest rates in Sri Lanka.
2. To examine whether or not the regional Free Trade Agreements (FTA) like SAFTA (South Asian Free Trade Agreement) or ILFTA (India Sri Lanka Free Trade Agreement) generate economic benefits to Sri Lanka's agricultural sector.

Trade Liberalization and Role of Agriculture in Economic Growth

Theoretical Framework

Economic development requires increasing of real Gross Domestic Product (GDP) of a country over a long period of time. The increase in real GDP is a representation of economic development and manpower, capital accumulation, natural resources, entrepreneurial abilities, and technology play a vital role in increasing real GDP. Simultaneously, the agricultural sector also increases real GDP by generating agricultural surplus and increasing agricultural sector results surplus by increasing agricultural production, and utilizing the surplus labor from the agricultural sector. Trade policy reforms further encourage and motivate trade liberalization which tends to ultimately increase welfare derived from an efficient allocation of domestic resources in the agricultural sector. Because international trade can act as an engine of growth, trade reforms

facilitate international trade to be more accessible and simple. Efficient allocation of domestic resources reduces the production of import substitutes and increase production of exportable products which finally increases total output of the agricultural sector. On the other hand, increasing of exports and adjusting for efficient resource allocation generate comparative advantages which eventually can result a higher producer surplus from the agricultural sector. Trade liberalization also helps to increase consumer welfare by lowering price of import goods and import substitutes. Thus, international trade with more liberalized policies certainly may improve international openness to the rest of the world by mobilizing capital, labor, goods, and services across borders. Furthermore, the increasing of foreign trade can have a significant impact on wages, employment and investment which finally does result on a higher aggregate output in the agricultural sector and a broader country development.

Trade liberalization and Agricultural sector in Sri Lanka

Historically, Sri Lanka was an agricultural economy with agriculture accounting for more than 50 percent of its GDP. In 1950, the contribution of agriculture related activities to the GDP were nearly 46.3 percent whereas industrial sector was accounted for around 19 percent. The percapita GDP grew up by 2.3% between 1965 and 1977 when the Asian regional growth rate was 5.4%. This slow growth rate revealed the government to adapt open market policies and trade liberalization. As a result, Sri Lanka introduced liberalized economic policies in 1977 including low tariff structure having three-bands with 10%, 20% and 35% , removing non-tariff barriers , and relaxing exchange rates. The most prominent feature under the new policies were the export-oriented economic strategy that recognized the high rates of economic growth accomplish only by increasing new industrial exports such as garment products. At present, the manufacturing sector

contributes around 29.4% while agricultural sector contributes 12.8% of GDP. Relative contribution of agricultural has been decreasing to less than 19% of the total GDP. However, agriculture still accounted for about 35% of the total labor force and 23% of total exports in 2008 (Central Bank of Sri Lanka, 2008). Statistics show that there is a significant increase by 265% in rice production during the last three decades under the open economic policy framework introduced in 1977. Tea is the most prominent crop of the Sri Lankan plantation sector and Sri Lanka is one of the largest suppliers of black tea in the world. Statistics also shows that the tea sector benefited from liberalized trade policies. In 1999, Sri Lanka recorded a US\$ 269 million kilogram of tea (95 percent of total tea production) exports to the world market and earned US \$621 million in foreign exchange.

Agricultural growth rates in Sri Lanka have been poor compared to government expectations in last decades. According to the statistics of Central Bank of Sri Lanka, agricultural productivity growth was around 2% for the past few decades. Most recent policy framework has increased growth of the country's agricultural sector by around 5 percent. Sri Lanka aims to improve the productivity of many subsectors and to generate a significant exportable surplus while promoting import substitution to strengthen the balance of payment (Gunawardena, 2012). According to the government's ten year development framework for 2006-2016, the agriculture and food security policy focuses on land allocation and productivity improvement. This will expand the agricultural sector to ensure food production and aim improved technology and policies that expect to liberalize the phyto-sanitary regulations to encourage greater private sector participation.

Trade Liberalization Episodes in Sri Lanka

Until 1977, Sri Lanka was a relatively closed economy. Domestic production was protected by quantitative restrictions on imports and foreign investment was subjected to direct barriers.

Import substitution was encouraged to reduce imports and to achieve self-sufficiency in rice and other essential commodities. Import tariffs gradually increased from 10 percent to 500 percent in the 1960s. All imports except food, petroleum, fertilizer and pharmaceuticals were subject to quantitative restrictions (QR). In 1977, the United National Party government of Sri Lanka introduced a series of trade policy reforms. Thus, market liberalization policies were introduced, and Sri Lanka was actually the first country to implement free trade among the South Asian countries. This trade liberalization attempt focused on cutting tariffs and non-tariff barriers, introducing a six band tariff structure, limiting quantitative restrictions, and avoiding the entry barriers to foreign investment. The six-band tariff structure that was introduced by the budget of 1977 was as follows: i) zero percent on the price of essentials;(ii) 5 percent on most raw materials; (iii) 12.5 to 25 percent on most intermediate goods; (iv) a rate of 50 percent on goods that are neither “ essential” nor “luxury” (v) a protective rate of 100 percent on goods being produced domestically and ; (vi) a prohibitive rate of 500 per cent on goods considered to be “luxury” consumer items (White and Weerakoon 1995).These tariff reforms were followed by setting up a presidential tariff review commission and the tariff liberalization recorded a sharp increase of imports by US\$ 382.3 million in the 1978 compared to 1976.

In tariff disciplines, Sri Lanka maintained for ceiling bindings rather than tariffication and adopted 50 percent bound tariff level for all agricultural products. This was relatively low compared to other developing countries’ bound rates and worldwide bound rate was 62% (Herath, 2006).

According to the World Bank, Sri Lanka’s real GDP grew at an annual average rate of 4.9 percent between 1977 and 2007, managed to achieve 6 percent in 2008. Even though the country faced a costly a thirty- year war, a comparatively higher growth rate was maintained. However, the agricultural productivity growth was around at an average rate of 2 percent (Central Bank of Sri

Lanka). The main driving force behind it might have been the implementation of trade liberalization policies since 1977. As a result, the country grew at an average of 8.2 percent in 2010 (Central Bank of Sri Lanka 2011).

A study done by Gunawardena (2012) shows that agricultural productivity has improved during past years in Sri Lanka and all the provinces have positive regional GDP growth as agricultural productivity increases. The author further states that this productivity improvement has mostly benefited rural agricultural provinces. These findings suggests that Sri Lanka's GDP has considerably grown with trade policy reforms adapted in 1977. Rising of agricultural productivity in the long run can increase returns to production factors, and this increase of real income ultimately will generate positive economic benefits. It is obvious that these positive benefits would improve overall welfare that would make both consumers and producers better off across the economy.

REVIEW OF THE EMPIRICAL LITERATURE

Empirical Literature on Trade Liberalization and Agricultural Production Growth

This section describes previous studies that have investigated the relationship between trade liberalization and agricultural production growth. Also, some research has showed the relationship between trade openness and agricultural production growth. However, these studies illustrate conflicting results. Some analysts found that trade liberalization has increased the performance of exports and could have eventually increase the agricultural production while improving national welfare, whereas other researchers emphasized that there is not enough evidence to suggest a strong relationship between trade liberalization and agricultural production growth.

Brandao and Martin (1993) studied the structure of agricultural protection in developed and developing countries and reviewed estimations of trade implications on trade liberalization. The

RUNS model was employed to analyze the consequences of agricultural trade liberalization along with the Dunkel proposal. The results of this study indicated that agricultural prices of OECD countries will have significant impacts on world prices whereas developing countries in aggregate could expect to achieve smaller welfare gains if this Dunkel package were implemented by developed countries alone. This study also showed that food exporters of developing countries are likely to be the main beneficiaries. Moreover, this analysis concluded that large potential gains from a comprehensive move to agricultural trade liberalization will be achieved in the future even though there is a small gain from the initial liberalization. Further, the study indicated that developing countries can have cumulative benefits as trade liberalization stimulates productivity.

Incgo (1997) evaluated the effects of agricultural trade liberalization in least developed and net-food importing countries. Her analysis confirmed that welfare changes were affected significantly by an economy's structure of trade distortions. The study stated that most gains from UR comes from countries trade liberalization efforts and limited liberalization commitments have lost efficiency gains for some countries.. Further, this study emphasized that those countries may have lost rising market opportunities since they did not approach liberalized trade policies and structural reforms.

Hassine, Robichaud and Decaluwe (2010), investigated the agricultural trade liberalization, productivity gain, and poverty alleviation in Tunisia. This study used Computable General Equilibrium models to estimate the impact of trade liberalization scenarios on poverty and equity in Tunisia. Findings of this study showed that opening up of foreign trade promotes productivity growth and poverty can drop by 11 percent under the agricultural trade liberalization scheme.

METHODOLOGY

Data

This study focuses on secondary data published in the Central Bank of Sri Lanka's annual reports. Therefore, the selected sample period is 1960-2010, a 51- year period. This study's time period was delineated into two sub periods before 1977 and after 1977, when trade liberalization was introduced. Price effects of variables were removed using the GDP deflator of respective years to avoid the inflationary effects.

Analytical Methods

Our study applied Single Equation Models (SEMs) to examine the determinants of the agricultural production growth function. SEM regression analysis was performed by incorporating four variables. The dependent variable was the agricultural production growth rate in the country. In this study, real Gross Domestic Product (GDP) of the agricultural was used as a proxy for economic growth. The explanatory variables were trade openness, total investment, and real interest rate. Two dummy variables (D_1 & D_2) were added for trade liberalization and Free Trade Agreements (FTA). D_1 was assigned to trade liberalization or after 1977. D_2 was assigned to FTA, after 1995. In summary, regression analysis was performed for four models to analyze the impacts of the trade liberalization and regional trade agreements on Sri Lanka's economic growth. The four alternative models are as follows.

Model 1

Agricultural production growth $Growth = \beta_0 + \beta_1 \text{ Trade Openness} + \beta_2 \text{ Investments} + \beta_3 \text{ Real Interest} + \beta_5 D_1 + u_i$

This model used the data from 1960 to 2010 and the main objective was to observe the impacts of trade liberalization and trade openness on economic growth.

Model 2

Agricultural production growth $Growth = \beta_0 + \beta_1 \text{ Trade Openness} + \beta_2 \text{ Investments} + \beta_3 \text{ Real Interest} + u_i$

The main purpose of this model was to show the impacts of trade openness on economic growth before trade liberalization, from 1960 to 1977.

Model 3

Agricultural Production Growth $= \beta_0 + \beta_1 \text{ Trade Openness} + \beta_2 \text{ Investments} + \beta_3 \text{ Real Interest} + u_i$

The data used from 1977 to 2010 and main purpose was to show the impacts of trade liberalization and trade openness on economic growth.

Model 4

Agricultural production growth $= \beta_0 + \beta_1 \text{ Trade Openness} + \beta_2 \text{ Investments} + \beta_3 \text{ Real Interest} + \beta_4 D_2 + u_i$ This model also used data from 1977 to 2010 and included the FTA dummy variable aiming to show the impacts of FTA on economic growth with liberalized trade policies.

Trade openness was defined as the ratio of the total export and imports to total GDP ($X+M/GDP$). For our study, total investments included both domestic and foreign investments. In Sri Lanka, interest rates decisions are taken by the Central Bank of Sri Lanka, and this interest rate was the lending interest rate adjusted for the inflationary effects. All the statistics of exports, imports, investments, and interest rates were from the annual reports of central bank of Sri Lanka.

Multiple Regression Model

The study used the Ordinary Least Square (OLS) method to estimate multiple regression models. To examine the effects of trade liberalization on agricultural production growth, the following variables were used: Economic Growth, Trade Openness, Investment, Interest Rate, Trade Liberalization (dummy), and FTAs (dummy).

The general Regression Equation used as of form:

$$\text{Agricultural production growth} = \beta_0 + \beta_1 \text{ Trade Openness} + \beta_2 \text{ Investments} + \beta_3 \text{ Real Interest} + \beta_5 \text{ Dummy} + u_i$$

Trade openness is assumed to have a positive impact on agricultural production growth because the ratio of total exports and imports as well as their combined total to GDP ($X+M/GDP$) are expected to increase with trade liberalization. Total investments are assumed to have a positive relationship with agricultural sector growth because the lifting of trade restrictions attracts foreign firms, and accordingly raises the demand and returns to factors. The interest rate is expected to have a negative impact on agricultural productivity because high interest rates suppress investments. Such rates provide opportunities to convert money to time deposits, depressing investments by the private sector, and decreasing investment may lead to poor agricultural production growth. The trade liberalization dummy variable was added to check whether there is a change in the agricultural production growth after introducing the market economy in 1977. The Free Trade Agreement dummy variable was added to study the impacts of trade liberalization with FTAs on agricultural sector growth in Sri Lanka after 1995. The regression analysis was performed for four models using SAS as the analytical tool.

EMPIRICAL ANALYSIS AND RESULTS

Table 01.Descriptive Statistics

Table 1 provides the descriptive statistics of the study for the peif 1960 to 2010.

2010.

Table 2.Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
Total AgriculturalGDP	2088.22	757.8915	994.80	3386.15
tradeopeness	0.03629	0.03347	0.0035628	0.1189838
investments	136064.5882	184027.78491	978.0000000	752200.00
interestrates	11.5980	5.15560	4.0000000	25.0000000
D1	0.6667	0.47610	0	1.0000000

Table 02. Parameter Estimates of the Model 1

Variable	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1106.58940	240.68724	4.60 **	<.0001
tradeopeness	4373.25729	2375.59556	1.84 *	0.0721*
investments	0.00083940	0.00027216	3.08**	0.0034**
interestrates	80.46492	17.32201	4.65**	<.0001**
D1	139.35118	166.86597	0.84	0.4080

Note: Adjusted R-Square: 88% D-W Statistics is 1.41.

**, * denote significance at the 5% and 10% level, respectively.

Model 1 can be represented as

Agricultural Production Growth = $\beta_0 + \beta_1$ Trade Openness + β_2 Investments + β_3 Real Interest + β_5

$D_1 + u$

The coefficient of the Determination, adjusted R-square for Model 1 for the period of 1960 to 2010 is 88 percent. Therefore, the R^2 statistics suggested that more than 88 percent of the total variation in Agricultural sector's GDP is explained by the Single Equation regression model.

The Table 2 provides the parameter estimates of trade openness, investment, interest rate, and the trade liberalization dummy variable of the model 1 for the period of 1960 to 2010.

The variable trade openness shows a positive and significant relationship at the 90 percent level.

The elasticity of means suggest that 1 percent increase of trade openness can increase 0.075 percent increase of agricultural GDP growth. The study period for the model was 1960 to 2010. Within this selected period, there were several changes in the economy in the country. The most prominent feature was that the government introduced the open market policies in 1977 and liberalized the trade and tariff policies. This situation may have facilitated rapid expansion of the agricultural export and import sectors. As expected, agricultural trade openness results a significant positive effects on agricultural imports. Also, removal of tariffs on agricultural commodities induces a substantial reduction in the domestic prices. Simultaneously, this reduction of domestic prices induces an increase of agricultural exports because farmers may choose new markets for selling their products as domestic market becoming less attractive. These factors increased trade openness and production and may have significantly increased Sri Lanka's GDP in the agricultural sector.

The investment is positively related and significant at the 95 percent level. This agricultural GDP increase may be due to increasing foreign direct investment and domestic investments.

Increasing both investments elicits an independent influence on agricultural sector growth with the introduction of open market economy because both foreign direct investment and domestic investment increase as openness of the trade policy regimes. On the other hand investment includes

improvements in land, development of natural resources, and promotion of educational, training and extension institutions. These facilities ultimately increase the agricultural output in the country.

Real interest rate and agricultural production growth illustrate a positive relationship and it is significant at 5 percent. Increases in interest rates are also advocated as a means of curbing expenditure and investment. Interest rate is a double edge weapon as high interest rates could increase costs of production which increases prices.

The trade liberalization variable (D_1) and the Agricultural production growth variable indicate a positive relationship and it is evident that trade liberalization has promoted agricultural production growth in Sri Lanka. On average the real GDP is higher in the post-1977 period. This indicates that the overall trade policy framework adopted after 1977 has accelerated the agricultural GDP growth in Sri Lanka. In other words the open economic policy seemed to be successful in attracting investments and increasing trade openness. However, the model shows the liberalization variable is not significant. This might be due to the Liberalization of industry and service sector. These sectors might bring a pressure on agricultural sector which makes much competitiveness. Also, endogenous price competition in the agricultural sector may also be a reason to result the trade liberalization variable insignificant.

To ensure the accuracy of the regression results, the multicollinearity was tested and results indicated that multicollinearity was not a problem. Autocorrelation was found and corrected using the Cochrane-Orcutt procedure.

Model 2 (the data from 1960 to 1977) is represented as:

$$\text{Agricultural Production Growth} = \beta_0 + \beta_1 \text{ Trade Openness} + \beta_2 \text{ Investments} + \beta_3 \text{ Real Interest} + u_i$$

Model 3 (the data from 1977 to 2010) is represented as

$$\text{Agricultural Production Growth} = \beta_0 + \beta_1 \text{ Trade Openness} + \beta_2 \text{ Investments} + \beta_3 \text{ Real Interest} + u_i$$

The table 3 and 4 state the parameter estimates of the Model 2 and the Model 3.

The adjusted R square for model 2 and for model 3 is 69 percent and 72 percent, respectively. It shows that more than 69 percent of the total variation in the real GDP is explained by the regression model.

Table 3. Parameter Estimates of the Model 2

Model 3	Parameter estimates	Std. Error	t
(Constant)	51.65	153.77	0.34*
tradeopeness	-4218.75	1449.70	2.91**
investments	0.34	0.058	5.95**
interestrates	487.34	41.08	11.86**

Note: Adjusted R-Square: 69% , D-W Statistics is 1.062.

**,* denote significance at the 5% and 10% level, respectively.

Table 4. Parameter Estimates of the Model 3

Model 4	Parameter estimates	Std. error	t
(Constant)	10581	1740.503	6.08**
tradeopeness	118424	30245	3.92**
investments	0.022	.001	12.48**
interestrates	-32.559	90.459	-0.36

Note: Adjusted R-Square: 72%, D-W Statistics is 1.794

**,* denote significance at the 5% and 10% level, respectively.

Regression results of model 2 provide interesting results. Model 2 reports that trade openness is negatively related and a significant determinant at the 5 percent or 1 percent significance level. This is obviously evidence that the closed economic policies have not supported international competitiveness through increased imports and exports in this era. As mentioned earlier, for model 2, the Study period was 1960 to 1977 and the government had the authority in

making decisions and policy implementation. The government policy may have increased only imports but not exports. However, model 3 illustrates that trade openness is a positively related and a highly significant determinant on the agricultural production growth of Sri Lanka. The elasticity of means illustrate that 1 percent increase of trade openness increases 0.15 percent of agricultural GDP. This was the period of implementing trade liberalizing policies and this new policies encouraged the international competitiveness.

Both models show that the investments are positively related to the agricultural production growth and those are significant. The interest rate is negatively related to the economic growth after 1977 and it is statistically insignificant. As indicated before, interest rate is a double edge weapon as high rate of interest rate could increase costs on production and it could increase prices. These high interest rates encourage people to save rather than invest.

Each model was tested for the multicollinearity and results indicated that it was not a problem. Autocorrelation was found and corrected using the Cochrane-Orcutt procedure.

Table 5. Parameter Estimates of the Model 4

Model 5	Parameter estimates	Std. Error	T value	P-value
(Constant)	1863.18	322.9976	5.77	<0.0001
tradeopeness	21474	5513.0177	3.90**	0.0005
investments	0.00104	0.0005	2.11**	0.0440
interestrates	64.59782	17.0831	3.78**	0.0007
D2	-421.20695	173.7555	-2.42*	0.0218

Note: Adjusted R-Square: 76%, D-W Statistics is 1.4.

**, * denote significance at the 5% and 10% level, respectively.

The model 4 can be represented as

$$\text{Agricultural Production Growth} = \beta_0 + \beta_1 \text{ Trade Openness} + \beta_2 \text{ Investments} + \beta_3 \text{ Real Interest} + \beta_4 \text{FTA} + u_i$$

The table 5 explains the regression results of model 4 for the period of 1977 to 2010. The results report the relationship between the agricultural production growth and other variables including FTA dummy variable. Results show that the adjusted R-Square is 76 percent and this shows 76 percent of the total variation in the real GDP is explained by the regression model.

The results illustrate that the trade openness is positively related to agricultural production growth and is significant on agricultural GDP growth after 1977 with trade liberalization. Elasticity of means suggest that 1 percent increase of trade openness will increase 0.14 percent increase of agricultural GDP. This further suggests that trade openness has increased agricultural production growth by eliminating major trade barriers that were exhibited in the economy.

The investment is also positively related to the economic agricultural GDP growth and is a significant variable and further explains that domestic and foreign investment accelerated agricultural production growth. The interest rate is positively related to the agricultural GDP growth and it is a significant variable on the economic growth after 1977. This shows agricultural production growth has been directly affected by fiscal and monetary policies of Sri Lanka.

The dummy variable of the model 4 is Free Trade Agreements (FTA) and the variable is negatively related to the economic growth. Moreover, the FTA variable is a significant determinant at 5 percent significance. Sri Lanka signed the India-Sri Lanka Free Trade Agreement in 1998 and fully implemented in 2000. In 2004, Sri Lanka signed the South Asia Free Trade Agreement (SAFTA) and it implemented in 2006. This negative relationship implies that these agreements have not been supported to increase agricultural production growth in Sri Lanka. Even though the overall

trade policy framework adopted after 1977 has promoted the agricultural production growth, the regional trade agreements have not improved total agricultural output in the country.

The model was tested for the multicollinearity and results suggested that multicollinearity was not an issue. Autocorrelation was found and corrected using the Cochrane-Orcutt procedure.

SUMMARY AND CONCLUDING REMARKS

The empirical results of this study confirmed that trade liberalization policies adapted in 1977 had significantly increased the agricultural GDP by stimulating trade openness in Sri Lanka. Similarly, as a significant factor, investment also had promoted economic growth all along with these open market policies.

In summary, this study's results confirm that trade liberalization may have a positive influence on trade openness and could result in accelerated economic growth of Sri Lanka's agriculture. The new trade policies would have been responsible for more efficient use of the country resources in terms of increased welfare.

Moreover, the results report that the trade agreements such as the India-Sri Lanka Free Trade Agreement and the South Asia Free Trade Agreement (SAFTA) may have not had significant influence the agricultural production growth of the country.

Concluding Remarks

The study indicated that the average agricultural production growth rate was higher in post liberalization period. The total foreign exchange earned from all sectors has significantly increased during past years; manufacturing and service sectors specially produced a higher total output to the country. This situation created a wide gap between agricultural and total output during this period.

The most important factor for this wide gap would have been the structural transformation which is manufacturing and service sector make a higher contribution moving away from agricultural sector. However, foreign exchange earned by exporting agricultural products has increased substantially during this period. Therefore, it is reasonable to confirm the well-established positive impact of market liberalization on economic growth during the post liberalization period in Sri Lanka.

Overall, the trade liberalization policies have increased agricultural production. Competitive export and import opportunities among countries have led to maintain the standard levels of quality and a stable production. However, it emphasizes that there should be lot of improvements in this agricultural sector. Mainly, more attention should be given to reduce unspecialized and excessive workers in the agricultural sector to improve agricultural productivity. Most critical issue at present is that the agriculture does not bring a consistent economic gain to the farmer. This may be due to the government has not paid adequate attention to provide farmers with input and marketing facilities in time.

Irrigated agriculture plays a vital role in Sri Lankan economy. However, field water losses cause significant crop reduction and it may lead to decrease total agricultural production. Therefore, efficient field water management has to be promoted for increasing the water productivity through crop diversification and with new water saving techniques.

Farming without adequate concern on conservation of natural resources such as soil and water and environmental protection has led to deterioration of the agricultural resource base in the country and pollution of the environment. Even though the trade policy reforms can achieve a higher agricultural production growth, these factors may lead to underestimate the expected benefits of trade liberalization in the agricultural sector. This study suggests that continuous support to the

agricultural sector including natural resource conservation policies and proper skill development program may be useful to increase the total agricultural output in Sri Lanka.

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