

**Ministry of Education  
Department of Higher Education  
Yangon University of Distance Education**

**Yangon University of  
Distance Education  
Research Journal**

Vol. 10, No. 1

December, 2019

**Ministry of Education  
Department of Higher Education  
Yangon University of Distance Education**

**Yangon University of  
Distance Education  
Research Journal**

Vol. 10, No. 1

December, 2019

Contents	Page
<b>Patriotic Pride from U Latt's Novel, "Sabae Bin"</b>	1-4
<i>Kyu Kyu Thin</i>	
<b>Creation of characters in Kantkaw a novel of Linkar Yi Kyaw</b>	5-9
<i>Khin San Wint</i>	
<b>Author Khin Khin Htoo's Creative Skill of Writing a Story " Ku Kuu"</b>	10-15
<i>Kyin Thar Myint</i>	
<b>A Stylistic Analysis of the poem "the road not taken" by Robert Frost</b>	16-22
<i>Nyo Me Kyaw Swa</i>	
<b>The Effectiveness of Critical Thinking on Students in Classroom</b>	22-26
<i>Amy Thet</i>	
<b>Making Education Accessible: an investigation of an integrated English teaching-learning system in first year online class at Yangon University of Distance Education</b>	26-33
<i>Ei Shwe Cin Pyone</i>	
<b>A Geographical Study on Spatial Distribution Pattern of Health Care Centres in Sanchaung Township</b>	33-39
<i>Myo Myo Khine, Win Pa Pa Myo, Min Oo, Kaythi Soe</i>	
<b>A Study of Crop-Climate Relationship in Hlegu Township</b>	39-45
<i>Win Pa Pa Myo, Myo Myo Khine</i>	
<b>How to Organize Data for Presentation</b>	46-50
<i>Yee Yee Myint, Myint Myint Win</i>	
<b>A Geographical Study on Open University in New Zealand</b>	50-54
<i>Myint Myint Win, Yee Yee Myint</i>	
<b>Royal Administrative Practices in Konbaung Period (1752-1885)</b>	54-60
<i>Yin Yin Nwe</i>	
<b>Pyidawtha Programme (1952-1960)</b>	60-69
<i>Zaw Naing Myint</i>	
<b>The Role of Saya San in Myanmar Politics (1930-1931)</b>	70-76
<i>Hlaing Hlaing Nyunt</i>	
<b>A Study of the Floral Arabesque Patterns in Myanmar Traditional Paintings</b>	76-81
<i>Hla Hla Nwe</i>	
<b>A Study on Job Stress of Office Staff from Yangon University of Distance Education</b>	82-86
<i>Khin Ya Mone, Ma Aye, Theint Thiri Zan</i>	
<b>A study on the job satisfaction of the teaching staff in Yangon University of Distance Education</b>	86-91
<i>Theint Thiri Zan, Thiri Hlaing, Ma Aye</i>	
<b>A study on the work motivation of the teaching staff in Yangon University of Distance Education</b>	91-96
<i>Ma Aye, Khin Ya Mone, Theint Thiri Zan</i>	
<b>A study of Aristotle's Golden mean</b>	97-101
<i>Nwe Nwe Oo</i>	
<b>A Study of Legal Thought of John Austin</b>	102-109
<i>Aye Aye Cho</i>	
<b>A study of the concept of "good will" in Kantian philosophy from the Myanmar philosophical thought</b>	109-115
<i>Moe Aye Theint</i>	
<b>The Term "Pāragū" in the Buddhist Scriptures</b>	115-121
<i>Theingi Cho</i>	
<b>Arāḍa's Teaching from the Buddhacarita</b>	122-126
<i>Pa Pa Aung</i>	
<b>The Merit of Donating Four Material Requisites</b>	126-131
<i>Marlar Oo</i>	
<b>The Benefits of Workers under the Workmen's Compensation Act in Myanmar</b>	131-135
<i>Khin Mar Thein</i>	

Contents	Page
<b>Study on the Humanitarian Intervention under International Law</b> <i>Nu Nu Win</i>	136-141
<b>A Study on the Quality of Fried Edible Oil (Palm Oil)</b> <i>Thazin Lwin, Myo Pa Pa Oo, Nyi Nyi</i>	142-148
<b>New Ceramer Coating Based on Titanium-resorcinol Copolymer with Blown Seed Oils</b> <i>Yu Yu Myo, Nwe Ni Win, Thazin Win</i>	149-156
<b>A Study on Antioxidant Activity of Edible Green Leaves of Brassica Juncea Linn. (Mom-Hnyin-Sein)</b> <i>Ohmar Ko, Thuzar Win, Hnin Yee Lwin</i>	156-161
<b>Microcontroller controlled four-digit timer</b> <i>Lei Lei Aung, Myo Nandar Mon, Khin Phyu Win, Moh Moh</i>	161-166
<b>Study On Current-Voltage Characteristics of Znte Electroplated Film Under Illumination</b> <i>Myo Nandar Mon, Thi Thi Win, Lei Lei Aung, Moh Moh</i>	166-172
<b>Effect of Heat Treatment on Optical Properties of Cd-doped ZnO Thin Film</b> <i>Su Thaw Tar Wint, Myo Myint Aung, Moh Moh</i>	173-175
<b>Radon concentration in soil samples from different layers of the underground of Bago University campus</b> <i>Thi Thi Win, Myo Nandar Mon, Aye Aye Khine, Moh Moh</i>	176-180
<b>A Study on Weakly Preopen and Weakly Preclosed Functions</b> <i>Kaythi Khine, Nang Moe Moe Sam, Su Mya Sandy</i>	181-187
<b>Functions and Their Graphical Representation</b> <i>Ohmar Myint, Moe Moe San, Zar Chi Saint Saint Aung</i>	187-193
<b>Trilinear and Quadrilinear Forms</b> <i>Wai Wai Tun, Aye Aye Maw</i>	193-198
<b>Prevalence and bionomics of <i>Aedes aegypti</i> (Linnaeus, 1762) larvae in high risk areas of Pazundaung Township, Yangon Region</b> <i>Tin Mar Yi Htun</i>	198-204
<b>Comparative study of helminthes parasitic eggs and larvae in goat from Magway Township</b> <i>Nilar Win, Myat Thandar Swe, Thinzar Wint</i>	205-213
<b>Endoparasites of anurans from north Dagon and Kamayut Townships</b> <i>Pa Pa Han, Thuzar Moe, Phyo Ma Ma Lin, Aye Aye Maw</i>	213-218
<b>Investigation of some invertebrates in Taungthaman Lake, Amarapura Township, Mandalay Division</b> <i>Khin Than Htwe, Kathy Myint, Thin Thin Swe, Aye Kyi</i>	219-225
<b>Antimicrobial activity of <i>Dolichandrone spathacea</i> (L.f.) k. Schum. Flowers</b> <i>Moet Moet Khine, Tin Tin Nwe, Win Win Shwe, Mya Mya Win</i>	226-231
<b>Five Selected Wild Medicinal Plants and Theirs' Uses</b> <i>Mya Mya Win, Moet Moet Khine, Win Win Shwe</i>	232-237
<b>The Comparison of the Yield from Non-Grafted and Grafted of Five Plants of Family Solanaceae</b> <i>Win Win Shwe, Moet Moet Khine, Mya Mya win</i>	238-244
<b>Silk Fabrics Factories in Amarapura</b> <i>Win Thida, Ni Ni Win, Yu Lae Khaing</i>	245-251
<b>A study on production of rubber in Myanmar (1996 - 97 to 2017- 2018)</b> <i>Tin Tin Mya, Ni Ni Win, Thinzar Aung</i>	251-257
<b>A Study on Factors Affecting the Exclusive Breastfeeding of Mothers in PYA-PON District</b> <i>Khin Mar Kyi, May Zin Tun</i>	258-265
<b>A Study on the Health Status and Physical Fitness of Elderly People at Home for the Aged (Hninzigone), Yangon</b> <i>Hein Latt, Pyae Phyo Kyaw</i>	266-273
<b>A Study on Mortality and Fertility levels of Myanmar and its Neighbouring Countries</b> <i>Ni Ni Win, Thinn Thinn Aung, Thinzar Aung</i>	273-280

design packages. Moreover, they should advertise to their potential consumers by using appropriate media to gain more market share. Product development strategies are also important for all factories because quality products can attract the customers and it can help all factories develop their business.

The selected silk fabrics factories should try to enter new foreign market for their products. They should use such techniques as the latest technology, developing quality standards, appealing attractive packing designs, selling low prices in orders to compete with not only local market but also international market. Thus, the domestic products can compete and enter the foreign market successfully. Besides, it is necessary for these factories to maintain contact with tour companies in order to gain foreign customers.

### Acknowledgements

We would like to express my immense gratitude to Rector Dr. Tin Maung Hla, and Pro Rector Dr. Khin Thant Sin, Yangon University of Distance Education, for their encouragement to complete this research.

We would also like to express our sincere gratitude to each of our individual colleagues of the faculty of the Department of Economic, Yangon University of Distance Education for their every kind of help they provided us with so that we could complete this research.

### References

1. Kotler, P and K L Keller (2008), "*Marketing Management*", 13<sup>th</sup> Ed, New Delhi: Prentice Hall,
2. Thonpson, Jr, A. J Strickland and J.E. Gamble (2007), "*Crafting & Executing Strategy*" 15<sup>th</sup> Ed, Irwin, McGraw-Hill, P.172.
3. <http://www.businessdictionary.com/definition/growth-strategy.html#ixzzlwKczr9Vs>.  
\*\*\*\*\*

## A STUDY ON PRODUCTION OF RUBBER IN MYANMAR (1996 - 97 to 2017- 2018)

Tin Tin Mya<sup>1</sup>, Ni Ni Win<sup>2</sup>, Thinzar Aung<sup>3</sup>

### Abstract

The main theme of this research is to discuss the appropriate regression equation. In this study, Regression Analysis was applied to choose the appropriate regression equation for rubber production in Myanmar during the period from 1996- 97 to 2017-2018. The dependent variable is the production of rubber and the related independent variables are harvested acreage, sown acreage and raw rubber export. The appropriate model was chosen by considering the presence of multicollinearity or not. The harvested acreage and sown acreage of rubber are linearly related, so it is the nature of multicollinearity. The coefficient of sown acreage is also not significant. And then, the sown acreage of rubber must be reduced from the list of independent variable. In the chosen model. The rubber production is expressed as the function of harvested acreage and raw rubber export. According to the calculation, the estimated production of rubber was close to the actual production of rubber. Therefore, the estimated regression model can be used to predict the future production of rubber in Myanmar.

### 1. INTRODUCTION

#### 1.1 Rationale of the Study

Agriculture sector is the most important sector in Myanmar economy. Myanmar's agriculture is the fundamental factor for supporting the social and economic development of nation. In Myanmar, various crops can be categorized into cereals, oil crops, pulses, industrial crops, food crops and plantation crops. Myanmar exports agricultural merchandise to other countries for foreign exchange. In Myanmar, rubber is an industrial crop and it is also an export item.

<sup>1</sup>Lecturer, Department of Economics, Yangon University of Distance Education

<sup>2</sup> Lecturer, Department of Economics, Yangon University of Distance Education

<sup>3</sup> Assistant Lecturer, Department of Economics, Yangon University of Distance Education

Rubber is one of the three main perennial crops in Myanmar. Rubber can be grown in all regions of Myanmar especially Mon state, Kayin state, Rakhin state, Tanintharyi Region, Bago Region and Ayeyarwaddy Region. Rubber can be grown the length and breadth of the nation. Myanmar's rubber growers have struggled to produce high-quality products. With the help from Japan, a laboratory for testing the quality of rubber has been set up in Yangon, and Myanmar is trying to apply it for membership at the International Rubber Association (IRA) in Malaysia.

There are two main types of rubber such as "natural" and "synthetic". Nature rubber is that the latex derived naturally from the rubber tree, and the latter is synthesized from chemicals sourced from petroleum refining. Natural rubber is the raw material for a wide range of rubber products. Rubber products are usually divided into three major classes: (1) tires, (2) industrial rubber goods used in motor-vehicle, aircraft, and ship construction, agricultural machine building, railroad transport, and construction, and (3) consumer goods, including footwear (the most important in this category), mats, bathing caps, inflatable inner tubes and rubber rings, gloves, and pacifiers.

Myanmar can export various kinds of crops to neighbour countries and other trade partners. Rubber is enough for not only local consumption but also for foreign export. Only 8 percent of total product is used within Myanmar, the rest exported to other countries. 70 percent of total product in exported to China and the main exported counties of Myanmar's raw rubber are China, Singapore, Malaysia and Korea.

Today Myanmar is necessary to increase foreign earning and investment for developing economic sector. Since rubber is the foreign exchange earner, a research on the production of rubber in Myanmar is chosen for more information.

## **1.2 Objective of the Study**

The main objective of the study is to explain the fitted linear regression function for rubber production of Myanmar.

## **1.3 Scope and Limitation of the Study**

This research was based on secondary data published by Central Statistical Organization (CSO) and to find the regression function by using the Statistical Package for Social Science (SPSS). The study period is from 1996-97 to 2017-18.

## **1.4 Method of Study**

To meet the objective of the study, regression analysis was used to find the best fitted trend model for production of rubber in Myanmar. The linear regression functions were calculated by using Statistical Package for Social Science (SPSS). The results were obtained by Enter and Stepwise Regression Methods of SPSS.

## **1.5 Organization of the Study**

This research is divided into five chapters. As the introduction part, the background of the study, the objective of the study, method of study and organization of the study are presented in Chapter I. Chapter II deals with the theoretical background of this dissertation. Finding appropriate regression function for rubber production of Myanmar is presented in Chapter III. Chapter IV is the construction of the fitted multiple linear regression models of production of rubber in Myanmar. Chapter V is the conclusion.

## **2. STATISTICAL METHODOLOGIES**

### **2.1 Correlation and Regression**

Correction is a statistical method used to determine whether a relationship between variable exists. On the other hand, it determines the strength of the relationship.

Regression is a quantitative expression of the basic nature of the relationship between the dependent variable (Y) and independent variables (X), that is, positive or negative, linear or nonlinear.

There are two types of regression: simple and multiple. In a simple regression, there is one independent variable that is used to predict the dependent variable. In a multiple regression, two or more independent variables are used to predict one dependent variable.

Simple relationships can also be positive or negative. A positive relationship exists when both variables either increase or decrease at the same time. In a negative relationship, as one variable increases, the other variable decreases, and vice versa.

Linear and curvilinear relationships: If X and Y are related in a linear manner, then, as X changes, Y changes by a constant amount. If a curvilinear relationship exists, Y will change by a constant rate as X changes.

## 2.2 Correlation Coefficient

The correlation coefficient computed from the sample data measures the strength and direction of a linear relationship between two variables. The symbol for the sample correlation coefficient is ' $r$ '. The symbol for the population correlation coefficient is ' $\rho$ '.

The range of the correlation coefficient is from -1 to +1. If there is a strong positive linear relationship between the variables, the value of ' $r$ ' will be close to +1. If there is a strong negative linear relationship between the variables, the value of ' $r$ ' will be close to -1. When there is no linear relationship between the variables or only a weak relationship, the value of ' $r$ ' will be close to 0. Formula for The Correlation Coefficient ' $r$ ' is

$$r = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{[n(\sum X^2) - (\sum X)^2][n(\sum Y^2) - (\sum Y)^2]}}$$

Where  $n$  is the number of data pairs.

## 2.3 The Significance of the Correlation Coefficient

Since the value of ' $r$ ' is computed from data obtained from samples, there are two possibilities when ' $r$ ' is not equal to zero: either the value of ' $r$ ' is high enough to conclude that there is a significant linear relationship between the variables, or the value of ' $r$ ' is due to chance.

To make this decision, one uses a hypothesis-testing procedure:

Step 1- state the hypotheses

Step 2- compute the t-test statistic

Step 3- determine the level of significance ' $\alpha$ ' and critical value

Step 4- writes the decision rule

Step 5- makes the decision

Step 6- summarize the results

Hypotheses

Null Hypothesis:  $H_0: \rho = 0$  (There is no correlation between the variables.)

Alternative Hypothesis:  $H_1: \rho \neq 0$  (There is correlation between the variables.)

Formula for the  $t$ -test of correlation coefficient is

$$t = r \sqrt{\frac{n-2}{1-r^2}}$$

with degree of freedom equal to  $n-2$ . Decision rule is that if  $t$  statistic is greater than critical value, we reject  $H_0$ . Otherwise, we accept  $H_0$ .

## 2.4 Simple Linear Regression Model

Simple regression holds that the dependent variable Y is a function of only one independent variable. It is sometimes called bivariate analysis because only two variables are involved. The simple linear regression model is defined as

$$Y_i = \beta_0 + \beta_1 X_i + e_i$$

Where  $\beta_0$  is the intercept and  $\beta_1$  is the slope in the regression line. These are called constant and regression coefficient, and  $e_i$  is the random (stochastic) error term.

When the other variable changes exactly 1 unit, the magnitude of the change in one variable is called a marginal change. The value of slope  $\beta_1$  for the regression equation represents the marginal change.

**2.5 Multiple Linear Regression Model**

Multiple regression analysis is the study of how a dependent variable Y is related to two or more independent variables. Consequently, the multiple linear regression model can be written as follows;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_kX_k + e$$

Where  $k$  refers to the number of explanatory variables. In the multiple regression model,  $\beta_0, \beta_1, \dots, \beta_k$  are the parameters and  $e$  is a random error term.

**2.8 Estimated Multiple Regression Equation**

An estimated multiple regression equation can develop which takes the following form:

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + \dots + b_kX_k$$

Where  $b_0, b_1, \dots, b_k$  are the estimated values for the parameters  $\beta_0, \beta_1, \dots, \beta_k$  and  $\hat{Y}$  is the estimated value of the dependent variable Y. The estimated procedure for multiple regression is nearly identical to simple regression. The least square model uses sample data to provide the value of  $b_0, b_1, \dots, b_k$  which minimize the sum of squared residuals.

**2.10 Measures of Goodness-of-fit**

There are at least two measures of goodness-of-fit; (1) the standard error of the estimate, and (2) the coefficient of determination.

**2.11 Testing for Significance**

The significance tests for the linear regression model were the  $t$  test and  $F$  test. If the  $F$  test shows that the regression has overall significance, the  $t$  test is then used to determine whether each of the individual independent variables is significant. A separate  $t$  test is used for each of the independent variables; thus the  $t$  test is a test for individual significance.

**2.11.1 F test**

The hypothesis for the  $F$  test takes the following form

Null Hypothesis:  $\beta_0 = \beta_1 = \dots = \beta_k = 0$

Alternative Hypothesis: At least one  $\beta_i \neq 0$

To take the decision, one uses a hypothesis-testing procedure,

Step 1- state the hypothesis

Step 2- finds the  $F$  value (in this case,  $F = \frac{MSR}{MSE}$ )

Step 3- determines the critical value

Step 4- writes the decision rule

Step 5- makes the decision

Step 6- summarize the results

ANOVA Table for Multiple Regression Analysis

Source of Variation	Sum of Square	Degree of Freedom	Mean Square	F
Regression	SSR	k-1	MSR = SSR/k-1	MSR/MSE
Error	SSE	n-k-1	MSE = SSE/(n-k-1)	
Total	SST	n-1		

The decision rule is that if the  $F$  value is greater than the critical value, reject null hypothesis. Otherwise, accept null hypothesis.

**2.11.2 t- test**

For any parameter  $\beta_i$ , the hypotheses take the form



Null Hypothesis:  $\beta_i = 0$

Alternative Hypothesis:  $\beta_i \neq 0$

The test statistic for this test is

$$t = \frac{b_i - \beta_i^*}{s_{b_i}}$$

Where  $\beta_i^*$  is the null's claim about  $\beta_i$  which in this case means  $\beta_i^* = 0$ . The decision rule for this test takes the following form

Reject the null if:  $t < -t_{\alpha/2, n-1}$  or  $t_{\alpha/2, n-1}$

Do not reject the null if:  $-t_{\alpha/2, n-1} \leq t \leq t_{\alpha/2, n-1}$

### 3. FINDING THE APPROPRIATE REGRESSION FUNCTION

Regression is a statistical method used to describe the nature of the relationship between variables, that is, positive or negative, linear or nonlinear. The main purpose of finding the models is to predict the variable interested based on other related variable or variables. The model constructed may involve random variables, mathematical variables and parameters.

There are two types of relationship; simple and multiple. In a simple relationship, there are only variable under study. In multiple relationships, there are many variables under study.

#### 3.1 Formulating Regression Functions for Production of Rubber in Myanmar

In this dissertation, the production of rubber in Myanmar is regressed on harvested acreage (HA), sown acreage (SA) of rubber and export of raw rubber (EXP). The three regression functions for the production of rubber (PROD) can be expressed as following.

$$PROD_t = \beta_0 + \beta_1 HA_t + e_t \tag{1}$$

$$PROD_t = \beta_0 + \beta_1 HA_t + \beta_2 EXP_t + e_t \tag{2}$$

$$PROD_t = \beta_0 + \beta_1 HA_t + \beta_2 EXP_t + SA_t + e_t \tag{3}$$

where  $PROD_t$  = production of rubber (thousand tons) in current year t  
 $HA$  = harvested acreage (thousand acre) in current year t  
 $EXP_t$  = raw rubber export (thousand acre) in current year t  
 $SA_t$  = sown acreage (thousand acre) in current year t  
 $e_t$  = the error (or) disturbance terms.

#### 3.2 Finding the Appropriate Regression Function for Production of Rubber Correlations

Table (3.1) Correlations Matrix

		PROD (Thousand Ton)	HA (Thousand Acres)	SA (Thousand Acres)	EXP (Thousand MT)
Pearson Correlation	PROD (Thousand Ton)	1.000	.997	.977	.733
	HA (Thousand Acres)	.997	1.000	.980	.713
	SA (Thousand Acres)	.977	.980	1.000	.738
	EXP (Thousand MT)	.733	.713	.738	1.000
Sig. (1-tailed)	PROD (Thousand Ton)	.	.000	.000	.000
	HA (Thousand Acres)	.000	.	.000	.000
	SA (Thousand Acres)	.000	.000	.	.000
	EXP (Thousand MT)	.000	.000	.000	.

Source: SPSS Output (Statistical Package for Social Science).

According to the table (3.1), the correlation between the production of rubber (PROD) and harvested acreage (HA) is 99.7 percent which is highest correlation. The correlation between the production of rubber (PROD) and sown acreage (SA) is 97.7 percent. The correlation between the production of rubber (PROD) and export of raw rubber is 73.3 percent. We can see that production of rubber and three independent variables are positively correlation.

#### 4. MULTIPLE LINEAR REGRESSION MODEL FOR PRODUCTION OF RUBBER IN MYANMAR

In this section, the multiple linear regression model for production of rubber (PROD) for the period 1996-1997 to 2015-2016 was built. In this model, production of rubber (PROD)(thousand tons) is dependent variable; harvested acreage (HA)(thousand acres) and export of raw rubber (EXP)(thousand metric tons) are independent variables. The appropriate multiple linear regression models is

$$PROD_t = \beta_0 + \beta_1 HA_t + \beta_2 EXP_t + e_t$$

Where  $PROD_t$  = production of rubber (thousand tons) in current year t  
 $HA$  = harvested acreage (thousand acre) in current year t  
 $EXP_t$  = raw rubber export (thousand acre) in current year t  
 $e_t$  = the error (or) disturbance terms.

In this study, the computations were made by the use of Statistical Package for Social Science (SPSS) software.

##### 4.1 Estimated Model for the Production of Rubber

The estimated values of coefficient for the harvested acreage and raw rubber export of the production of rubber model are described in table (4.1).

**Table (4.1) Estimated Values of Coefficient**

Variables	Coefficient	Standard Error	t-value	Sig:
Constant	-19.642	2.144	-9.16	.000*
HA	.318	0.007	45.348	.000*
EXP	.135	0.060	2.093	.050*

Note : Constant=PROD (thousand tons).

Source : SPSS Output.

\*indicate statistically significant at 10%, 5% and 1% level.

According to table (4.1), the estimated multiple regression model is

$$PROD_t = -19.642 + 0.318HA_t + 0.135EXP_t$$

Over the period of study, it is found that production of rubber is positively related to harvested acreage (HA) of current year (t) and raw rubber export (EXP) of current year (t).

From the estimated regression model, it was found that holding raw rubber export (EXP) is constant; one thousand acre increase in the harvested acreage led on the average to about 0.318 thousand ton increase in production of rubber. Similarity, holding the harvested acreage (HA) of rubber is constant; one thousand metric ton increase in raw rubber export tends to 0.135 thousand ton increase in production of rubber.

The following table (4.2) represents the analysis of variance for the estimated production of rubber in Myanmar during the period from 1996-97 to 2017-18.

**Table (4.2) Analysis of Variance Table for Multiple Regressions**

Source of Variation	Sum of Square	Degree of Freedom	Mean Square	F-ratio	Sig:
Regression	109346.185	3	36448.728	1464.049	.000
Residual	448.125	18	24.896		
Total	109794.310	19			

Source: SPSS Output.

According to table (4.2), the F-value is statistically significant at 10%, 5% and 1% level.

The computed adjusted  $R^2$  value and its summary statistics are described in table (4.3).

**Table (4.3) Summary Statistics**

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.998	0.996	0.995	4.9896

Source: SPSS Output

According to table (4.3), the correlated coefficient ( $r$ ) was 0.998. The coefficient of determination ( $r^2$ ) value of 0.996 means that about 99.6 percent of the variation in the rubber production is explained by the harvested acreage and raw rubber export. The standard error of the estimate,  $S_e$ , means the average amount of error is 4.174.

### 5. CONCLUSION

In this paper, dependent and independent variable(s) can be considered as simple regression and multiple regression. In this study, multiple regression analysis is applied to choose the appropriate regression equation for rubber production in Myanmar during the period from 1996-97 to 2017-18. In this research, the production of rubber is expressed as the function of harvested and sown acreage of rubber and export of raw rubber. But harvested acreage and sown acreage of rubber are positively related. So, the appropriate regression equation for production of rubber is expressed as the function of harvested acreage of rubber and export of raw rubber.

In this study, it was found that the selected regression models of production of rubber satisfy the assumption. Due to lack of advanced technology, Myanmar can only export raw rubber with the lower price. Therefore for the long run, the policy makers should consider technical development for high-quality rubber products. Private and public partnership is essential to develop the rubber sector in Myanmar. Investment in rubber sector should be supported for the income generation for rural communities in Myanmar.

### Acknowledgements

We would like to express our immense gratitude to Rector Dr. Tin Maung Hla, Yangon University of Distance Education and Pro Rector Dr. Khin Thant Sin, for their encouragement to complete this research.

We are sincerely thankful to Dr. Win Thida, Professor, Head, Department of Economics and Dr. Tin Tin Aye, Professor, department of economics for her participation in this research and various helps. Thanks also go to any colleagues, Department of Economics, Yangon University of Distance Education for their moral supports assistance and during the period when data and information were collected, analysed and compiled to bring about this research.

### References

1. Bluman, A.G, 'Elementary Statistics; A Step by Step by step Approach' Six Edition.
2. Central Statistical organization (CSO), Myanmar Statistical Year Book (2001, 2008, 2010, 2015, 2016, 2017, 2018).
3. Central Statistical Organization (CSO), "Selected Monthly Economic Indicators" Nay Pyi Taw, Myanmar,
4. Gujarati, D.N. (1995), "Basic Econometrics", Third Edition, MC Grow Hill.
5. Su Myat Wai (2012), "Linear Regression Model for production of Wheat in Myanmar," B.Econ (Stats) Dissertation, Department of Statistics, Yangon University of Economics.
6. Webzter, A.L. (1995) "Applied Statistics for Business and Economic," Edition Edition, MC, Graw Hill Companies.

\*\*\*\*\*