

# Czech University of Life Sciences Prague



## Department of Statistics

### Statistical Analysis of Farm Economy in the Czech Less Favoured Areas

#### Diploma Thesis

Supervisor: Ing. Tomáš Hlavsa, Ph.D.

Author: Ibitola Abayomi Afun

© 2017 CULS in Prague

**Declaration**

I declare that I have worked on my diploma thesis titled " Statistical Analysis of Farm Economy in the Czech Less Favoured Areas" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any other person.

In Prague, .....

.....

Ibitola Abayomi Afun

## **Acknowledgement**

I wish to appreciate my supervisor Ing. Tomas Hlavsa Ph.D. for his advice during this work. Also, I like to appreciate my classmates, I am deeply honoured to have studied with this unique intellectual group. I like to appreciate my parents for their support, and the government of the Czech Republic for this opportunity; I will forever be grateful.

I dedicate this work to the Lord God Almighty; whom I am eternally grateful to.

## Statistical analysis of farm economy in the Czech Less Favoured Areas

### Summary

The European Union's Common Agricultural Policy (CAP) is the subsidy system and aggregation of EU-wide programmes targeted towards meeting the EU's agricultural and environmental objectives which includes increase in agricultural production, protection of the environmental bio-diversity, and fair standard of living of farmers.

The Common Agricultural Policy was birthed as a direct solution to the food shortage in the region after World War 2. This policy has evolved over the years, with the present tenure being year 2014 – 2020 with an objective to ensure Europe Union reach a higher level of safe and quality food production, while preserving the natural resources that agricultural activities depend on.

There are presently two operational modules of the CAP policy; Pillar 1 and 2. Pillar 2 focuses on Rural Development, which ultimately defines certain areas as Areas with Natural Constraints, ANC, or Less Favoured Area, LFA.

This work analyzes the performance of areas classified as LFAs in the Czech Republic with a view to compare the performances of farms.

This was done by the definition or derivation of business performance indicators, comparison of the indicators, and a regression analysis of a selected indicator to determine the factors affecting the performance.

**Keywords:** Less Favoured areas, Common Agricultural Policy, payment, current subsidies, statistical analysis

## Table of Contents

List of Figures and Tables .....	vi
List of Figures .....	vi
List of Tables .....	vii
List of Equations .....	viii
CHAPTER 1 .....	1
1. INTRODUCTION .....	1
CHAPTER 2 .....	3
2 Objectives and Methodology .....	3
2.1 Objectives of Thesis: .....	3
2.2 Methodology: .....	3
2.2.1 Indicator Definition .....	3
2.2.2 Mathematical Trend Analysis .....	4
CHAPTER 3 .....	5
3 THEORETICAL BACKGROUND .....	5
3.1 PILLAR 1: THE DIRECT PAYMENT AND MARKET – RELATED EXPENDITURES .....	5
3.1.1 Basic Payment Scheme: .....	5
3.1.2 Schemes for the redistribution of basic payments (Redistributive Payment): .....	6
3.1.3 Young farmers’ scheme: .....	7
3.1.4 Greening (Payment for agricultural practices beneficial to the climate and environment): .....	8
3.1.5 Coupled Payments: .....	10
3.1.6 Areas with Natural Constraints/Less Favoured Areas: .....	10
3.1.7 Active farmers: .....	11
3.1.8 Small farmers’ scheme: .....	11
3.1.9 Cross-Compliance: .....	12
3.1.10 Budgetary and financial discipline mechanism: .....	12
3.1.11 The Integrated Administration and Control System: .....	12
3.2 PILLAR 2: RURAL DEVELOPMENT SUPPORT FOR EU MEMBER STATES .....	13
3.2.1 Transfer of knowledge and Information: .....	14
3.2.2 Advisory services, farm management and farm relief services: .....	14
3.2.3 Quality systems applicable to farm products and foods: .....	15
3.2.4 Physical investment in infrastructure, farm products processing: .....	15
3.2.5 Restoration of agricultural production potential damaged by natural disasters and catastrophic events and introduction of appropriate prevention measures: .....	15
3.2.6 Farm and Business Development: .....	15
3.2.7 Basic services and renovation of villages in rural areas: .....	16

3.2.8 Investment in the development of forests and improving their viability:.....	16
3.2.9 Setting-up of producer groups and organizations: .....	16
3.2.10 Preservation of farming practices which benefit the environment and climate, and encourage the changes needed in this respect: .....	17
3.2.11 Subsidies for organic farming: .....	17
3.2.12 Natura 2000 and Water Framework Directive payments:.....	17
3.2.13 Animal welfare payments: .....	18
3.2.14 Payment for forest, environment and climate services and forest conservation: .....	18
3.2.15 Risk Management Toolkit: .....	18
3.2.16 Payment to areas facing natural constraints: .....	18
3.3 AREAS FACING NATURAL CONSTRAINTS (ANCs).....	19
3.3.1 PAYMENT UNDER PILLAR 1: .....	20
3.3.2 PAYMENT UNDER PILLAR 2: .....	21
3.3.3 LFA OBJECTIVES.....	25
3.3.4 LFA IN AUSTRIA: .....	25
3.3.5 LFA IN THE UK .....	26
3.3.6 LFA IN FRANCE .....	28
3.3.7 LFA IN GERMANY .....	29
3.3.8 LFA IN CZECH REPUBLIC .....	30
3.4 Business Performance Measurement (BPM).....	31
3.4.1 What is BPM?.....	31
3.4.2 Financial Performance Indicators .....	32
CHAPTER 4 .....	45
4.DATA ANALYSIS .....	45
4.1 Descriptive Statistic.....	45
4.1.1 Descriptive Statistic for LFA Type H .....	45
4.1.2 Descriptive Statistic for LFA Type N .....	48
4.1.3 Descriptive Statistic for LFA Type O .....	50
4.1.4 Descriptive Statistic for LFA Type S.....	52
4.2 Hypothesis Testing .....	54
4.2.1 Comparison categorized by LFA Type .....	54
4.3 Trend Analysis .....	60
4.3.1 Mathematical Trend Using Least Square Method .....	60
4.4 Regression Analysis .....	80
4.4.1 Regression Analysis of Current Ratio .....	80
CHAPTER 5 .....	83

5. CONCLUSION.....	83
REFERENCES.....	84
APPENDIX.....	90
APPENDIX 1: DIRECT PAYMENT CEILING FOR EU MEMBER STATES.....	90
APPENDIX 2: RURAL DEVELOPMENT SUPPORT FOR EU MEMBER STATES.....	91
APPENDIX 3: BIOPHYSICAL CRITERIA FOR THE DELIMITATION OF AREAS FACING NATURAL CONSTRAINTS .....	92
APPENDIX 4: ALLOCATION OF EAFRD FUNDS TO MEMBER STATES.....	95
APPENDIX 5: AMOUNTS AND SUPPORT RATES.....	96
APPENDIX 6: IACS LAND USE CODES ALLOWED FOR LFASS SCOTLAND.....	101
APPENDIX 7: GRAZING CATEGORY FOR LFASS SCOTLAND.....	102
APPENDIX 8: HOLDING CLASSIFICATION FOR LFASS SCOTLAND.....	103
APPENDIX 9: Normality Test of Indicators for the LFA Type H.....	104
APPENDIX 10: Normality Test of Indicators for the LFA Type N.....	107
APPENDIX 11: Normality Test of Indicators for the LFA Type O.....	110
APPENDIX 12: Normality Test of Indicators for the LFA Type S.....	113
APPENDIX 13: SCATTER PLOTS FOR CURRENT RATIO WITH OTHER VARIABLES.....	116

## List of Figures and Tables

### List of Figures

FIGURE 1-1: CAP BUDGET FOR 2014 – 2020[SOURCE OWN].....	2
FIGURE 3-3-1: ALLOCATION OF EAFRD FUNDS TO MEMBER STATES [SOURCE OWN].....	22
FIGURE 3-3-2: EU'S LFA CLASSIFICATION [SOURCE OWN].....	23
FIGURE 4-1: DESCRIPTIVE STATISTICAL FOR LFA TYPE H [SOURCE OWN].....	47
FIGURE 4-2: DESCRIPTIVE STATISTICAL FOR LFA TYPE N [SOURCE OWN].....	49
FIGURE 4-3: DESCRIPTIVE STATISTICAL FOR LFA TYPE O [SOURCE OWN].....	51
FIGURE 4-4: DESCRIPTIVE STATISTICAL FOR LFA TYPE S [SOURCE OWN].....	53
FIGURE 4-5: TEST OF EQUALITY OF VARIANCE FOR CURRENT RATIO [SOURCE OWN].....	54
FIGURE 4-6: TEST OF EQUALITY OF VARIANCE FOR QUICK RATIO [SOURCE OWN].....	55
FIGURE 4-7: TEST OF EQUALITY OF VARIANCE FOR GROSS PROFIT RATIO [SOURCE OWN].....	55
FIGURE 4-8: TEST OF EQUALITY OF VARIANCE FOR CURRENT CASH-DEBT COVERAGE RATIO [SOURCE OWN].....	55
FIGURE 4-9: TEST OF EQUALITY OF VARIANCE FOR OPERATING ROA RATIO [SOURCE OWN].....	56
FIGURE 4-10: TEST OF EQUALITY OF VARIANCE FOR DEBT RATIO [SOURCE OWN].....	56
FIGURE 4-11: TEST OF EQUALITY OF VARIANCE FOR EXPENSIVENESS [SOURCE OWN].....	56
FIGURE 4-12: CURRENT RATIO ANOVA [SOURCE OWN].....	57
FIGURE 4-13: QUICK RATIO ANOVA [SOURCE OWN].....	57
FIGURE 4-14: GROSS PROFIT RATIO ANOVA [SOURCE OWN].....	58
FIGURE 4-15: CURRENT CASH-DEBT COVERAGE RATIO ANOVA [SOURCE OWN].....	58

FIGURE 4-16: EXPENSIVENESS ANOVA [SOURCE OWN] .....	58
FIGURE 4-17: OPERATING ROA RATIO ANOVA [SOURCE OWN] .....	59
FIGURE 4-18: DEBT RATIO ANOVA [SOURCE OWN] .....	60
FIGURE 4-19: LFA TYPE H TREND FOR CURRENT RATIO [SOURCE OWN] .....	61
FIGURE 4-20: LFA TYPE H TREND FOR QUICK RATIO [SOURCE OWN] .....	61
FIGURE 4-21: LFA TYPE H TREND FOR GROSS PROFIT RATIO [SOURCE OWN] .....	62
FIGURE 4-22: LFA TYPE H TREND FOR OPERATING ROA RATIO [SOURCE OWN] .....	63
FIGURE 4-23: LFA TYPE H TREND FOR CURRENT CASH-DEBT COVERAGE RATIO [SOURCE OWN] .....	63
FIGURE 4-24: LFA TYPE H TREND FOR DEBT RATIO [SOURCE OWN] .....	64
FIGURE 4-25: LFA TYPE H TREND FOR EXPENSIVENESS [SOURCE OWN] .....	65
FIGURE 4-26: LFA TYPE N TREND FOR CURRENT RATIO [SOURCE OWN] .....	65
FIGURE 4-27: LFA TYPE N TREND FOR QUICK RATIO [SOURCE OWN] .....	66
FIGURE 4-28: LFA TYPE N TREND FOR GROSS PROFIT RATIO [SOURCE OWN] .....	67
FIGURE 4-29: LFA TYPE N TREND FOR OPERATING ROA RATIO [SOURCE OWN] .....	67
FIGURE 4-30: LFA TYPE N TREND FOR CURRENT CASH-DEBT COVERAGE RATIO [SOURCE OWN] .....	68
FIGURE 4-31: LFA TYPE N TREND FOR DEBT RATIO [SOURCE OWN] .....	69
FIGURE 4-32: LFA TYPE N TREND FOR EXPENSIVENESS [SOURCE OWN] .....	69
FIGURE 4-33: LFA TYPE O TREND FOR CURRENT RATIO [SOURCE OWN] .....	70
FIGURE 4-34: LFA TYPE O TREND FOR QUICK RATIO [SOURCE OWN] .....	71
FIGURE 4-35: LFA TYPE O TREND FOR GROSS PROFIT RATIO [SOURCE OWN] .....	71
FIGURE 4-36: LFA TYPE O TREND FOR OPERATING ROA RATIO [SOURCE OWN] .....	72
FIGURE 4-37: LFA TYPE O TREND FOR CURRENT CASH-DEBT COVERAGE RATIO [SOURCE OWN] .....	73
FIGURE 4-38: LFA TYPE O TREND FOR DEBT RATIO [SOURCE OWN] .....	73
FIGURE 4-39: LFA TYPE O TREND FOR EXPENSIVENESS [SOURCE OWN] .....	74
FIGURE 4-40: LFA TYPE S TREND FOR CURRENT RATIO [SOURCE OWN] .....	75
FIGURE 4-41: LFA TYPE S TREND FOR QUICK RATIO [SOURCE OWN] .....	75
FIGURE 4-42: LFA TYPE S TREND FOR GROSS PROFIT RATIO [SOURCE OWN] .....	76
FIGURE 4-43: LFA TYPE S TREND FOR OPERATING ROA RATIO [SOURCE OWN] .....	77
FIGURE 4-44: LFA TYPE S TREND FOR CURRENT CASH-DEBT COVERAGE RATIO [SOURCE OWN] .....	77
FIGURE 4-45: LFA TYPE S TREND FOR DEBT RATIO [SOURCE OWN] .....	78
FIGURE 4-46: LFA TYPE S TREND FOR EXPENSIVENESS [SOURCE OWN] .....	79
FIGURE 4-47: CORRELATION MATRIX FOR CURRENT RATIO [SOURCE: OWN] .....	80
FIGURE 4-48: OLS ANALYSIS FOR CURRENT RATIO [SOURCE: OWN] .....	81

## List of Tables

TABLE 4-1: DESCRIPTIVE STATISTICAL FOR LFA TYPE H [SOURCE OWN] .....	46
TABLE 4-2: DESCRIPTIVE STATISTICAL FOR LFA TYPE N [SOURCE OWN] .....	48
TABLE 4-3: DESCRIPTIVE STATISTICAL FOR LFA TYPE O [SOURCE OWN] .....	50
TABLE 4-4: DESCRIPTIVE STATISTICAL FOR LFA TYPE S [SOURCE OWN] .....	52
TABLE 4-5: SUMMARY TABLE FOR TRENDS [SOURCE OWN] .....	79



## List of Equations

EQUATION 2-1: CURRENT RATIO DEFINITION.....	3
EQUATION 2-2: QUICK RATIO DEFINITION .....	3
EQUATION 2-3: CURRENT CASH-DEBT COVERAGE RATIO DEFINITION.....	3
EQUATION 2-4: GROSS PROFIT RATIO DEFINITION.....	4
EQUATION 2-5: OPERATING ROA RATIO DEFINITION.....	4
EQUATION 2-6: DEBT RATIO DEFINITION .....	4
EQUATION 3-1: CURRENT RATIO (WORKING CAPITAL RATIO).....	33
EQUATION 3-2: QUICK RATIO (ACID TEST RATIO).....	34
EQUATION 3-3: ABSOLUTE LIQUID RATIO .....	34
EQUATION 3-4: CURRENT CASH-DEBT COVERAGE RATIO.....	35
EQUATION 3-5: NET PROFIT (NP) RATIO.....	36
EQUATION 3-6: GROSS PROFIT (GP) RATIO .....	36
EQUATION 3-7: OPERATING PROFIT MARGIN .....	37
EQUATION 3-8: RETURN ON EQUITY (ROE) .....	37
EQUATION 3-9: RETURN ON ASSETS (ROA) .....	37
EQUATION 3-10: OPERATING ROA .....	38
EQUATION 3-11: RETURN ON TOTAL CAPITAL.....	38
EQUATION 3-12: OPERATING-EXPENSE RATIO (OER).....	39
EQUATION 3-13: DEPRECIATION-EXPENSE RATIO.....	39
EQUATION 3-14: INTEREST-EXPENSE RATIO .....	40
EQUATION 3-15: INVENTORY TURNOVER RATIO.....	41
EQUATION 3-16: RECEIVABLES TURNOVER RATIO.....	41
EQUATION 3-17: AVERAGE COLLECTION PERIOD.....	41
EQUATION 3-18: ACCOUNTS PAYABLE TURNOVER RATIO .....	42
EQUATION 3-19: ASSET TURNOVER RATIO.....	42
EQUATION 3-20: DEBT TO EQUITY RATIO .....	43
EQUATION 3-21: PROPRIETARY RATIO.....	43
EQUATION 3-22: FIXED ASSETS TO EQUITY RATIO.....	44
EQUATION 3-23: CURRENT ASSETS TO EQUITY RATIO.....	44
EQUATION 3-24: DEBT TO ASSET RATIO .....	45
EQUATION 3-25: DEBT TO EQUITY RATIO .....	45

## CHAPTER 1

### 1. INTRODUCTION

The European Union's Common Agricultural Policy (CAP) is the subsidy system and aggregation of EU-wide programmes geared towards meeting the European Union agricultural and related environmental goals.

The long-term goal is centered on the self-sustainability of the European Union. The objectives of the Common Agricultural Policy as defined by Article 39 (ex Article 33 TEC) of the consolidated version of the Treaty on the functioning of the European Union (European Council, 2012) are as stated below:

- a. To increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and optimum utilization of the factors of production, in particular labour;
- b. To ensure fair standard of living for the agricultural community in particular by increasing the individual earnings of persons engaged in agriculture;
- c. To stabilize markets;
- d. To assure the availability of supplies;
- e. To ensure that supplies reach consumers at reasonable prices.

Application methodology according to the Article 39 of the functioning of the European Union, Consolidated version, is to take into consideration the following:

- a. The particular nature of agricultural activity which results from the social structure of agriculture and from structural and natural disparities between the various agricultural regions;
- b. The need to effect the appropriate adjustments by degrees;
- c. The fact that in the Member States agriculture constitutes a sector closely linked with the economy as a whole.

The Common Agricultural Policy was birthed as an answer to the severe food shortage in Europe during and after World War 2; 1939 -1945, was introduced in the year 1962 and have gone through developmental phases; from focus on food security to ensuring market competitiveness, and sustainability cohesion, and policy efficiency. There has been a

policy reform from product support centric to producer/farmer support and presently to a land based approach (European Parliament and Council, 2013).

The present CAP with a tenure period 2014 -2020, was designed, according to the European Council, to ensure Europe Union reach a higher level of safe and quality food production, while preserving the natural resources that agricultural activities depend on. However, this is to be achieved with a lower budget; a total amount of EUR 362.787 billion for the period 2014 – 2020.

The CAP presently has two operational modules called Pillar 1 and Pillar 2. Pillar 1 focuses on Direct Payment and Market-Related Expenditures, while Pillar 2 focuses on Rural Development.

Based on the Multi-Annual Financial Framework (MFF), the total amount of EUR 362.787 billion for the term 2014 -2020, with Direct Payment and Market-Related Expenditures expected to take about 76.588%, while Rural Development is expected to take 23.412%.

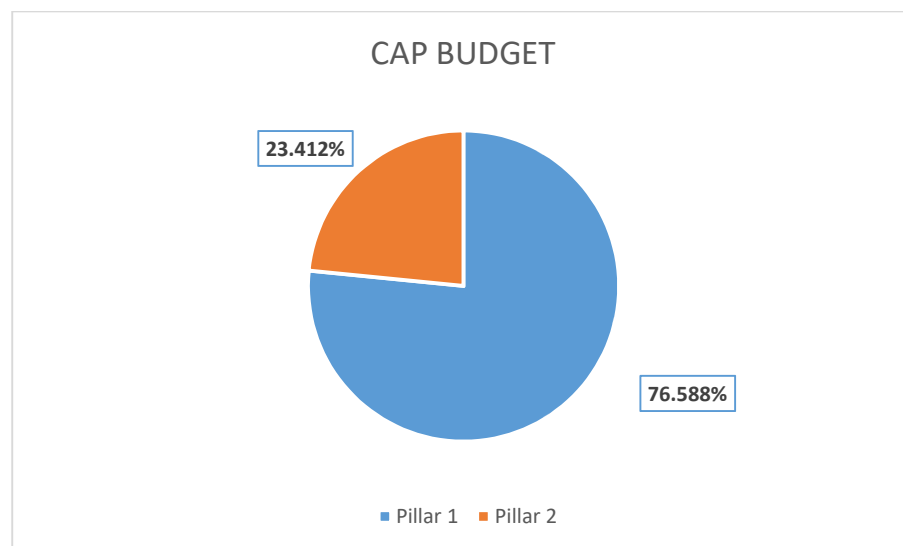


Figure 1-1: CAP Budget for 2014 – 2020[Source Own]

## CHAPTER 2

### 2 Objectives and Methodology

#### 2.1 Objectives of Thesis:

Diploma thesis deals with evaluation of farm economy of agricultural enterprises in the Czech Less Favoured Areas. The main goal is to evaluate economic performance and related indicators.

#### 2.2 Methodology:

The evaluation of farm economy and the impact of LFA policy changes on selected economic indicators will be carried out by statistical analysis, such as exploratory data analysis, distribution analysis, hypothesis testing and regression analysis.

##### 2.2.1 Indicator Definition

For the analysis, the following parameters were so derived:

Current Ratio:

$$\text{Current Ratio} = \frac{(\text{Current assets} + \text{Other Current Assets})}{\text{Current Liabilities}}$$

Equation 2-1: Current Ratio Definition

Quick Ratio:

$$\text{Quick Ratio} = \frac{(\text{Current assets} + \text{Other Current Assets} - \text{Stock})}{\text{Current Liabilities}}$$

Equation 2-2: Quick Ratio Definition

Current Cash-Debt Coverage Ratio:

$$\text{Current Cash - Debt Coverage Ratio} = \frac{\text{Revenue from Operating Activities}}{\text{Current Liabilities}}$$

Equation 2-3: Current Cash-Debt Coverage Ratio Definition

Gross Profit Ratio:

$$= \frac{((\text{Sales of own products and service} + \text{Sales of goods and performance}) - (\text{Cost of Sales} + \text{consumption} + \text{Material and energy consumption} + \text{Administrative and other costs} + \text{Wages}))}{\text{Current Liabilities} + \text{Sales of own products and service} + \text{Sales of goods and performancesabilities}}$$

Equation 2-4: Gross Profit Ratio Definition

Operating ROA:

$$\text{Operating ROA} = \frac{\text{EBIT}}{(\text{Intangible Assets} + \text{Intangible Fixed Assets} + \text{Financial Assets} + \text{Fixed Assets} + \text{Current Assets})}$$

Equation 2-5: Operating ROA Ratio Definition

Debt Ratio:

$$\text{Debt Ratio} = \frac{\text{Total Liabilities}}{(\text{Intangible Assets} + \text{Intangible Fixed Assets} + \text{Financial Assets} + \text{Fixed Assets} + \text{Current Assets})}$$

Equation 2-6: Debt Ratio Definition

## 2.2.2 Mathematical Trend Analysis

The Least Square Fit method was used to minimize the sum of the squared errors, with an assumption that errors are normally and independently distributed.

Linear Trend Equation:  $Y_t = a + bX$

$$\sum Y = na + b\sum X$$

Where  $n$  = number of observations, and is  $X = t - A$

$t$  is time,

$A$  is artificial mean of time, such that is  $\sum X = 0$

Also,  $\sum XY = a\sum X + b\sum X^2$

Hence,  $a = \frac{\sum Y}{n}$  and  $b = \frac{\sum XY}{\sum X^2}$

## CHAPTER 3

### 3 THEORETICAL BACKGROUND

#### 3.1 PILLAR 1: THE DIRECT PAYMENT AND MARKET – RELATED EXPENDITURES

Pillar 1 of the Common Agricultural Policy of the European Union consist of the following key components based on the EU regulation (No 1307/2013) which provides the legal basis, rules and definitions for direct payments to farmers.

The objectives are to enhance competitiveness of EU agriculture, and sustainable management of natural and environmental condition and resources.

It employs the below enumerated instruments to achieve stated objectives:

##### 3.1.1 Basic Payment Scheme:

The scheme is established by article 1 (b) (i) of the EU regulation number 1307/2013. It is the reformed version of the Single Area Payment Scheme of the CAP 2007-2013. The regulations however allowed the transitional Single Area Payment Scheme, to enable countries have a seamless transition without any bottlenecks.

It is administered based on payment entitlements allocated to farmers; allocation is based on regional or individual farmer's level historical data, in the first year of application of the scheme, and activated each year by farmers.

Per Article 21 of the EU regulation, support under basic payment scheme shall be available to farmers who obtained valid payment entitlements per the Regulation.

Payment entitlements shall be allocated to farmers who per Article 9 of the aforementioned EU regulation are Active farmers provided the following conditions are fulfilled:

- Application for allocation of payment entitlements under the scheme by the closing date for submission of applications in 2015 to be set in accordance with the EU regulation except in case of force majeure or exceptional circumstances.
- Satisfaction of the verification of eligibility conditions of the Integrated Administration and Control System (IACS).

The number of payment entitlement allocation to a farmer is proportional to the number of hectares of farmland reported during the application process. However, the exception to this is during a force majeure or exceptional circumstances.

The exceptions to this process of Payment entitlement allocation are Member States still using the transitional Single Area Payment Scheme.

The unit value of payment entitlements is deduced by dividing a fixed percentage of the national ceiling for each year by the number of entitlements at national or regional level, excluding those allocated from the national or regional reserves. Member States may however decide to differentiate the value of payment entitlements

This component is mandatory for all member states; it requires all member states to devote 70% of their national funding allocation after deduction of payments to young farmers and any other optional payments to this scheme.

The total value of all allocated payment entitlements of the national reserve or regional reserves; called National ceiling, is as set in the Annex II of the EU regulation 1307/2013. However, Member States may increase their individual ceiling by a maximum of 3%, which can be reviewed annually.

It must be noted that there is a possibility of reduction of payment to be granted to a farmer in a given calendar year by at least 5% for the part of payment exceeding in the amount of One Hundred and Fifty Thousand Euro (EURO 150 000). However, Member States may subtract cost of expenditures linked to the agricultural activity such as salaries paid and declared in the previous year, taxes, and social contributions related to employment.

### **3.1.2 Schemes for the redistribution of basic payments (Redistributive Payment):**

This is a payment which may be granted to farmers qualified for payment under the basic payment scheme or single area payment scheme without bias or influence of reduction of payment over EURO 150 000.

This payment shall be granted annually upon activation of payment entitlement by the farmer or upon declaration of eligible hectares by the farmer if country is still using the Single Area Payment Scheme.

The payment shall be calculated each year by Member States by multiplying a figure to be set by the Member State, which shall not be higher than 65 % of the national or regional average payment per hectare, by the number of payment entitlements activated by the farmer or by the number of eligible hectares declared by the farmer. The number of such payment entitlements or hectares shall not exceed a maximum to be set by Member States which shall not be higher than 30 hectares or the average size of agricultural holdings set out in Annex VIII of EC 1307/2013 regulation if that average size exceeds 30 hectares in the Member State concerned.

However, this limit may be upgraded at the national level of Member States.

### **3.1.3 Young farmers' scheme:**

Young farmers as defined by the second paragraph of Article 50 of 1307/2013 regulation are natural persons who are setting up agricultural holding as head of the holding for the first time, or who already have set up an agricultural holding within five years preceding the first submission of an application under the basic payment scheme/single payment scheme, and who are no more than 40 years of age in the year of submission of application.

Member States shall grant these young farmers who are entitled to payment under the basic payment scheme/single payment scheme payment for young farmers annually without prejudice to reduction of payment.

The payment is for a maximum of five years; the maximum period is reduced by the number of years preceding the period of first submission of application

The amount due to young farmers is calculated by each country member by either multiplying the number of entitlements the farmer has activated by 25% of the average value of the owned/leased-in payment entitlements held by the farmer, or 25% of an amount calculated by dividing a fixed percentage of the national ceiling



for the calendar year 2019 (refer to Annex II) by the number of all eligible hectares declared in 2015.

Member Countries, might instead of the afore-mentioned methodology, allocate an amount per farmer calculated by multiplying a fixed number of hectares by 25% of the national average payment per hectare.

### **3.1.4 Greening (Payment for agricultural practices beneficial to the climate and environment):**

This is a mandatory but with flexible application component for EU Member States. The aim is to encourage the use of climate and environment friendly farming practices.

Practices classified as climate and environment friendly are as follow:

- Crop Diversification
- Maintenance of existing permanent grassland
- Maintaining an Ecological focus area on the farm land

Without prejudice to reduction of payment, payment would be granted to farmers who comply with practices that are climate and environment friendly as stated above. Payment is proportional to level of compliance, and it takes the form of annual payment per eligible hectare. To finance these, Member States are to use 30% of the annual national ceiling.

#### **3.1.4.1 Requirement for Compliance:**

##### **3.1.4.1.1 Crop Diversification:**

According to Article 44 of EU regulation 1307/2013, Where the arable land is between 10 - 30 hectares, and is not entirely cultivated with crops under water for a significant part of the year or for a significant part of the crop cycle, there must be at least two (2) different crops cultivated on the land, with the main crop not covering more than 75% of the land.

If the arable land is more than 30 hectares in size and is not entirely cultivated with crops under water for a significant part of the year or for a significant part of the crop cycle, there should be at least three (3) different crops on that land with main crop not covering more than 75% of the land, and the two main crops should collectively not cover more than 95 % of the land

This shall not however hold, if grasses or other herbaceous forage or land lying fallow cover more than 75% of the arable land.

#### 3.1.4.1.2 Maintenance of Existing Permanent Grassland:

Farmers are required not to convert or plough permanent grassland situated in areas designated as environmentally sensitive areas; such as peats, wetlands, hence, States are to ensure ratio of areas of permanent grassland to the total agricultural area declared by farmers does not decrease by more than 5% compared to a reference ratio established by each country.

Should it be ascertaining that the ratio reported decreased by more than 5% of the reference ratio, the farmer would be imposed with obligations at holding level to reconvert land into permanent grassland. However, should the reported ratio be maintained within the limit of the reference ratio, It would be considered as compliance to requirement.

#### 3.1.4.1.3 Maintaining an Ecological Focus Area on the Farm Land:

It is required that if the arable land of an agricultural holding is more than 15 hectares of land, an area of at least 5% of the arable land is to be considered as Ecological focus area; this is expected to be increases to 7% by the 31st March, 2017 based on a legislative act of the European Commission which should be enacted after review of the present percentage evaluation report.

Member States shall decide that one or more of the following are to be considered to be ecological focus area:

- Land lying fallow;
- Terraces;
- Landscape features, including such features adjacent to the arable land of the agricultural holding
- Buffer strips, including buffer strips covered by permanent grassland, if these are distinct from adjacent eligible agricultural area;
- Strips of eligible hectares along forest edges;
- Areas with short rotation coppice with no use of mineral fertilizer and/or plant protection products;

- Areas with catch crops, or green cover established by the planting and germination of seeds,
- Areas with nitrogen-fixing crops.

### **3.1.5 Coupled Payments:**

Coupled support is a grant that is link to the specific sectors or productions which are of economic, social or environmental importance and are under duress.

Per the second paragraph of the EC Regulation 1307/2013 Article 52, the following sectors and productions may be granted support: Cereals, Oilseeds, Protein crops, Grain Legumes, Flax, Hemp, Rice, Nuts, Starch, Potato, Milk and Milk Products, Seeds, Sheep meat and Goat meat, Beef and Veal, Olive Oil, Silk-worms, Fodder, hops, Sugar beet cane and chicory, Fruit and Vegetables, and short rotation coppice.

Coupled support may only be granted as a motivation factor to maintain current levels of production in the sectors or regions concerned.

Coupled support is an annual payment with defined limits based on fixed area and yields, or on a fixed number of animals.

To finance this support, Member States are required to use up to 8% of their national ceiling, but countries can use up to 13% of annual national ceiling at their own discretion.

### **3.1.6 Areas with Natural Constraints/Less Favoured Areas:**

This is a payment which may be given to farmers entitled to payment under basic payment scheme whose agricultural holding is fully or partly located in areas with natural constraints.

Less Favoured Area (LFA) is such location with considerable limitation to the possibilities of using the land, and hence, attracting a higher cost of production. This includes areas such as the mountainous areas.

Payment under this instrument may be granted based on all areas falling within the confine of areas of natural constraint, or restrict the payment to some of those areas using a non-bias and pragmatic criterion.

This annual payment is granted per eligible hectare upon activation of payment entitlements, and is without prejudice to the application of reduction of payment, and financial discipline.

Member countries may use up to 5% of their annual national ceiling to finance this payment. The rate decided on by each Member State may however be reviewed and communicated to the European Commission by the 1st of August, 2016.

### **3.1.7 Active farmers:**

Active farmer, according to Article 9 of the EC regulation 1307/2013, is a natural or legal person or group of persons whose agricultural areas are not just kept naturally in a state suitable for grazing or cultivation, but who also carry out on those areas the minimum activity such as production, rearing or growing of agricultural products, including harvesting, milking, breeding animals, and keeping animals for farming purposes. Also, these person(s) should not be operating airports, railway services, waterworks, real estate services, permanent sport and recreational grounds.

Anyone, who does not meet these requirements, would by no means be granted direct payments.

It must be noted that Member States have the prerogative to add to these requirement as might be deemed necessary.

The objective of these requirements is to block loopholes usually exploited by "sofa farmers".

### **3.1.8 Small farmers' scheme:**

This is a scheme for farmers who in 2015, hold owned or leased-in payment entitlements or in countries still using the Single Payment Scheme and whose total amount of direct payment claimed or due to be granted in a given calendar year is

less than One Hundred (100) EURO, or/and where eligible area of holding for which direct payments are claimed, or due to be granted is less than one (1) hectare.

Member States may establish a scheme for these small farmers, and small farmers may opt to seek for support under the scheme.

Such small farmers are exempted from greening requirements and less strict cross compliance.

The total cost of the small farmers' scheme may not account for more than 10% of the national ceiling.

### **3.1.9 Cross-Compliance:**

Farmers are required to abide by the environmental and agricultural standards set by Member States, and EU public health, animal health, environmental and animal welfare standards. The purpose is to limit soil erosion, maintaining soil structure and organic matter levels. Failure to comply with the rules will lead to reduction or stoppage of direct payment.

### **3.1.10 Budgetary and financial discipline mechanism:**

The financial discipline mechanism was introduced to ensure direct payment expenditure does not exceed the national ceiling in each financial year. This is done via payment reduction/ direct payment adjustment whenever projection indicates that total expenditure would exceed the national ceiling in each year (financial), or to free up funds for the new crisis reserve with a ceiling of EURO 400 million. Reductions are not done on the first Two thousand (2000) EURO paid to each farmer.

### **3.1.11 The Integrated Administration and Control System:**

This is an integrated management system that necessitates it for EU Member States to take necessary measures to ensure appropriate utilization of allocated funds, and implement controls to guarantee that allocation to farmers is based on guiding principles, hence avoiding any form of fraud.

it provides for unique identification system for farmers, an identification system covering all agricultural areas called Land Parcel Identification System (LPIS); identification system for payment entitlements, and a system for identification and registration of animals (in Member States where animal-based measures apply).

It must be noted that instruments could be classified along the divide of compulsion and flexibility of application.

The mandatory instruments are listed below:

- Basic Payment Scheme
- Young Farmers' Scheme
- Cross-Compliance
- Budgetary and financial discipline
- Integrated Administration and Control System

The mandatory instruments with flexible application are:

- Greening
- Eligible hectares
- Active farmers

Other instruments are optional.

### **3.2 PILLAR 2: RURAL DEVELOPMENT SUPPORT FOR EU MEMBER STATES**

The second pillar of the CAP is essentially the introduction of the EU's rural development policy, introduced as part of Agenda 2000 and retained in the 2014-2020 reform, is purposed to contribute to the implementation of the Europe 2020 Strategy for promotion of growth and employment via the promotion of sustainable rural development. The intent is to develop an agriculture that avoids damaging the climate, competitive, innovative, and balanced from regional and environmental point of view.

It is financed by the European Commission via the European Agricultural Fund for Rural Development (EAFRD) and leveraged by the Member States.

The priorities of this pillar are as follows:

- Promotion of knowledge transfer and innovation in agriculture and forestry.
- Increment in the viability and competitiveness of all types of agriculture, promote innovative agricultural technologies and support sustainable forest management.
- Promote the organization of the food production chain, animal welfare and risk management in farming.
- Restoration, preservation, and reinforcement of the agricultural and forest ecosystems.
- Promote the efficient use of resources (water and energy), and support the transition to a low-carbon economy.
- Promote social inclusion, poverty reduction and economic development.

The implementation methodology of this pillar of CAP is based on the planning of individual Member States (or their regions), however, the plans should accord priority to the European Rural Development Policy which has a range of measures.

The range of measures of the European Rural development covers the following areas:

### **3.2.1 Transfer of knowledge and Information:**

Per Article 14 of the EU regulation 1305/2013, this defines the scope of measure, and serves as its legal basis. This measure covers vocational training and skill acquisition, demonstration and information activities such as workshops and coaching for the benefit of economic actors; persons engaged in agricultural, food and forestry sectors, operating in rural areas. This measure does not support formal education.

Cost supported under this measure include the logistics cost of knowledge transfer.

### **3.2.2 Advisory services, farm management and farm relief services:**

This measure serves to help farmers, young farmers and other Agro-allied economic actors in rural areas access advisory/consultancy services for improvement of the improvement of economic, climate and environmental performance.

Measure includes support for setting up farm management, farm relief and advisory services.

### **3.2.3 Quality systems applicable to farm products and foods:**

Measure support promotion and information actions geared towards the official quality scheme, including farm certification schemes for agricultural products, cotton or foodstuffs, recognized and acceptable to Member States.

### **3.2.4 Physical investment in infrastructure, farm products processing:**

This supports tangible and intangible investments to improve the overall performance and sustainability of agricultural holding. Investment areas include processing, marketing and development of agro-allied products. Also included are infrastructure-centric investments focused on modernization or adaptation of agriculture and forestry, including access to the holding supply and conservation of energy and water.

### **3.2.5 Restoration of agricultural production potential damaged by natural disasters and catastrophic events and introduction of appropriate prevention measures:**

This measure aims to invest in cushioning the effect of natural disasters and restoration of agricultural land and production capabilities.

The support may be granted to farmers; individually or as a group, and to a public entity if there is evidence of investment undertaken by such entity is linked to agricultural production potential.

### **3.2.6 Farm and Business Development:**

This measure grants aids to business start-up aid for young farmers, and non-agricultural activities in rural areas, and development of small farms. It also grants annual payment or one-off payments for farmers eligible for small farmers' scheme support who permanently transfer their holding to another farmer.



### **3.2.7 Basic services and renovation of villages in rural areas:**

This measure gives support in drafting and updating developmental plans of rural areas, basic services, protection and management of areas of high nature value.

Support also include investment in the creation, and development of small scale infrastructure such as green energy, broadband infrastructure, e-government services, tourism infrastructure, and investment in relocation of activities or conversion of properties located within the proximity of a rural settlements, with a view to improve the quality of life in the settlement.

### **3.2.8 Investment in the development of forests and improving their viability:**

This measure supports the following; afforestation and creation of woodland, establishment of agroforestry systems, forest conservation, forest restoration, and investments in forestry technologies and in the processing of forest product.

### **3.2.9 Setting-up of producer groups and organizations:**

Based on Article 27 of the EU regulation 1305/2013, this measure is the basis of grants to facilitate the setting up of groups/organizations aimed at adaption of agro-produce based on market requirements, collective placing of goods on the market, establishing common rules on production information focused on harvesting and availability, and activities such as business and marketing skills development.

This support is given to producer groups and organizations based on a business plan, paid as a flat rate aid in annual installments for a maximum period of five years calculated from the date of recognition of the group/organization.

### **3.2.10 Preservation of farming practices which benefit the environment and climate, and encourage the changes needed in this respect:**

This measure aims to preserve and promote agricultural practices that are environment and climate friendly.

This measure must mandatorily be included in the rural development policy of Member States both at national and regional levels

Grant is given to farmers/group of farmers who showed commitment beyond the mandatory/required standard.

Apart from financial assistance, States are required to provide required information to farmers to carry out operations under this measure.

### **3.2.11 Subsidies for organic farming:**

This measure grants support to farmers/group of farmers who beyond mandatory requirements convert to or preserve organic farming practices/methods as prescribed by EU regulation and who are active farmers.

The grant is given for a period of five to seven years, paid annually to compensate for all or part of additional cost incurred or loss of income resulting from commitment made.

In case where necessity demands, grants may also cover transactional cost to a value of up to 20% of the premium paid for commitments, and 30% in case of groups of farmers.

### **3.2.12 Natura 2000 and Water Framework Directive payments:**

This measure gives support for commitments given towards actualization of the Habitats, Wild Birds, and Water Framework Directives of the EU which aims to conserve a wide range of rare, threatened or endemic animal, plant species and water bodies to maintain biodiversity.

The support is to compensate for loss of income and/or additional costs incurred and it is given to farmers, private forest holders/association of private forest holders in a duly justified case.

### **3.2.13 Animal welfare payments:**

This measure is to compensate active farmers who voluntarily carry out operations to consisting of one or more animal welfare commitments beyond regulatory requirements.

The compensation is to cover loss of income and parts if not all additional costs as a result of the commitments.

Payment is made annually and it may also cover up to 20% of the farmers transactional cost due to commitments, which have a renewable period of one to seven years.

### **3.2.14 Payment for forest, environment and climate services and forest conservation:**

The measure gives support to forest holders; public or private, or other bodies or associations that carry out operations consisting of one or more forest environment and climate commitments.

Support is to cover only commitments beyond mandatory requirements, and it is to compensate for all/part of the additional cost, and loss income due to commitments. It may also cover up to 20% of transactional cost.

Commitments is renewable for a period of five to seven years which may however be reviewed upward by individual countries when justified.

### **3.2.15 Risk Management Toolkit:**

This measure gives supports such as insurance for crops, livestock and plants, a mutual fund to respond to adverse climatic events, animal and plant diseases, parasite infestations and environmental incidents, and income stabilization tool to active farmers.

### **3.2.16 Payment to areas facing natural constraints:**

This measure supports farmers in Less Favoured Areas by compensating for all or part of the additional costs and loss of income related to the obstacles to agricultural production in the area.

### 3.3 AREAS FACING NATURAL CONSTRAINTS (ANCs)

Areas facing Natural Constraints, ANCs, also called the Less Favoured Areas, LFAs, are areas characterized by the presence of considerable natural limitations to the use of land for agricultural production either due to climate or topology of the terrain or any other specific condition.

According to Article 32 of the EU regulation No 1305/2013, the following areas have been designated as “Areas facing Natural Constraints”; here after referred to as ANCs or LFAs:

- Mountainous Areas
- Areas with slopes or that are too steep, making it difficult to conduct agricultural activities.
- Areas north of the 62nd parallel; 62 degrees north of the Earth's equatorial plane, and some adjacent areas; these areas are considered mountainous.
- Any other area that meets at least 60% of one of the criteria listed in Annex III of EU Regulation 1305/2013; refer to appendix three (3) for the table of criteria.
- Areas affected by specific constraints and land management are required to conserve the environment, maintain countryside, preserve potential for tourism, or protect coastline.

The specific constraints are areas with either of the following:

- at least 60% of the agricultural area is composed of areas meeting at least one of the criteria listed in Annex III at the threshold value indicated, and areas meeting at least two of the criteria listed in Annex III of EU Regulation 1305/2013; refer to appendix three (3) for the table of criteria, each within a margin of not more than 20% of the threshold value indicated.
- at least 60% of the agricultural area meets at least two of the criteria listed in Annex III of EU Regulation 1305/2013; refer to appendix three (3) for the table of criteria, each within a margin of not more than 20% of the threshold value indicated.

During the classification process of areas as ANCs, Member States are required to carry out fine tuning exercise with the purpose of excluding areas which would due to the presence of natural constraints have qualified to be classified as ANCs but such constraints have been overcome by investments or economic activity, or characterized by

evidence of normal land productivity, or in which the production/farming techniques have offset the income loss or added cost that could have been incurred due to the natural constraint.

Agricultural holdings operating in ANCs/LFAs are assisted under the Common Agricultural Policy under both pillars of the CAP.

### **3.3.1 PAYMENT UNDER PILLAR 1:**

#### **3.3.1.1 Financial Provision:**

Under Pillar 1, Member States are required to use up to 5% of their annual national ceiling to finance the ANCs/LFAs.

Member countries of the EU may review their set/fixed percentage every year; they are however required to communicate their decision to the EU Commission.

Details of national ceiling are as stated in Annex II of the EU regulation 1307/2013; refer to appendix two (2) for tabular detail of ceiling.

#### **3.3.1.1.1 Guideline for Payment:**

- Grants may be given to active farmers who are entitled to payment under the basic payment scheme whose agricultural holding is wholly or partly located in an area classified/designated as ANCs/LFAs. Payment is to be based on objective and non-discriminatory criteria.
- Payment is to be without recourse to the application of financial discipline or reduction of payment. It is an annual payment and based on the number of eligible hectares with the area of discuss, and the payment transaction is carried out upon activation of payment entitlement annually.
- Payment per hectare is deduced by dividing the amount accrued from the decided percentage of national ceiling by the total number of eligible hectares.
- Member States may objectively and non-discriminatorily set the maximum number of hectares per holding qualified for payment.
- Division of national ceiling at regional level should be based on objective and non-discriminatory criteria.

### 3.3.2 PAYMENT UNDER PILLAR 2:

#### 3.3.2.1 *Financial Provision:*

Based on the implementation of the Multi-Annual Financial Framework, and funding channeled through the European Agricultural Fund for Rural Development, EAFRD, the total financial resource available to the rural development measures is approximately 161 billion Euro; 99.6 billion Euro after movement between the two pillars of CAP, and 61 billion Euro leveraged by Member States. However, 16% of this total budget is allocated for the funding of the ANCs/LFAs under the second pillar of CAP.

Hence, the total fund available to ANCs under pillar 2 is 25.76 billion Euros (approximate). This is for the period 2014 -2020; seven (7) years.

Allocation of EAFRD funds to Member States is as depicted in Table 4 of the appendix, and chart below;

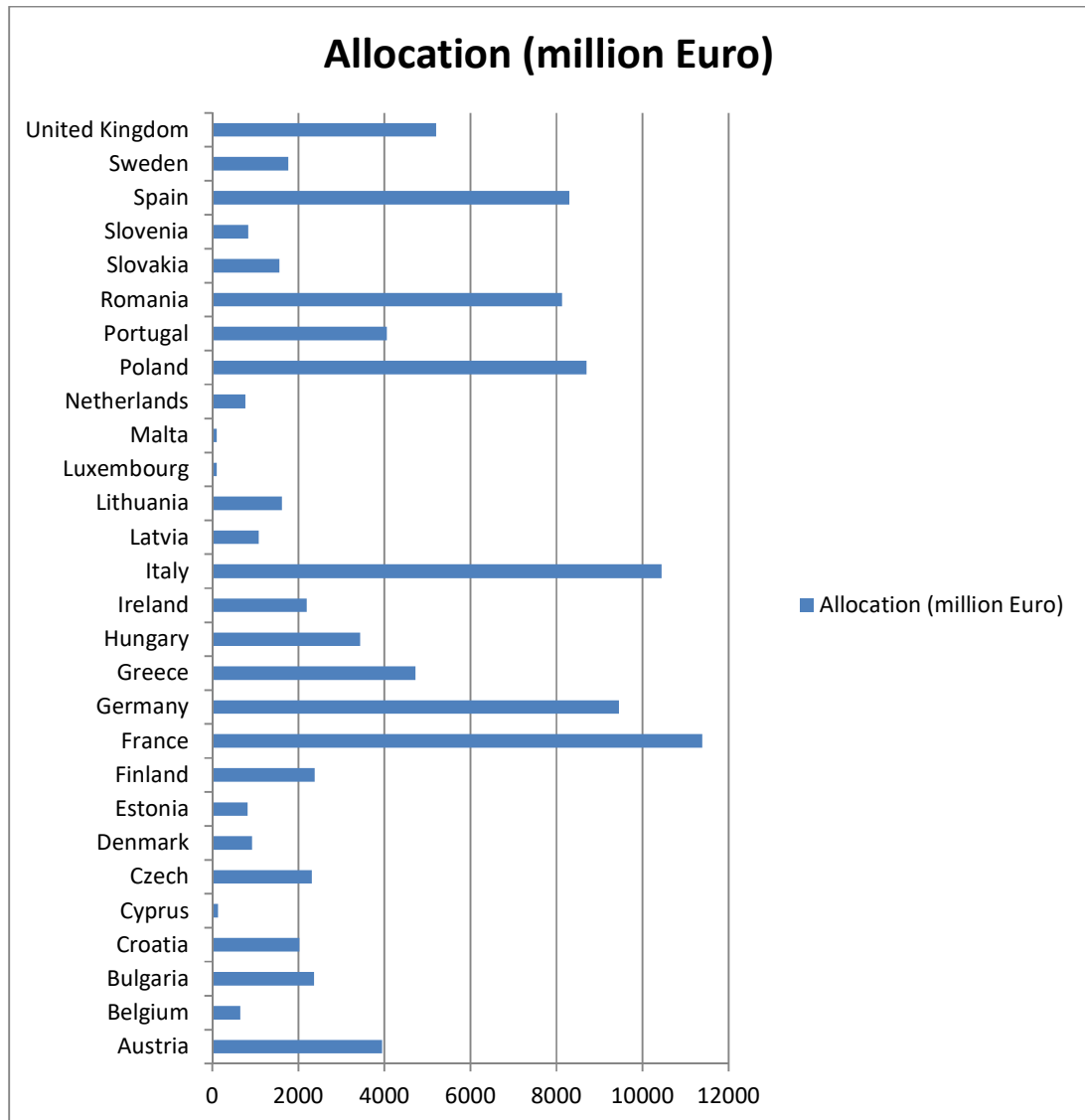


Figure 3-3-1: Allocation of EAFRD Funds to Member States [Source Own]

#### 3.3.2.2 Guideline for Payment:

- Grant is given annually per hectare of agricultural area qualified for compensation. This compensation covers all or part of the additional costs incurred due to constraints, and loss of income. It is calculated in comparison to non-ANC areas.
- Grant is only given to active farmers.
- Payment is fixed in the range specified in Annex II of EU Regulation 1305/2013; refer to appendix, table 5. Member States may however review this upward if justified.

- Member states may give grant to active farmers who previously were entitled to payment under the programme for Improving the environment and countryside of the period 2007-2013 whose agricultural holdings are located in areas with handicaps, other than mountain areas. However, for those whose areas are no longer eligible for payment as an ANC; payment is made in a gradually reducing manner over a maximum period of four (4) years.
- While under degressive payment; grant paid should not be more than 80% that paid in the period 2007 – 2013.

Areas facing Natural Constraints amount for 55.1% of EU's agricultural land; almost 175 million hectares (EUROSTAT, 2008), with areas classified as "Other" Less-Favoured Areas amounting for approximately 65.7% of LFAs in the EU, Mountain areas amounting approximately 28.4%, while areas with specific handicap amount for 5.9%.

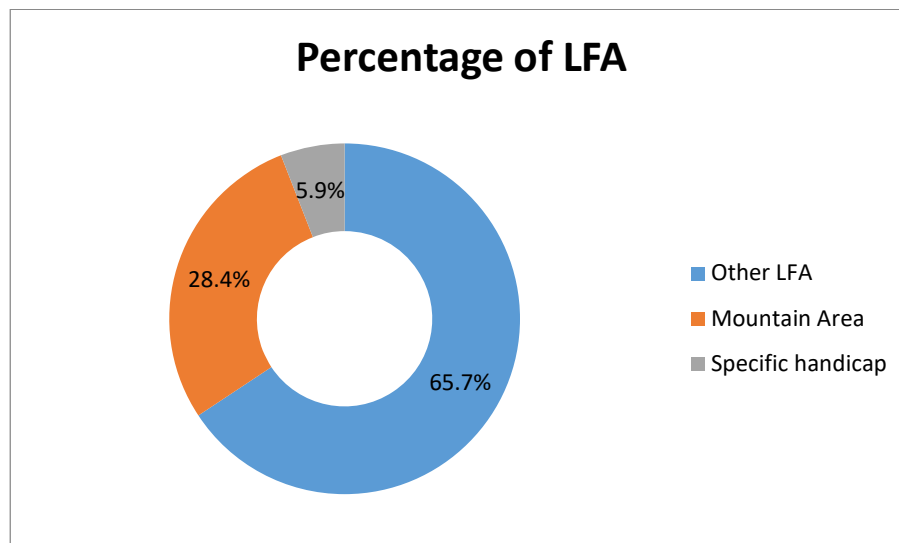


Figure 3-3-2: EU's LFA Classification [Source Own]

**3.3.2.3 Countries with majorly "Other" LFAs with respect to agricultural land include:**

- The United Kingdom
- Lithuania
- Denmark



- Luxembourg
- Poland
- Germany
- Ireland
- Belgium
- Latvia
- Estonia

*3.3.2.4 Countries with majorly Mountain areas with respect to agricultural land include:*

- Austria
- Finland
- Greece
- Italy
- Slovenia

*3.3.2.5 Countries with mixed LFAs (mountain and other LFAs) with respect to agricultural land include:*

- France
- Spain
- Portugal
- Czech Republic

(Perrier-Cornet, 2010)

(Research Institute of Agricultural Economics, Prague, Czech Republic and Štolbová, 2008)

### 3.3.3 LFA OBJECTIVES

The general objectives of the LFA payment policy is to mitigate against the risk of agricultural activity abandonment, loss of biodiversity, deforestation, forest fire and loss of valuable rural landscape.

These objectives are extended and adapted by individual country of the EU, so as to align with their peculiarity.

### 3.3.4 LFA IN AUSTRIA:

The LFA makes up approximately 80% of the total Austrian Land mass (Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)).

The Less Favoured Areas (LFAs) in Austria are defined by their location in steep land, high altitudes, and regions with unfavorable climatic conditions. LFAs are classified as either Mountain Areas, or "Other Less Favoured Areas".

The primary objective is to maintain an agricultural and forestry sector based on environmental principles and small family farms.

Payment is per hectare basis with different thresholds based on the applied pillar of CAP.

Under Pillar 1, threshold is set to six (6) hectares per farm holding, while in the second pillar, threshold is one hundred (100) hectares per farm holding, but with a progressive reduction from sixty (60) hectares up to One hundred (100) hectares.

Financial aid is calculated based on the below stated indicators:

- Land Area/size
- Land Type; Forage or other land
- Type of Farm holding; with or without livestock
- And, based on points from the Mountain Farmer Registry Point System.

The Mountain Farmer Registry Point system is an administrative system that allocated points to holdings based on production difficult rather than area size, and also used to classify Mountain farms into four (4) groups. Classification is as depicted below:

- Group 1: minor difficulty (up to 90 points; 31 % of all mountain farms)
- Group 2: medium difficulty (between 91 and 180 points; 41 % of all mountain farms)

- Group 3: major difficulty (between 181 and 270 points; 18 % of all mountain farms)
- Group 4: extreme difficulty (271 points and more; 10 % of all mountain farms)

LFA payment is made with consideration for the following factors:

- Persistent natural handicaps.
- Predominantly small and medium-sized farms as a result of the topography.
- Preferential assistance for farms with fodder-based livestock systems.
- Minimum land area of 2 hectares; commitment period minimum of 5 years; adherence to the code of good agricultural practice.

### 3.3.5 LFA IN THE UK

Each country within the UK; England, Scotland, and Wales, has a scheme for satisfying the requirements of the EU policy on ANCs/LFAs.

In England, the Upland Entry Level Stewardship Scheme (Upland ELS) is used, while Scotland uses the Less Favoured Areas Support Scheme (LFASS), and The Welsh Glastir Scheme.

#### 3.3.5.1 *The Upland Entry Level Stewardship Scheme (Upland ELS):*

In England, the priorities for Rural Development are as stated below:

- Creation of a productive and sustainable rural economy
- Conservation and enhancement of the rural environment.

ANCs which are synonymously known as Severely Disadvantaged Areas (SDA); due to the non-eligibility of Areas formally classified as Disadvantaged Areas (DA) as of 1st January 2007, are compensated for all or part of income loss and additional cost incurred due to presence of constraints in holding.

The payment scheme is jointly financed by the European Agricultural Fund for Rural Development (EAFRD) and the Department of Agriculture and Rural Development (DARD).

Payment is area based, with a minimum set to three (3) hectares of eligible forage land, with at least enough eligible stock to meet the minimum 0.2 livestock units (LUs) per hectare stocking density across the entire holding except for area dedicated for dairy activity. The Area threshold for full payment is 200 hectares, and 75% payment for areas above the threshold level.

Farmers who were eligible for payment under the previous Hill Farming Area Scheme as a Disadvantaged Area are no longer eligible for payment under this scheme. However, those eligible under the SDA classification are still eligible provided minimum requirement of eligibility are met, with a commitment to adherence of Cross compliance requirements and Good Farming Practices such as;

- Not overgrazing or allowing overgrazing of the natural and semi-natural vegetation on the holding.
- Non-introduction of unsuitable supplementary feeding, except where deemed necessary for the animal welfare during periods of extreme weather conditions.

#### **3.3.5.2 Less Favoured Area Support Scheme (LFASS):**

This scheme provides essential income support to Scottish farm holdings in remote and constrained rural areas of Scotland.

The objectives are as follow:

- Ensure Agricultural activity in the area under discuss continue to operate as a viable business.
- Mitigate the risk of land abandonment.
- Rural landscape maintenance.
- Sustainable farming systems.

To be eligible for payment under this scheme, the active farmer must be at least sixteen (16) years of age, with a farm land of minimum of three (3) hectares of eligible farm area, and adherence to cross-compliance requirements.

Eligible land must be as classified as either Severely Disadvantaged Area (SDA) or Disadvantaged Area (DA), is a forage land and have Integrated Administration and Control System (IACS) land use code; refer to table 6, and has a grazing category; refer to table 7.

All agricultural holdings are classified into three (3) classes per the fragility of the parish. This classification is the basis for payment; refer to table 8.

#### **3.3.5.3 Glastir Scheme:**

The aims of the scheme are:

- To provide balance between the need for food production and safety, and the protection of the environment
- Accessibility to all stakeholders
- Biodiversity, climate change and water output support
- Efficient distribution of funds to farmers

Under this scheme, no distinction is made between SDAs and DAs; all farm holdings in the LFA region will be entitled to twenty percent (20%) uplift in their All Wales payment.

The All Wales Payment is the entry level to access all Glastir's elements, in which farmers receive a flat rate of 28 GBP per hectare.

#### **3.3.6 LFA IN FRANCE**

There is a national framework for rural development which defines the methodology for the LFA payments in areas facing natural constraints (ANCs/LFAs). These modalities are adapted at regional levels especially the good agricultural practice definitions.

ANCs are classified as either Mountain area; minimum altitude of about six hundred meters (600m) and could be with a slope of twenty (20%) percent, or Other Less-Favoured Area; areas within the mountainous areas but with less severe constraints, and areas with low productivity quotient of soil.

The objective of the ANC scheme in France is essentially aimed towards the maintenance of agricultural activity in all regions of France by compensating for the income gap between areas facing constraints and areas without such constraints.

Eligibility is based on holding of a minimum size of three (3) hectares of agricultural area, and minimum of three (3) livestock units per hectare, maximum size of holding is set to fifty (50) hectares of agricultural holding; the first twenty-five (25) hectares receive higher payment rate.

Also, the farmer must be less than 65 years in age with at least 50% of income coming from the agricultural holding.

Payment is coupled with presence of natural handicaps and adherence to good agricultural practices such as non-overgrazing of natural vegetation, while decoupled from production.

### **3.3.7 LFA IN GERMANY**

Germany has a National framework for rural development; adopted by the European Commission on the 12th December 2014, it consists of measures aimed towards rural development, one of these measures is the payment to areas facing natural constraints (ANCs/LFAs).

This framework serves as the basis for programmes in thirteen (13) regions in Germany.

The general objectives of the LFA as defined in the national framework are as follows;

- Maintenance of agricultural activity
- Maintenance of rural landscape for tourism and recreation
- Mitigation of income gap between areas facing natural constraints and areas without such constraints.
- Promotion of good agricultural practices.

#### **3.3.7.1 Eligibility for LFA Payment:**

- Active farming continuously for five (5) years
- Minimum of 3hectares of holding in area classified as LFA
- Adherence to principles of Good farming practices

However, areas used for the following crops are ineligible for payment:

- maize
- sugar beet
- wheat
- wine
- vegetables

Payment under this scheme is based on area of holding; arable and grassland, and the soil quality as classified by the Landwirtschaftliche Vergleichszahl (LVZ).

### 3.3.8 LFA IN CZECH REPUBLIC

The Czech Republic has about fifty-four percent (54%) of its total area as agricultural land. The agricultural land is made up of seventy-two percent (72%) arable land, twenty-seven percent (27%) grassland and meadows, and one percent (1%) permanent crops. Approximately fifty percent (50%) of the country's agricultural land is classified as Areas facing Natural Constraints.

The LFA scheme is one of the major measures of its Rural Development Programme (RDP) which was adopted by the European Commission on the 26th May 2015.

The fourth priority of the RDP is focused on restoration, preservation and enhancement of agriculture and forest ecosystems. The objective is to prevent land abandonment, promotion of organic farming; maintenance and conversion, with the aim of maintaining sustainable farming in areas with natural and other specific constraints (ANCs/LFAs).

It also aims to achieve the sustenance of biodiversity and the rural environment.

These objectives are essentially the same as those of the 2007-2013 periods which are stated below:

- Income support for farms operating in the LFAs.
- Sustainable use of agricultural land while protecting other natural resources especially water resources.
- Stabilization of rural demography
- Maintenance of rural landscape
- Promotion of Good Agricultural Practices

(Research Institute of Agricultural Economics, Prague, Czech Republic and ŠTOLBOVÁ, 2007)

LFAs are classified into three (3) groups in the Czech Republic;

- **Mountain Areas (H)**; agricultural holding has its agricultural area in the mountain area, where constraint is due to shortened growing season due to elevation, and high cost of farming on sloping fields. These areas are designated as Mountainous because the altitude/elevation is greater than 600meters above sea level, or with an

altitude of between 500 and 600metres above sea level and having slopes of more than 15° over the area more than 50% of the territory.

- **"Other" LFA (O);** agricultural holding has its agricultural area in the other Less Favoured Area (Areas characterized by low soil fertility and low population density). Agricultural productivity of Utilized Agricultural Area is less than 34 points, with a population density lower than 75 per square kilometers, with agricultural workforce accounting for more than eight percent (8%) of the economically active population of the community.
- **Specific Handicap (S);** agricultural holding has its agricultural area in regions with specific handicaps (Areas with a combined effect of low soil fertility and high cost of farming due to steep sloping fields). Agricultural land productivity is less than 34 points, slopes of more than 7° over the area more than 50% of the territory. In these areas, there exist the need to preserve the agricultural production to protect the rural landscape, environment, and tourism potential.

Areas in the region of LFA eligible for LFA support are only grasslands rather than the whole agricultural holding; this is however subject to change from the year 2018, with a minimum area size of one (1) hectare of grassland. Focus is on livestock breeding. Areas eligible for support amount to about 40% of agricultural lands classified as LFA.

### 3.4 Business Performance Measurement (BPM)

#### 3.4.1 What is BPM?

Performance measurement is the process of collecting, analyzing and/or reporting information regarding the performance of an individual, group, organization, system or component. (Performance measurement, 2015)

Moullin, M. (2007) describes performance measurements in the context of organizational excellence; "the process of evaluating how well organizations are managed and the value they deliver for customers and other stakeholders". (Moullin, 2007)

Business Performance Measurement can hence be defined as the empirical analysis of a business based on financial and operational data of the business, with



a view of deducing how well the business has done in achieving its organizational goals and objectives in line with the vision of the Stakeholders.

Andy Neely (2002) describes Performance Measurement based on functional analysis and from different perspectives; Accounting, Marketing, and Operations.

The Accounting Perspective focused on empirical measurement of the financial performance of the business using the instruments called Financial Indicators (Financial Ratios).

### 3.4.2 Financial Performance Indicators

These indicators which are also called Financial Analysis tools are used in assessing a company's performance and trends in performance. (Robinson et al., 2012).

It involves the conversion of business financial data into metrics that assist in decision gauging and making. These tools assist in answering questions such as: How successfully has the company performed, relative to its own past performance and relative to its competitors? How is the company likely to perform in the future? Based on expectations about future performance, what is the value of this company or the securities it issues? (Robinson et al., 2012)

Data source for financial analysis is usually the company's financial statements and notes, including commentaries prepared based on acceptable accounting principles. Data usually include past performance details in terms of incomes, and cash flows, current situation; assets, liabilities, and owners' equity.

These tools are classified based on perspectives of measurement or function. The following are the common classification:

- Liquidity Ratios
- Profitability Ratios
- Activity Ratios
- Solvency Ratios

(Classification of Financial Ratios, 2015) and (Basu, 2016). (NetMBA Business Knowledge Center, 2002)

## Liquidity Ratios:

"Liquidity ratios demonstrate a company's ability to pay its current obligations. In other words, they relate to the availability of cash and other assets to cover accounts payable, short-term debt, and other liabilities". (Barry, 2016)

These ratios measure the adequacy of current and liquid assets in servicing the business' short term debts. These are also called the Short-Term Solvency ratios.

The commonly used Liquidity ratios are as listed below:

- Current Ratio (Working Capital Ratio)
- Quick Ratio (Acid Test Ratio)
- Absolute Liquid Ratio
- Current Cash-Debt Coverage Ratio

### Current Ratio (Working Capital Ratio):

This is the numerical ratio of Current Asset to Current Liability within a time frame of usually less than one-year period.

Current Asset includes Assets in inventory.

It measures the ability of the business to pay its near-term debt. (Barry, 2016). The general acceptable ratio is two to one (2:1). Lower than this, the business might lose the confidence of short term suppliers and creditors, while higher than that might show the business has idle assets that are not been used for business. (NetMBA Business Knowledge Center, 2002)

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Equation 3-1: Current Ratio (Working Capital Ratio)

### Quick Ratio (Acid Test Ratio):

This ratio is stricter than Current Ratio due to a more pragmatic definition of Current Assets; Cash, account receivables and note receivables, without the inventories.

The generally acceptable ratio is 1:1; higher than this the company might have idle assets not been used for business, lower, the company might be unable to meet its short term obligations. (NetMBA Business Knowledge Center, 2002).

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$$

Equation 3-2: Quick Ratio (Acid Test Ratio)

### Absolute Liquid Ratio:

This is the ratio of a company's absolute liquid asset to its current liabilities; Absolute liquid assets are current assets without the inventories and account receivables.

This ratio helps to eliminate doubts due to the unpredictable nature of collection of account receivables.

An absolute liquid ratio of 0.5:1 is considered ideal for most of the companies. (Accounting for Management, 2015).

$$\text{Absolute Liquid Ratio} = \frac{\text{Current Assets} - (\text{Inventory} + \text{Account Receivables})}{\text{Current Liabilities}}$$

Equation 3-3: Absolute Liquid Ratio

## Current Cash-Debt Coverage Ratio:

This ratio indicates the ability of a business to pay its current liabilities from net cash generated from the business' operations. It is calculated as the mathematical ratio of net cash from operations to the average current liabilities; the net cash provided by operating activities is the net cash generated from its operations during a particular period. The average current liabilities are deduced by averaging the sum of opening liabilities, and closing liabilities.

Generally, a ratio of 1:1 is considered very comfortable, since it implies the business is able to pay all of its current liabilities from the cash flow of its own operations. (Accounting for Management, 2015)

$$\text{Current Cash – Debt Coverage ratio} = \frac{\text{Net Cash Generated from Operations}}{\text{Average Current Liabilities}}$$

Equation 3-4: Current Cash-Debt Coverage Ratio

## Profitability Ratios:

“Profitability ratios measure the efficiency of management in the employment of business resources to earn profits. These ratios indicate the success or failure of a business enterprise for a particular period”. (Accounting for Management, 2015)

“It is important to note, however, that many factors can influence profitability ratios, including changes in price, volume, or expenses, as well the purchase of assets or the borrowing of money”. (Reference for Business, 2016)

The commonly used profitability ratios are as stated below:

- Net Profit (NP) Ratio
- Gross Profit (GP) Ratio
- Operating Profit Margin

- Return on Equity (ROE)
- Return on Assets (ROA)
- Operating ROA
- Return on Total Capital
- Operating-Expense Ratio
- Depreciation-Expense Ratio
- Interest-Expense Ratio

#### Net Profit (NP) Ratio:

This is the ratio of a company's net profit; profit after tax, to the net sales. This indicator measures the overall profit from the primary operations of the business. Hence, non-operating revenues and expenses are not taken into consideration. (Accounting for Management, 2015)

$$\text{Net Profit Ratio} = \frac{\text{Net Profit After Tax}}{\text{Net Sales}}$$

Equation 3-5: Net Profit (NP) Ratio

#### Gross Profit (GP) Ratio:

This is the ratio of a company's gross profit; net sales minus cost of goods sold, to the revenue from net sales. This indicator measures the overall profit from the primary operations of the business. Higher ratio is always good for the business as it implies ability to cover its expenses. (Bull, 2007, p. 24).

$$\text{Gross Profit Ratio} = \frac{(\text{Net Sales} - \text{Cost of Goods})}{\text{Net Sales}}$$

Equation 3-6: Gross Profit (GP) Ratio

### Operating Profit Margin:

This is a measure of the ratio of operating cost; cost of goods sold plus operating expenses, to the net sales. It is usually expressed in percentages. (Accounting for Management, 2015)

$$\text{Operating Profit Margin} = \frac{(\text{Cost of Goods} + \text{Operating Expenses})}{\text{Net Sales}} \times 100$$

Equation 3-7: Operating Profit Margin

### Return on Equity (ROE):

This measure is also called Return on Investment (ROI), it is the baseline measurement of profitability from the shareholders' perspective. It is defined as the ratio of Net income to Shareholders' equity. (NetMBA, 2002).

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Shareholder 'Equity}}$$

Equation 3-8: Return on Equity (ROE)

### Return on Assets (ROA):

This indicator measures how well a business is effectively utilizing its assets. It is defined as the ratio of Net income to the Business' Total Asset. (Reference for Business, 2016).

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Total Asset}}$$

Equation 3-9: Return on Assets (ROA)

## Operating ROA:

This indicator is similar to the ROA, however, rather than using Net Income as its component, it uses Earnings before Interest and Tax (EBIT); Operating Income. A higher ratio is preferred. (Finance Train, 2013).

$$\text{Operating ROA} = \frac{\text{Earnings before Interest and Tax}}{\text{Average Total Asset}}$$

Equation 3-10: Operating ROA

## Return on Total Capital:

This indicator is also referred to Return on Invested Capital or Return on Capital employed. It is defined as the percentage of ratio of Operating Income to the Capital Employed.

Capital Employed can however be defined in the following ways

- Total of fixed and current assets.
- Total of fixed assets only.
- Fixed assets plus working capital.
- Total of long term funds. Long term funds include capital, Reserve and surplus.

(Accounting for Management, 2015).

$$\text{Return on Total Capital} = \frac{\text{Earnings before Interest and Tax}}{\text{Capital Employed}} \times 100$$

Equation 3-11: Return on Total Capital

### Operating-Expense Ratio (OER):

This is a measure of what it cost to operate a business compared to the income generated from the business. A lower OER means the business is being managed efficiently, hence more profitably.

It is defined mathematically as the percentage ratio of Operating Expenses to Operating Income. (Investopedia.com, 2010)

$$\text{Operating – Expense Ratio} = \frac{\text{Operating Expenses}}{\text{Operating Income}} \times 100$$

Equation 3-12: Operating-Expense Ratio (OER)

### Depreciation-Expense Ratio:

This is also called the Amortization Expense Ratio; it is a measurement of Financial Efficiency; how effectively a business is able to generate income. It measures the amount of depreciation relative to the level of sales. (Michigan State University Extension, 2014).

Depreciation represents the periodic, scheduled conversion of a fixed asset into an expense as the asset is used during normal business operations. (Accounting Tools, 2013).

The benchmark for the ratio is between 10-15%.

$$\text{Depreciation – Expense Ratio} = \frac{\text{Depreciation Expenses}}{\text{Gross Revenue}} \times 100$$

Equation 3-13: Depreciation-Expense Ratio

### Interest-Expense Ratio:

This is also called the Interest Coverage Ratio; It is a measure of a company's ability to meet its interest payments. Interest coverage ratio is equal to earnings before interest and taxes (EBIT) for a time period, often one year, divided by interest expenses for the same time period. The interest



coverage ratio is a measure of the number of times a company could make the interest payments on its debt with its EBIT. It determines how easily a company can pay interest expenses on outstanding debt. (Ready Ratios, 2013).

$$\text{Interest - Expense Ratio} = \frac{\text{Operating Income}}{\text{Interest Expenses}}$$

Equation 3-14: Interest-Expense Ratio

### Activity Ratios:

Activity ratios also known as Turnover ratios, and Efficiency ratios. These class of indicators measure the efficiency of a business in generating revenues by converting its production into cash or sales. (Accounting for Management, 2015).

The commonly used profitability ratios are as stated below:

- Inventory turnover ratio
- Receivables turnover ratio
- Average collection period
- Accounts payable turnover ratio
- Asset turnover ratio

### Inventory Turnover Ratio:

This indicator measures how many times a company has sold and replaced its inventory during a certain period of time. It is mathematically defined as the ratio Cost of goods sold to Average inventory at cost. (Accounting for Management, 2015).

This indicator is also called the Stock Turnover ratio; it can be used to measure if a business has excessive inventory investment relative to its sales level. (Accounting Tools, no date).

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory at cost}}$$

Equation 3-15: Inventory Turnover Ratio

#### Receivables Turnover Ratio:

This is also called the Debtor turnover ratio; is an indication of how quickly the firm collects its accounts receivables. It essentially measures how quickly credit sales are turned into cash. (NetMBA, 2002).

It is defined mathematically as the ratio of Net Credit Sales to Average Account Receivables. (Accounting for Management, 2015).

$$\text{Receivables Turnover Ratio} = \frac{\text{Net Credit Sales}}{\text{Average Account Receivables}}$$

Equation 3-16: Receivables Turnover Ratio

#### Average Collection Period:

Average Collection Period refers to the number of days that credit sales take to be turned to cash. (NETMBA, 2002).

Mathematically expressed as the ratio of the Number of Working days to the Receivable Turnover Ratio.

It must be noted that working days is usually an account year, and the ratio is expressed in days.

$$\text{Average Collection Period} = \frac{\text{Number of Working Days}}{\text{Receivables Turnover Ratio}}$$

Equation 3-17: Average Collection Period

### Accounts Payable Turnover Ratio:

This is also called the Creditor turnover ratio or Creditors' Velocity; is an indication of how quickly a business pays its accounts payables within a period of time. It essentially measures the credit worthiness of a business. (Accounting for Management, 2015).

$$\text{Receivables Turnover Ratio} = \frac{\text{Net Credit Sales}}{\text{Average Account Receivables}}$$

Equation 3-18: Accounts Payable Turnover Ratio

### Asset Turnover Ratio:

This efficiency ratio measures the efficiency with which assets of a business are utilized by the business to produce goods and services. It is defined as the ratio of Net Revenue to the Average Total Assets. (Bull, 2007, p. 23).

$$\text{Asset Turnover Ratio} = \frac{\text{Net Revenue}}{\text{Average Total Asset}}$$

Equation 3-19: Asset Turnover Ratio

### Solvency Ratios:

Solvency ratios are indicators used to measure the lifespan of a going concern. They indicate the capital structure of a business, the ability to fulfill its long term financial obligations; payment of interest and principal amount on medium and long term borrowings, and the balance of stockholders' funds; internal equities, with creditors' funds; external equities. (Accounting for Management, 2015).

The commonly used profitability ratios are as stated below:

- Debt to equity ratio
- Proprietary ratio
- Fixed assets to equity ratio
- Current assets to equity ratio

### Debt to equity ratio:

This is also called the External-Internal Equity Ratio; this indicator measures the soundness of long term financial policies of a company. It is a measure of the portion of the assets of a business being financed by creditors to the portion of assets financed by stockholders.

A less than one (1) ratio indicates that the portion of assets financed by stockholders is greater than the portion financed by creditors.

$$\text{Debt to Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Stockholders' Equities}}$$

Equation 3-20: Debt to equity ratio

### Proprietary ratio:

This is also known as the Equity Ratio; it measures the ratio of stakeholders' equity to the Total Asset of the business; hence, measuring how much of the stakeholders' equities is been used for the business.

A high ratio signifies that most of the business operation is being financed by equities of the Stakeholders, while a low ratio shows a high debt burden on the business. (Accounting Tools, no date).

$$\text{Equity Ratio} = \frac{\text{Stockholders' Equities}}{\text{Total Tangible Asset}}$$

Equation 3-21: Proprietary ratio

### Fixed assets to equity ratio:

This is a ratio of a business' fixed asset to the stakeholders' equities; it essentially measures whether the company has more fixed assets than the investors equities.

A higher ratio shows more fixed assets than stakeholders equities; this might attract more investor funds into the business. (Don and Hearst Newspapers, LLC, no date).

$$\text{Fixed Assets to Equity Ratio} = \frac{\text{Fixed Asset}}{\text{Stakeholders'Equities}}$$

Equation 3-22: Fixed assets to equity ratio

#### Current assets to equity ratio:

This is a measure of stakeholders' equities invested in Current Assets; Current Assets include cash and other assets that should be converted to cash within an accounting year. (Accounting for Management, 2015).

$$\text{Current Assets to Equity Ratio} = \frac{\text{Current Asset}}{\text{Stakeholders'Equities}}$$

Equation 3-23: Current assets to equity ratio

#### Indicators of Indebtedness

These indicators are also called the indicators of debt management. They analyze the financial structure of a company with the aim of determining the extent to which the business is financed by external resources (debt). (FEBMAT- Finance, Economics, Business, Management, Accounting, Taxes, 2016).

The commonly used debt management ratios are as stated below:

- Debt to Asset Ratio
- Debt to Equity Ratio

#### Debt to Asset Ratio:

This is also called the Debt Ratio, or the Total Debt Ratio. Mathematically, it's the ratio of total liabilities to total assets. It measures the rate at which a business is

financed by current liabilities and long-term debt. (Brigham and Ehrhardt, 2002, pp. 95).

$$\text{Debt Ratio} = \frac{\text{Total Liabilities}}{\text{Total Asset}} = 1 - \text{Equity Ratio}$$

Equation 3-24: Debt to Asset Ratio

#### Debt to Equity Ratio:

This is a transform of the Debt to Asset Ratio, it measures the same thing as the Debt ratio but present it in differently. Debt to Equity Ratio shows the amount of debt to a unit of equity. (Brigham and Ehrhardt, 2002, pp. 95-96).

$$\text{Debt to Equity Ratio} = \frac{\text{Debt Ratio}}{1 - \text{Debt Ratio}} = \frac{\text{Total Liabilities}}{\text{Total Asset} - \text{Total Liabilities}}$$

Equation 3-25: Debt to Equity Ratio

## CHAPTER 4

### 4.DATA ANALYSIS

#### 4.1 Descriptive Statistic

##### 4.1.1 Descriptive Statistic for LFA Type H

Year	N Obs	Variable	Mean	Std Dev	Lower Quartile	Upper Quartile	Lower 95%		Upper 95%	
							CL for Mean	CL for Mean		
2007	219	Current Ratio	14.69449	99.37304	1.523021	6.0551655	1.4598472	27.9291388		
		Quick Ratio	11.96627	93.55186	0.9111917	3.6188566	-0.4931021	24.4256439		
		Current Cash-Debt Coverage Ratio	6.326381	38.39911	0.7003713	4.9061311	1.2123324	11.4404304		
		Gross Profit Ratio	-0.37144	1.142107	-0.5460601	0.2037713	-0.524253	-0.2186236		
		Operating ROA	0.056192	0.082686	0.0175006	0.0804416	0.0451792	0.0672038		
		Debt Ratio expensiveness	0.357757 0.928995	0.213818 0.300638	0.2021119 0.85	0.4797483 0.97	0.3292802 0.888956	0.3862333 0.9690349		
2008	190	Current Ratio	4.060507	6.488194	1.2907493	4.9506849	3.1320005	4.9890136		
		Quick Ratio	2.613648	5.366309	0.7238334	3.0288318	1.8456916	3.3816052		
		Current Cash-Debt Coverage Ratio	2.787226	3.495745	0.6252815	4.0005602	2.28696	3.2874917		
		Gross Profit Ratio	-0.76617	3.477711	-0.6653282	0.1602538	-1.2638536	-0.2684833		
		Operating ROA	0.05214	0.114472	0.0085081	0.0743433	0.0357585	0.068522		
		Debt Ratio expensiveness	0.348039 0.932842	0.266259 0.210513	0.2035057 0.88	0.4651002 0.99	0.3099351 0.9027162	0.3861421 0.962968		
2009	229	Current Ratio	4.550889	7.195732	1.2975457	5.4880171	3.6139383	5.4878397		
		Quick Ratio	3.002549	5.711449	0.7249797	3.0632325	2.2588658	3.7462325		
		Current Cash-Debt Coverage Ratio	2.604885	3.220438	0.5002479	3.4288117	2.185554	3.0242154		
		Gross Profit Ratio	-0.79919	2.330944	-0.7402282	0.0710009	-1.1026978	-0.495677		
		Operating ROA	0.045886	0.111402	-0.0027737	0.0798569	0.0313806	0.0603916		
		Debt Ratio expensiveness	0.316693 0.928253	0.22538 0.160117	0.1827887 0.84	0.4329333 1.02	0.2873465 0.9074046	0.3460396 0.9491019		
2010	227	Current Ratio	5.269337	8.484208	1.3454288	6.204573	4.1572275	6.3814461		
		Quick Ratio	3.58592	7.095332	0.7427717	3.5758242	2.6558641	4.5159752		
		Current Cash-Debt Coverage Ratio	2.61648	2.999847	0.4784126	3.7077993	2.2232606	3.0097001		
		Gross Profit Ratio	-1.44541	15.69266	-0.7947678	0.1489542	-3.5070172	0.6161986		
		Operating ROA	0.032913	0.092869	0.006996	0.0654506	0.0207668	0.0450589		
		Debt Ratio expensiveness	0.303717 1.082335	0.224801 2.475877	0.1496804 0.87	0.4244372 0.99	0.2743163 0.7585204	0.3331186 1.4061492		
2011	229	Current Ratio	5.570191	8.695558	1.3658607	6.2668712	4.4329187	6.7074637		
		Quick Ratio	3.820135	7.113407	0.6956583	3.602328	2.8897889	4.7504818		
		Current Cash-Debt Coverage Ratio	3.098439	4.298848	0.5799245	3.9244547	2.536202	3.6606754		
		Gross Profit Ratio	-0.46663	1.589723	-0.7765753	0.1717892	-0.6740821	-0.2591723		
		Operating ROA	0.042441	0.05719	0.0107858	0.0642128	0.0349778	0.0499042		
		Debt Ratio expensiveness	0.290482 0.923406	0.203226 0.14749	0.1445284 0.87	0.4114793 0.99	0.2639618 0.9042016	0.3170028 0.9426107		
2012	219	Current Ratio	5.664035	10.85507	1.2032914	5.7515546	4.214991	7.1130785		
		Quick Ratio	3.95747	8.617449	0.6604812	3.519051	2.8071263	5.1078128		
		Current Cash-Debt Coverage Ratio	3.223122	5.51711	0.5417654	4.6007982	2.486643	3.9596012		
		Gross Profit Ratio	-0.56602	2.19265	-0.675316	0.203743	-0.8580418	-0.2740011		
		Operating ROA	0.040377	0.065273	0.0110562	0.0567312	0.0316841	0.0490703		
		Debt Ratio expensiveness	0.279408 0.930137	0.203148 0.184616	0.1391996 0.85	0.4049082 0.99	0.2523521 0.9055496	0.3064633 0.9547244		

Table 4-1: Descriptive statistical for LFA Type H [Source Own]

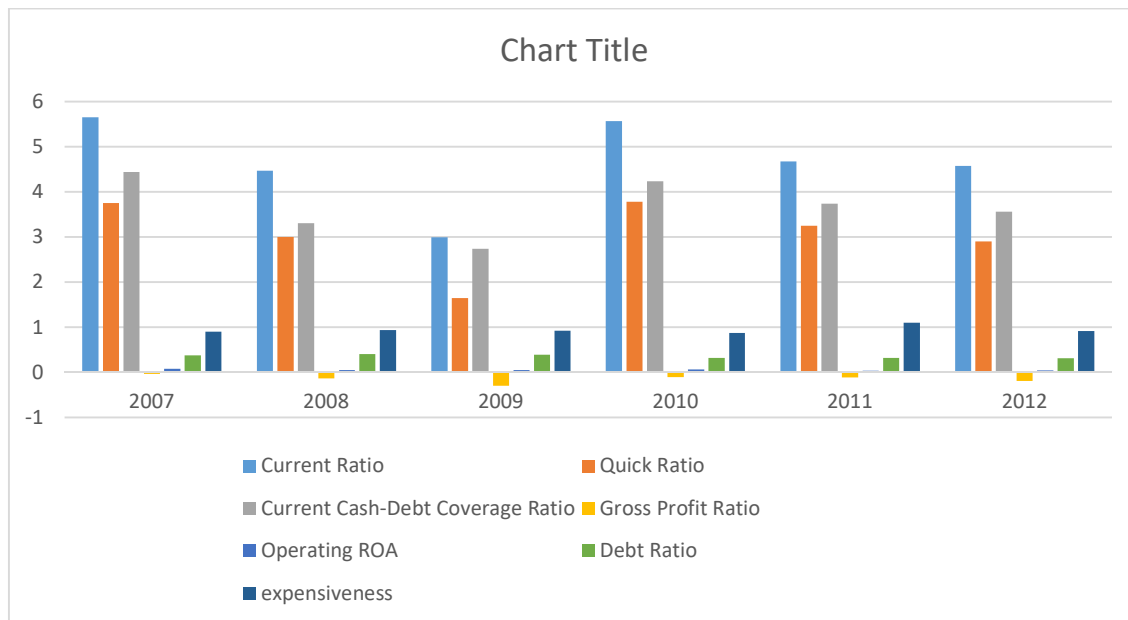


Figure 4-1: Descriptive statistical for LFA Type H [Source Own]

The mean value of the Current Ratio is 14.694 with a huge deviation of values around this value in the year 2007 which shows that performance of farms as indicated using current ratio tend to be scattered rather than cluster around the mean; indicating huge variation in performance. However, the mean value drastically dropped to about 4.06 in the year 2008, with slight continuous upward movement in 2009 up to 2012, and also, with a much lower deviation around the means by farms examined; indicating more similarity in performance by the farms.

The mean values of the Quick Ratio and the Current Cash-Debt Coverage Ratio are of the same pattern as the Current Ratio both in trend and deviation.

The farms, however maintained a slightly negative Gross Profit Ratio; performances of all farms tend to cluster closely around the mean, with the best performance recorded in the year 2007 with a mean value of -0.37 and the worst in the year 2010 with a value of -1.44.

The Operating ROA, Debt Ratio and Expensiveness appear stable throughout the period under study, with means values just barely above 0, with extremely minimal dispersion around the mean values.

All indicators under study do not follow the Bell shape; as they are not all normally distributed, which is expected based on the table 3-1, as values tend to either cluster closely around the mean or hugely scattered. Test details can be found in Appendix 9.



## 4.1.2 Descriptive Statistic for LFA Type N

Year	N Obs	Variable	Mean	Std Dev	Lower Quartile	Upper Quartile	CL for Mean	
							Lower 95%	Upper 95%
2007	402	Current Ratio	4.114135	6.254423	1.9970564	5.0508986	3.5008881	4.7273811
		Quick Ratio	2.064406	3.088875	0.8441161	2.5368521	1.7615413	2.36727
		Current Cash-Debt Coverage Ratio	5.379174	7.837434	2.9432306	6.530591	4.6107135	6.1476351
		Gross Profit Ratio	0.231199	0.33949	0.194916	0.3087367	0.1978705	0.264528
		Operating ROA	0.055381	0.0576	0.0252708	0.0675183	0.0497331	0.0610285
		Debt Ratio	0.312801	0.178549	0.181697	0.415755	0.2952938	0.3303073
		expensiveness	0.946468	0.51324	0.88	0.96	0.8961444	0.9967909
2008	356	Current Ratio	3.995588	3.318284	1.8212272	5.0650775	3.6492224	4.3419537
		Quick Ratio	1.886113	1.782124	0.7580764	2.5665671	1.7000927	2.0721323
		Current Cash-Debt Coverage Ratio	5.022227	3.9885	2.5491303	6.4947688	4.6059039	5.4385509
		Gross Profit Ratio	0.183492	0.258365	0.1285472	0.2673283	0.1565239	0.2104606
		Operating ROA	0.033247	0.050604	0.0096544	0.0542165	0.0279652	0.0385294
		Debt Ratio	0.307148	0.173965	0.1894488	0.3875516	0.288989	0.3253064
		expensiveness	0.946011	0.108435	0.91	0.99	0.9347087	0.9573138
2009	433	Current Ratio	4.430578	6.942953	1.5934191	5.2351601	3.7740219	5.0871336
		Quick Ratio	2.062558	2.946437	0.5883616	2.4153838	1.7839303	2.3411861
		Current Cash-Debt Coverage Ratio	4.860248	7.167385	2.0657343	5.8680694	4.1824691	5.5380276
		Gross Profit Ratio	0.198807	1.753935	0.0478514	0.1912683	0.0327535	0.3648597
		Operating ROA	0.000614	0.057087	-0.0193353	0.019008	-0.0047839	0.0060129
		Debt Ratio	0.309956	0.197485	0.1738113	0.4054273	0.2912811	0.3286313
		expensiveness	1.015035	0.130104	0.97	1.06	1.0027458	1.0273235
2010	442	Current Ratio	4.152777	3.946884	1.5710833	5.2390625	3.7833923	4.5221625
		Quick Ratio	2.077178	2.399504	0.6316085	2.6060721	1.8526109	2.3017454
		Current Cash-Debt Coverage Ratio	4.789937	3.94538	2.1883711	6.1391539	4.4206923	5.159181
		Gross Profit Ratio	0.154571	0.384259	0.1246513	0.2510814	0.1186088	0.1905337
		Operating ROA	0.019314	0.052748	0.0040652	0.0327807	0.0143778	0.0242511
		Debt Ratio	0.300585	0.196751	0.1658209	0.4045384	0.2821712	0.3189986
		expensiveness	0.97457	0.112782	0.94	1	0.964027	0.9851132
2011	428	Current Ratio	4.088235	5.004941	1.757306	5.2805432	3.6127264	4.5637426
		Quick Ratio	2.04903	2.552841	0.7383715	2.5640331	1.80649	2.2915693
		Current Cash-Debt Coverage Ratio	5.089401	6.460192	2.5686578	6.7019161	4.4756326	5.703169
		Gross Profit Ratio	0.211575	0.280565	0.1728169	0.3014528	0.184888	0.2382624
		Operating ROA	0.049422	0.048157	0.0229096	0.0682812	0.0448415	0.0540028
		Debt Ratio	0.282042	0.184877	0.1596965	0.375922	0.2644567	0.2996275
		expensiveness	0.91736	0.107944	0.87	0.96	0.9071043	0.9276153
2012	415	Current Ratio	4.571821	4.998909	1.7380683	5.8771515	4.0888762	5.0547663
		Quick Ratio	2.290842	3.091831	0.6704699	2.6983981	1.9921403	2.5895444
		Current Cash-Debt Coverage Ratio	5.792489	5.411525	2.6998305	7.8186249	5.2696812	6.315297
		Gross Profit Ratio	0.21655	0.258808	0.1775027	0.3101416	0.1914855	0.2416145
		Operating ROA	0.039303	0.04579	0.0146162	0.0619164	0.0348843	0.043721
		Debt Ratio	0.265957	0.166002	0.1511277	0.3462174	0.2499385	0.2819745
		expensiveness	3.335157	48.99345	0.88	0.98	-1.3923654	8.0626787

Table 4-2: Descriptive statistical for LFA Type N [Source Own]

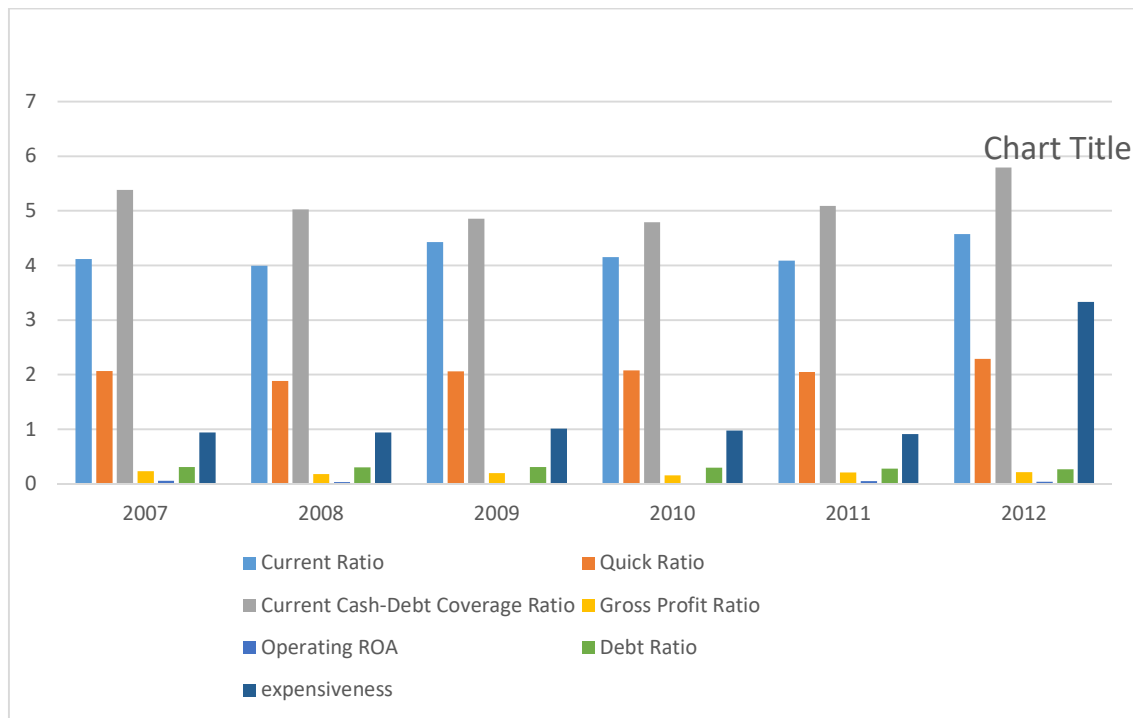


Figure 4-2: Descriptive statistical for LFA Type N [Source Own]

The mean value of the Current Ratio tends to be about 4.0 across the year from 2007 to 2012 with a relatively moderate variation around the mean by farm performances. Lowest value was recorded in 2008 with a value of 3.996 and a maximum of 4.572 in the year 2012.

All other indicators across board are of the same pattern as the Current Ratio, except for Expensiveness for the year 2012; which is relatively higher than those of previous years and with a huge deviation by farms; standard deviation is 48.993.

It is worthy of note that the Gross Profit is consistently positive but lower than 1.

All indicators are not normally distributed as values tend to all have clustered around the mean values.

Test result can be found in Appendix 10.

### 4.1.3 Descriptive Statistic for LFA Type O

Year	N Obs	Variable	Mean	Std Dev	Lower Quartile	Upper Quartile	Confidence Interval	
							Lower 95% CL for Mean	Upper 95% CL for Mean
2007	379	Current Ratio	4.116099	4.603507	1.9004428	4.9222354	3.6511447	4.5810528
		Quick Ratio	2.050626	3.054725	0.8322034	2.4834664	1.7420988	2.3591532
		Current Cash-Debt Coverage Ratio	4.62577	3.898643	2.3258015	6.2165343	4.2320069	5.0195325
		Gross Profit Ratio	0.141199	2.559757	0.1521317	0.2754758	-0.1173361	0.3997348
		Operating ROA	0.047727	0.06931	0.0222594	0.0625015	0.040727	0.0547276
		Debt Ratio	0.341998	0.19512	0.1923853	0.465816	0.3222913	0.3617054
		expensiveness	0.933219	0.149649	0.89	0.97	0.9181044	0.9483336
2008	327	Current Ratio	3.624855	4.944616	1.5815937	4.5468666	3.086099	4.1636112
		Quick Ratio	1.574614	2.234288	0.6036594	1.9613175	1.3311706	1.8180582
		Current Cash-Debt Coverage Ratio	4.183508	4.600884	1.9086682	5.7634768	3.6822039	4.6848113
		Gross Profit Ratio	0.113886	0.321432	0.0693271	0.2188824	0.0788096	0.1489632
		Operating ROA	0.014437	0.047439	0.0042737	0.0298695	0.0092762	0.0195979
		Debt Ratio	0.345762	0.206983	0.2031779	0.4434046	0.3232439	0.3682793
		expensiveness	0.984281	0.127732	0.95	1	0.9703854	0.9981773
2009	406	Current Ratio	5.421535	26.92155	1.5704556	5.1519748	2.7917294	8.0513401
		Quick Ratio	2.542966	14.59328	0.5772348	2.2088963	1.1174364	3.9684965
		Current Cash-Debt Coverage Ratio	5.175303	25.33387	1.5479354	5.1485228	2.7005881	7.6500171
		Gross Profit Ratio	-0.02392	0.776035	-0.0322417	0.1720906	-0.0998205	0.0519807
		Operating ROA	-0.0007	0.061231	-0.0203985	0.0175814	-0.0066708	0.0052769
		Debt Ratio	0.344508	0.219799	0.2033148	0.4374531	0.3230633	0.3659517
		expensiveness	1.025665	0.170925	0.97	1.07	1.0089891	1.0423409
2010	393	Current Ratio	3.480648	11.16236	1.5769231	5.002451	2.3693642	4.5919321
		Quick Ratio	1.627475	6.357561	0.5968676	2.270709	0.994539	2.2604106
		Current Cash-Debt Coverage Ratio	3.753452	9.765881	1.6224338	5.260521	2.7811959	4.7257076
		Gross Profit Ratio	0.001049	2.262046	0.0788337	0.2481454	-0.2244436	0.2265408
		Operating ROA	0.025067	0.04771	0.0081239	0.0398239	0.0203294	0.0298046
		Debt Ratio	0.325519	0.182682	0.1913525	0.4200931	0.307379	0.3436598
		expensiveness	3.515496	50.34541	0.91	0.99	-1.477424	8.5084164
2011	389	Current Ratio	4.510734	8.123958	1.6404278	5.3524619	3.6987935	5.3226743
		Quick Ratio	2.201804	4.718868	0.6178683	2.3510848	1.7301821	2.6734267
		Current Cash-Debt Coverage Ratio	4.9721	8.331615	1.9523016	6.2726126	4.1394054	5.8047943
		Gross Profit Ratio	0.151205	0.352578	0.1267872	0.2880523	0.1160123	0.186397
		Operating ROA	0.038715	0.041723	0.0171273	0.0569112	0.0345504	0.0428794
		Debt Ratio	0.330493	0.335335	0.1852616	0.4117389	0.2970218	0.3639643
		expensiveness	0.956684	0.378707	0.88	0.98	0.9189324	0.9944352
2012	368	Current Ratio	4.976656	7.993736	1.6753603	5.4452005	4.1561092	5.7972029
		Quick Ratio	2.434211	4.342128	0.6177204	2.6175809	1.9884972	2.879925
		Current Cash-Debt Coverage Ratio	5.269693	5.584801	2.1299014	6.4752547	4.6964201	5.8429654
		Gross Profit Ratio	0.176522	0.441657	0.1221801	0.2832938	0.1312489	0.2217959
		Operating ROA	0.036367	0.043042	0.0157718	0.0512628	0.0319487	0.0407851
		Debt Ratio	0.302337	0.192308	0.1747714	0.3846162	0.2825963	0.3220767
		expensiveness	0.937255	0.116143	0.89	0.98	0.9253498	0.949161

Table 4-3: Descriptive statistical for LFA Type O [Source Own]

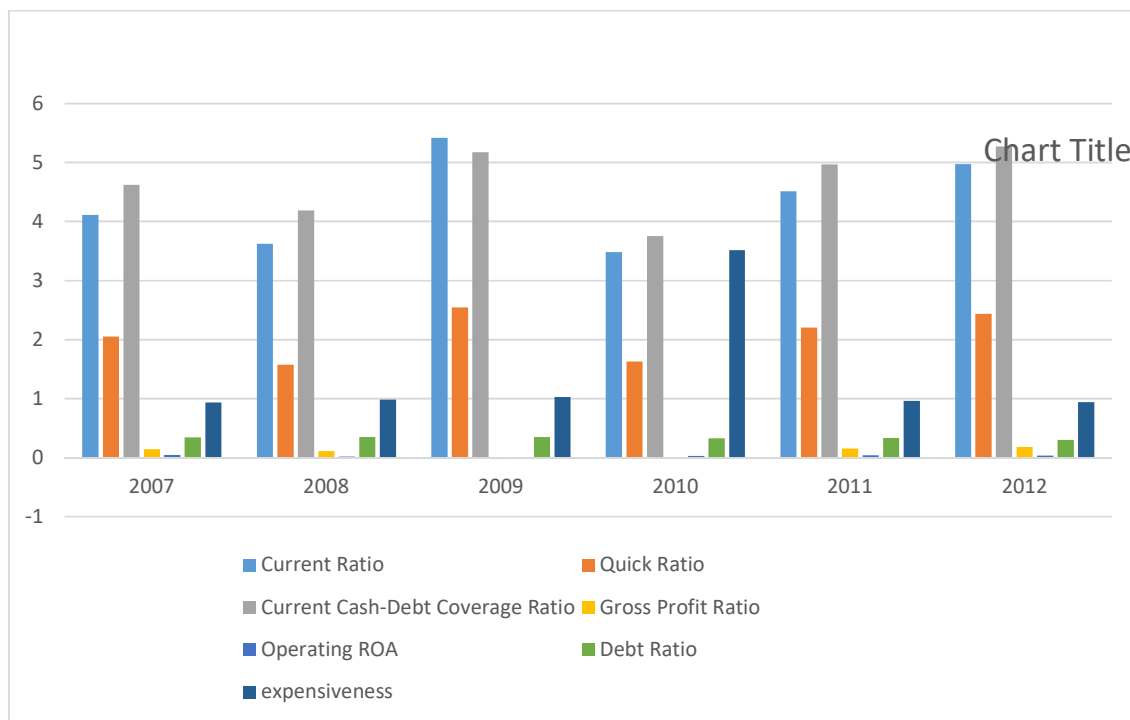


Figure 4-3: Descriptive statistical for LFA Type O [Source Own]

The mean values of Current Ratio tend to vary between 3.48 and 5.43 with moderate dispersion around the mean apart from performances in 2009, with the standard deviation peaking at 26.92.

The Quick Ratio was 2.05 in the year 2007, dipped in the year 2008 to 1.57 then upped again to 2.54 then dropped to 1.62 in 2010, then upped again in 2011 and 2012.

The Current Cash-Debt Coverage Ratio took the same pattern as the Quick ratio peaking in 2012 to 5.27.

The Gross Profit Ratio was consistently lower than 1 throughout the period understudy, it dipped progressively from 2007 until 2009 when it recorded a value of -0.023 then picked again consistently to a peak of 0.177 in 2012.

The Operating ROA is of the same pattern as the Gross Profit Ratio. Debt Ratio seems relatively stable between 0.30-0.35.

Expensiveness is of the same pattern tilting between 0.93-1.03 except for 2010 where it peaked at about 3.52.

All indicators are not normally distributed as values tend to all have clustered around the mean values. Test result can be found in Appendix 11.

#### 4.1.4 Descriptive Statistic for LFA Type S

Year	N Obs	Variable	Mean	Std Dev	Lower Quartile	Upper Quartile	Lower 95%		Upper 95%	
							CL for Mean	CL for Mean		
2007	75	Current Ratio	5.655697	8.368832	1.6927104	6.7266187	3.7031045	7.6082903		
		Quick Ratio	3.753194	6.881692	0.9197828	3.0651163	2.1475764	5.3588115		
		Current Cash-Debt Coverage Ratio	4.444152	5.720012	1.1613106	6.0233813	3.1095739	5.7787291		
		Gross Profit Ratio	-0.02768	0.672888	-0.1590489	0.2855982	-0.1835739	0.1282171		
		Operating ROA	0.074322	0.10145	0.0222297	0.098536	0.0509802	0.0976633		
		Debt Ratio	0.377769	0.246347	0.1961286	0.5270674	0.3210895	0.4344483		
		expensiveness	0.902667	0.11289	0.85	0.97	0.876693	0.9286403		
2008	72	Current Ratio	4.46786	5.731347	1.3203283	5.7145549	3.111272	5.8244473		
		Quick Ratio	3.005262	5.003477	0.6780284	3.349748	1.8209588	4.1895661		
		Current Cash-Debt Coverage Ratio	3.30854	4.225322	1.0025845	4.5936701	2.3084229	4.3086577		
		Gross Profit Ratio	-0.12924	0.869306	-0.2156641	0.3637001	-0.3349969	0.0765259		
		Operating ROA	0.048328	0.069977	0.0086816	0.061821	0.0318847	0.0647722		
		Debt Ratio	0.400821	0.285569	0.1958445	0.5420068	0.3337151	0.467926		
		expensiveness	0.933611	0.116369	0.895	1	0.9062658	0.9609564		
2009	96	Current Ratio	2.995558	11.90634	1.226683	6.1768508	0.5701138	5.4210028		
		Quick Ratio	1.646681	8.647232	0.5844267	3.6084165	-0.1148501	3.408212		
		Current Cash-Debt Coverage Ratio	2.739286	8.106645	0.8239554	4.479431	1.0878779	4.3906938		
		Gross Profit Ratio	-0.29905	1.286041	-0.4190537	0.3114614	-0.55963	-0.0384778		
		Operating ROA	0.049296	0.084629	0.0050804	0.0843749	0.032148	0.066443		
		Debt Ratio	0.388303	0.308527	0.177765	0.5020375	0.3257897	0.4508165		
		expensiveness	0.925833	0.166687	0.85	0.995	0.8920594	0.9596073		
2010	93	Current Ratio	5.570573	11.17961	1.3700558	5.8432528	3.2681596	7.8729872		
		Quick Ratio	3.783444	8.628631	0.7166942	3.6460177	2.0063986	5.5604896		
		Current Cash-Debt Coverage Ratio	4.234854	10.15162	0.8774032	4.4745871	2.1441523	6.3255546		
		Gross Profit Ratio	-0.10085	0.83334	-0.2474293	0.4150821	-0.2724774	0.0707711		
		Operating ROA	0.063315	0.077655	0.0115303	0.0984932	0.0473217	0.0793074		
		Debt Ratio	0.32388	0.220045	0.1800109	0.4308599	0.2785625	0.369198		
		expensiveness	0.874946	0.153889	0.8	0.99	0.8432532	0.9066393		
2011	97	Current Ratio	4.672347	15.79249	1.1375951	4.7999259	1.4552513	7.8894421		
		Quick Ratio	3.246597	12.30464	0.5955267	2.7258513	0.7400137	5.7531798		
		Current Cash-Debt Coverage Ratio	3.740133	11.65158	0.6052385	5.0246699	1.3665854	6.1136815		
		Gross Profit Ratio	-0.1128	1.05443	-0.2557475	0.259392	-0.3264465	0.1008485		
		Operating ROA	0.037188	0.061933	0.0119648	0.0666387	0.0247058	0.0496703		
		Debt Ratio	0.325314	0.270783	0.1502413	0.4148204	0.2707391	0.3798889		
		expensiveness	1.099794	1.908266	0.84	0.98	0.7151932	1.4843945		
2012	77	Current Ratio	4.573522	11.19079	1.3174447	5.791984	2.033524	7.1135207		
		Quick Ratio	2.900551	7.712158	0.6037313	3.4906318	1.150106	4.6509963		
		Current Cash-Debt Coverage Ratio	3.561709	7.575827	0.9156274	4.9151847	1.8422074	5.281211		
		Gross Profit Ratio	-0.19024	0.946885	-0.1555293	0.24474	-0.4051579	0.0246749		
		Operating ROA	0.045224	0.108076	0.0094147	0.0631355	0.0206941	0.0697544		
		Debt Ratio	0.315388	0.286144	0.1486743	0.3777893	0.2504416	0.3803352		
		expensiveness	0.918442	0.100539	0.86	0.99	0.895622	0.9412611		

Table 4-4: Descriptive statistical for LFA Type S [Source Own]

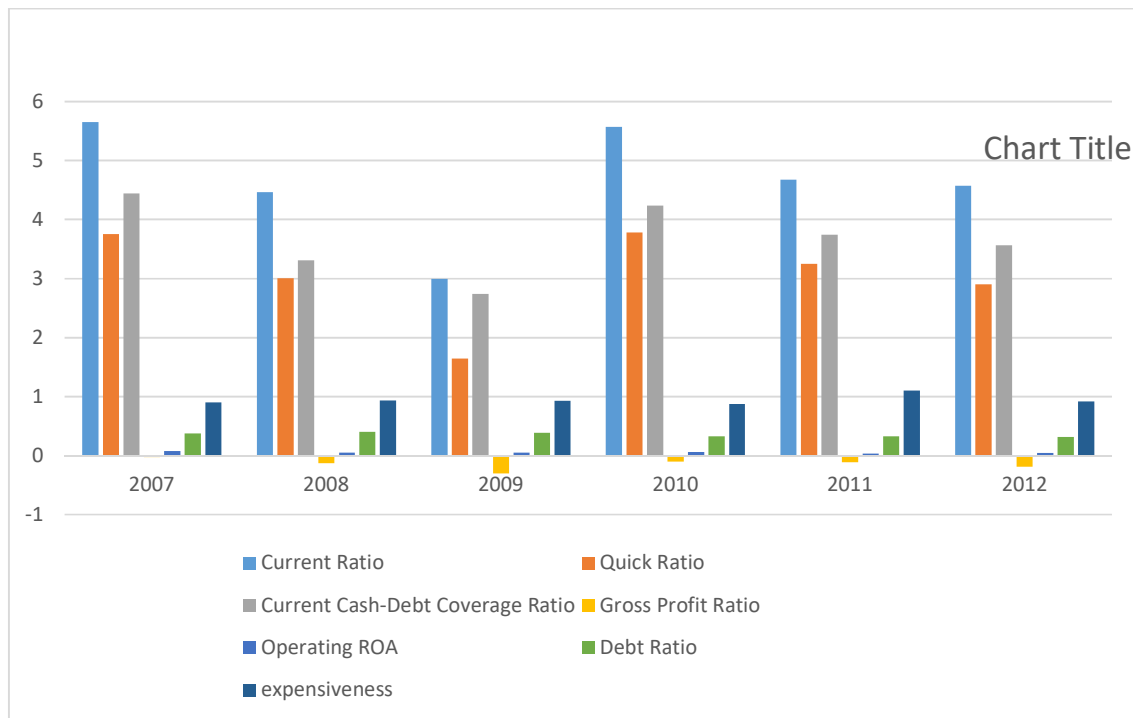


Figure 4-4: Descriptive statistical for LFA Type S [Source Own]

The mean value of the Current Ratio range between 2.99 and 5.67; with the highest value (5.67) in the year 2007 and the lowest (2.99) in the year 2009. Quick Ratio ranges between 1.64 and 3.79. Current Cash-Debt Coverage Ratio ranges between 2.73 and 4.45, Gross Profit Ratio ranges from -0.30 to -0.02. The Operating ROA ranges between 0.037 to 0.075, while the mean values of Debt Ratio range from 0.31 to 0.40. Also, Expensiveness ranges from 0.87 to 1.10.

All indicators are not normally distributed except for Debt Ratio in the year 2007 and Expensiveness in the year 2012, as values tend to all have clustered around the mean values. Test result can be found in Appendix 12.

## 4.2 Hypothesis Testing

General comparisons of indicators categorized by LFA Type were done.

Equality of Variance were tested using Levene's Test; indicators with homoscedasticity were tested for equality of mean using ANOVA, why those that have no equality of variance were tested using Kruskal-Wallis.

### 4.2.1 Comparison categorized by LFA Type

#### Test for Equality of Variance

This is to check the equality of variance across the LFA Types.

Null Hypothesis,  $H_0$ : Equality of variance exists.

Alternate Hypothesis,  $H_A$ : Equality of Variance does not exist

Test was done at a confidence level of 95%

Current Ratio:

Levene's Test for Homogeneity of Current Ratio Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
LFA type	3	2.7568E9	9.1894E8	2.26	0.0799
Error	6535	2.663E12	4.0746E8		

Figure 4-5: Test of Equality of Variance for Current Ratio [Source Own]

The p-value; 0.0799, which is greater than alpha level 0.05, the null hypothesis is accepted, implying there is equality of variance about the mean among all LFA Types.

Quick Ratio:

Levene's Test for Homogeneity of Quick Ratio Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
LFA type	3	2.2761E9	7.587E8	2.12	0.0952
Error	6535	2.336E12	3.5748E8		

Figure 4-6: Test of Equality of Variance for Quick Ratio [Source Own]

The p-value; 0.0952, which is greater than alpha level 0.05, the null hypothesis is accepted, implying there is equality of variance about the mean among all LFA Types.

Gross Profit Ratio:

Levene's Test for Homogeneity of Gross Profit Ratio Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
LFA type	3	2134101	711367	1.81	0.1422
Error	6531	2.5608E9	392097		

Figure 4-7: Test of Equality of Variance for Gross Profit Ratio [Source Own]

The p-value; 0.1422, which is greater than alpha level 0.05, the null hypothesis is accepted, implying there is equality of variance about the mean among all LFA Types.

Current Cash-Debt Coverage Ratio:

Levene's Test for Homogeneity of Current Cash-Debt Coverage Ratio Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
LFA type	3	46908138	15636046	0.63	0.5925
Error	6535	1.61E11	24629073		

Figure 4-8: Test of Equality of Variance for Current Cash-Debt Coverage Ratio [Source Own]

The p-value; 0.5925, which is greater than alpha level 0.05, the null hypothesis is accepted, implying there is equality of variance about the mean among all LFA Types.



Operating ROA Ratio:

Levene's Test for Homogeneity of Operating ROA Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
LFA type	3	0.0294	0.00980	16.01	<.0001
Error	6549	4.0104	0.000612		

Figure 4-9: Test of Equality of Variance for Operating ROA Ratio [Source Own]

The p-value; 0.0001, which is less than alpha level 0.05, the null hypothesis is rejected, implying there is no equality of variance about the mean among all LFA Types.

Debt Ratio:

Levene's Test for Homogeneity of Debt Ratio Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
LFA type	3	0.8645	0.2882	2.80	0.0387
Error	6549	674.8	0.1030		

Figure 4-10: Test of Equality of Variance for Debt Ratio [Source Own]

The p-value; 0.0387, which is less than alpha level 0.05, the null hypothesis is rejected, implying there is no equality of variance about the mean among all LFA Types.

Expensiveness:

Levene's Test for Homogeneity of expensiveness Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
LFA type	3	2.3323E8	77743717	0.26	0.8561
Error	6557	1.98E12	3.0199E8		

Figure 4-11: Test of Equality of Variance for Expensiveness [Source Own]

The p-value; 0.8561, which is greater than alpha level 0.05, the null hypothesis is accepted, implying there is equality of variance about the mean among all LFA Types.

### Summary of Analysis:

The following indicators show homoscedasticity; Current Ratio, Quick Ratio, Gross Profit Ratio, Current Cash-Debt Coverage Ratio, and Expensiveness, while Operating ROA Ratio and Debt Ratio display heteroscedasticity.

### Comparison Using ANOVA

Indicators that exhibit heteroscedasticity were analyzed using One-way ANOVA.

This analysis is to check if the means of indicators are statistically the same among all LFA Types; this is a viable method as homoscedasticity of data has been confirmed.

Null Hypothesis,  $H_0$ : Means are statistically the same.

Alternate Hypothesis,  $H_A$ : Means are statistically not the same.

Test was done at a confidence level of 95%

Current Ratio:

R-Square	Coeff Var	Root MSE	Current Ratio Mean
0.002061	430.5800	20.66160	4.798552

Source	DF	Anova SS	Mean Square	F Value	Pr > F
LFA type	3	5760.523676	1920.174559	4.50	0.0037

Figure 4-12: Current Ratio ANOVA [Source Own]

The p-value, 0.0037, is less than the alpha level (0.05), hence the null hypothesis is rejected; implying that not all the indicator's mean of all LFA Types are equal statistically.

Quick Ratio:

R-Square	Coeff Var	Root MSE	Quick Ratio Mean
0.003659	670.2210	18.14693	2.707604

Source	DF	Anova SS	Mean Square	F Value	Pr > F
LFA type	3	7904.117475	2634.705825	8.00	<.0001

Figure 4-13: Quick Ratio ANOVA [Source Own]

The p-value, 0.0001, is less than the alpha level (0.05), hence the null hypothesis is rejected; implying that not all the indicator's mean of all LFA Types are equal statistically.

Gross Profit Ratio:

R-Square	Coeff Var	Root MSE	Gross Profit Ratio Mean
0.011994	-6124.305	3.218016	-0.052545

Source	DF	Anova SS	Mean Square	F Value	Pr > F
LFA type	3	821.0354231	273.6784744	26.43	<.0001

Figure 4-14: Gross Profit Ratio ANOVA [Source Own]

The p-value, 0.0001, is less than the alpha level (0.05), hence the null hypothesis is rejected; implying that not all of the indicator's mean of all LFA Types are equal statistically.

Current Cash-Debt Coverage Ratio:

R-Square	Coeff Var	Root MSE	Current Cash-Debt Coverage Ratio Mean
0.003578	246.5463	11.16812	4.529825

Source	DF	Anova SS	Mean Square	F Value	Pr > F
LFA type	3	2927.213793	975.737931	7.82	<.0001

Figure 4-15: Current Cash-Debt Coverage Ratio ANOVA [Source Own]

The p-value, 0.0001, is less than the alpha level (0.05), hence the null hypothesis is rejected; implying that not all of the indicator's mean of all LFA Types are equal statistically.

Expensiveness:

R-Square	Coeff Var	Root MSE	enpensiveness Mean
0.000124	1379.683	17.43593	1.263763

Source	DF	Anova SS	Mean Square	F Value	Pr > F
LFA type	3	247.5424388	82.5141463	0.27	0.8461

Figure 4-16: Expensiveness ANOVA [Source Own]

The p-value, 0.8461, is greater than the alpha level (0.05), hence the null hypothesis is accepted; implying that all the indicator's means of all LFA Types are equal statistically.

**Note:** Operating ROA Ratio and Debt Ratio which displayed heteroscedasticity were analyzed using the non-parametric Kruskal-Wallis Test as they satisfy the below stated assumption:

- Dependent Variables are continuous; all performance indicators are continuous.
- Independent Variable is categorical; LFA Type is categorical in nature.
- Normality of Data; as shown in the descriptive statistics of the data, a non-parametric method is required as data categories are mainly not normally distributed.
- Comparison was done based on Mean as the numbers of observations of each category are not exactly the equal.

Operating ROA Ratio:

Wilcoxon Scores (Rank Sums) for Variable Operating ROA Classified by Variable LFA type					
LFA type	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
H	1312	4629464.0	4299424.0	61282.5164	3528.55488
N	2472	8057973.0	8100744.0	74228.4041	3259.69782
O	2259	6930031.0	7402743.0	72786.6495	3067.74281
S	510	1856713.0	1671270.0	41027.3983	3640.61373
Average scores were used for ties.					

Kruskal-Wallis Test	
Chi-Square	69.8824
DF	3
Pr > Chi-Square	<.0001

Figure 4-17: Operating ROA Ratio ANOVA [Source Own]

Inference: p-value is less than alpha; 0.05, hence, null hypothesis is accepted. Mean of Operating ROA ratio for all LFA Types are statistically equal.

Debt Ratio:

Wilcoxon Scores (Rank Sums) for Variable Debt Ratio Classified by Variable LFA type					
LFA type	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
H	1312	4326667.0	4299424.0	61282.5167	3297.76448
N	2472	7639565.0	8100744.0	74228.4045	3090.43892
O	2259	7748642.0	7402743.0	72786.6498	3430.12041
S	510	1759307.0	1671270.0	41027.3985	3449.62157
Average scores were used for ties.					

Kruskal-Wallis Test	
Chi-Square	43.2422
DF	3
Pr > Chi-Square	<.0001

Figure 4-18: Debt Ratio ANOVA [Source Own]

Inference: p-value is less than alpha; 0.05, hence, null hypothesis is accepted. Mean of Debt ratio for all LFA Types are statistically equal.

**Summary of Analysis:**

All examined performance indicators have statistically the equal means across among the LFA Types. Hence, farms can be said to have same or closely similar level of performance irrespective of the classified LFA Type.

**4.3 Trend Analysis**

**4.3.1 Mathematical Trend Using Least Square Method**

The Year of Origin is 1<sup>st</sup> January, 2010.

Unit of X is half year.

Nature of Y is equivalent to the Performance indicator been observed.

**LFA Type H:**

**Current Ratio:**

Trend Equation for Current Ratio is  $Y_t = 6.635 + (-1.140X)$

The trend value is on a decline with a negative slope of 1.14; indicating a continuous decline in performance of farms of LFA Type H as measured using the indicator Current Ratio.

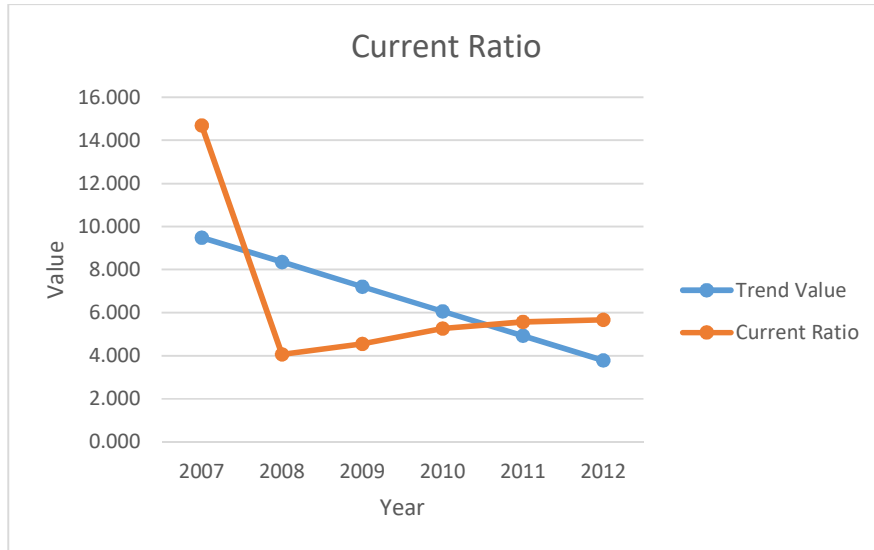


Figure 4-19: LFA Type H Trend for Current Ratio [Source Own]

**Quick Ratio:**

Trend Equation for Quick Ratio is  $Y_t = 4.824 + (-1.024X)$

The trend value is on a decline with a negative slope of 1.024; indicating a continuous decline in performance of farms of LFA Type H as measured using the indicator Quick Ratio.

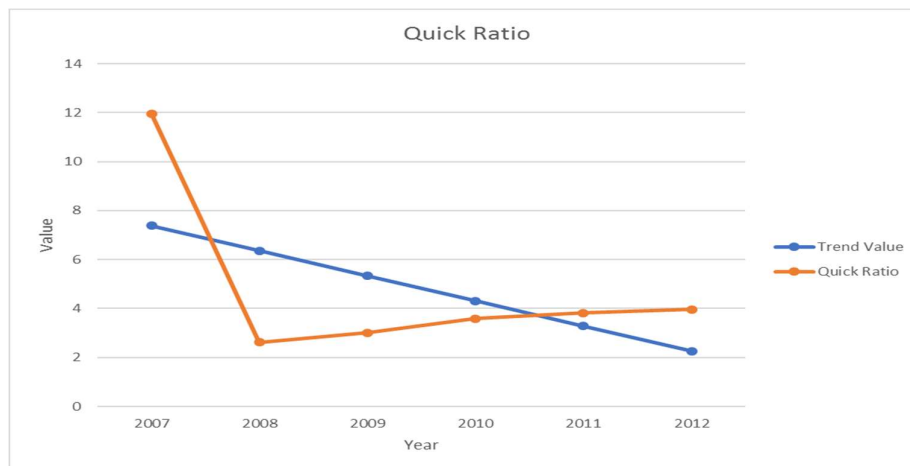


Figure 4-20: LFA Type H Trend for Quick Ratio [Source Own]

**Gross Profit Ratio:**

Trend Equation for Gross Profit Ratio is  $Y_t = -0.736 + (-0.021X)$

The trend value is on a gradual decline with a negative slope of 0.021; indicating a continuous decline in performance of farms of LFA Type H as measured using the indicator Gross Profit Ratio.



Figure 4-21: LFA Type H Trend for Gross Profit Ratio [Source Own]

**Operating ROA Ratio:**

Trend Equation for Operating ROA Ratio is  $Y_t = 0.045 + (-0.003X)$

The trend value is on a gradual decline with a negative slope of 0.003; indicating a picture of slight stability but decline in performance of farms of LFA Type H as measured using the indicator Operating ROA Ratio.

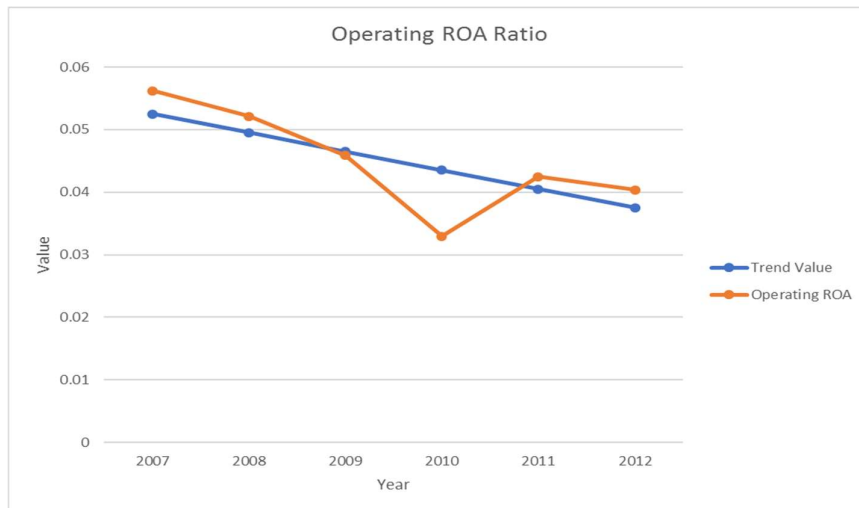


Figure 4-22: LFA Type H Trend for Operating ROA Ratio [Source Own]

### Current Cash-Debt Coverage Ratio:

Trend Equation for Current Cash-Debt Coverage Ratio is  $Y_t = 3.443 + (-0.416X)$

The trend value is on a decline with a negative slope of 0.416; indicating a continuous decline in performance of farms of LFA Type H as measured using the indicator Current Cash-Debt Coverage Ratio.

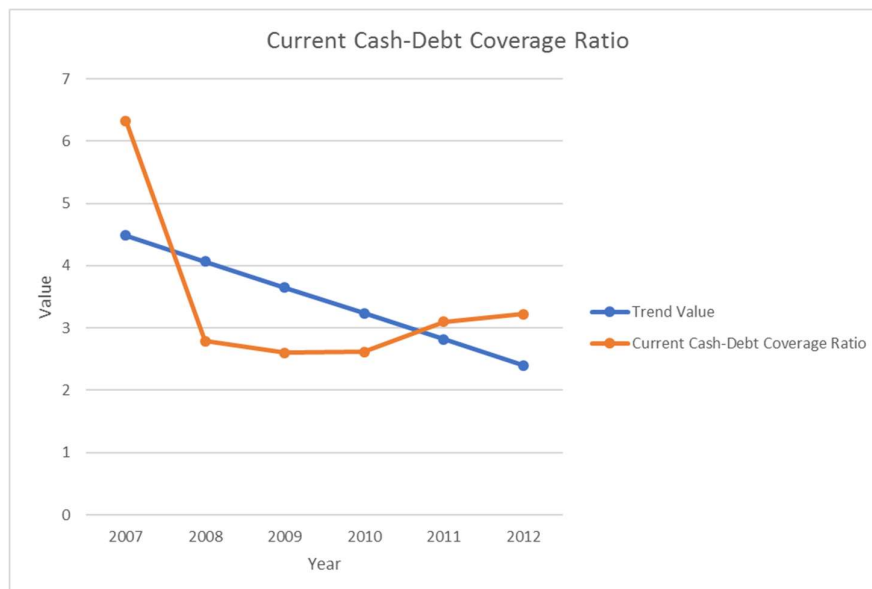


Figure 4-23: LFA Type H Trend for Current Cash-Debt Coverage Ratio [Source Own]



### Debt Ratio:

Trend Equation for Debt Ratio is  $Y_t = 0.316 + (-0.016X)$

The trend value is on a decline with a negative slope of 0.016; indicating a continuous decline in performance of farms of LFA Type H as measured using the indicator Debt Ratio.

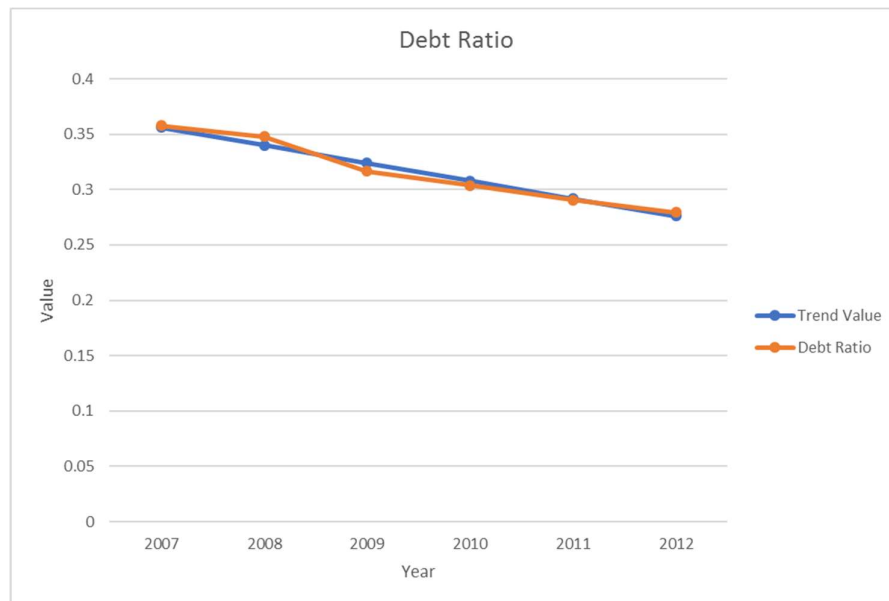


Figure 4-24: LFA Type H Trend for Debt Ratio [Source Own]

### Expensiveness:

Trend Equation for Expensiveness is  $Y_t = 0.954 + 0.004X$

The trend value is on a gradual incline with a positive slope of 0.004; indicating a picture of slight stability but increment in the Expensiveness of LFA Type H farms.

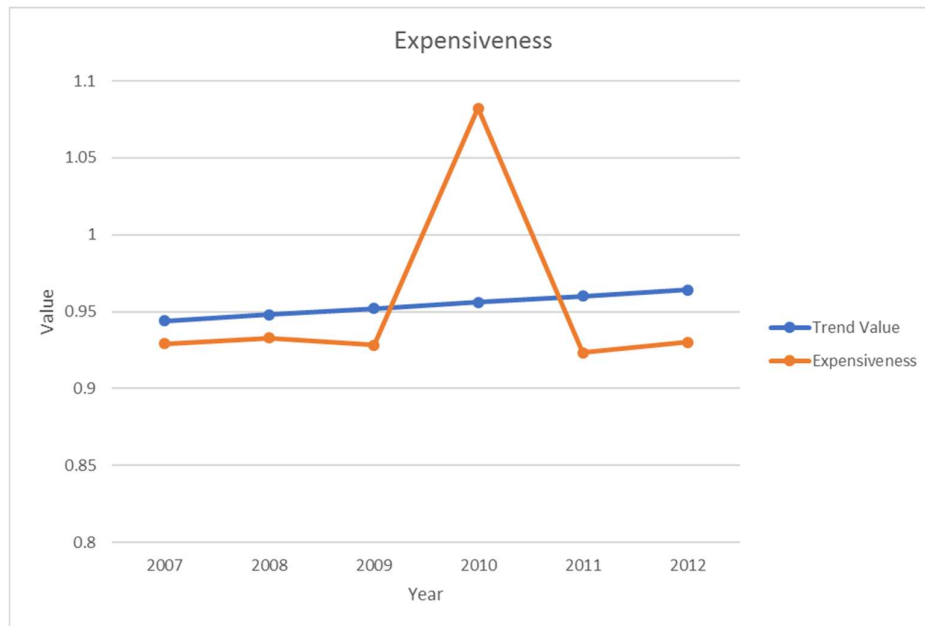


Figure 4-25: LFA Type H Trend for Expensiveness [Source Own]

### LFA Type N:

#### **Current Ratio:**

Trend Equation for Current Ratio is  $Y_t = 4.226 + 0.065X$

The trend value is on the increase with a positive slope of 0.065; indicating a continuous increment in performance of farms of LFA Type N as measured using the indicator Current Ratio.

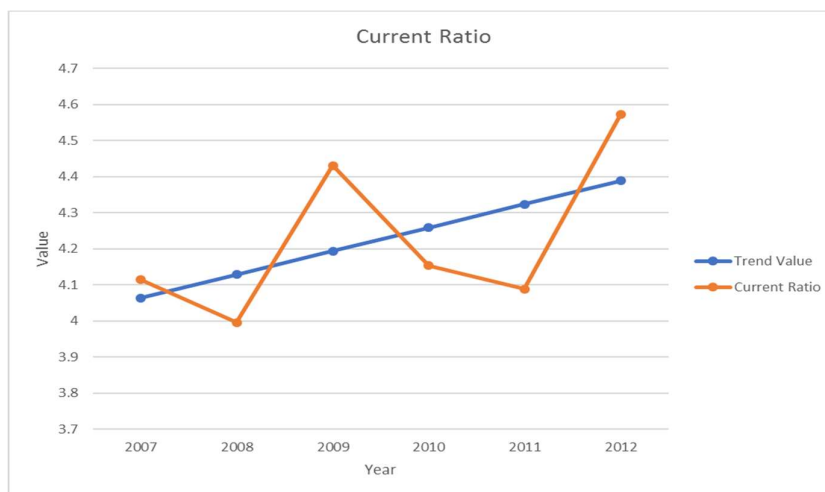


Figure 4-26: LFA Type N Trend for Current Ratio [Source Own]

**Quick Ratio:**

Trend Equation for Quick Ratio is  $Y_t = 2.072 + 0.047X$

The trend value is on the increase with a positive slope of 0.047; indicating a continuous increment in performance of farms of LFA Type N as measured using the indicator Quick Ratio.

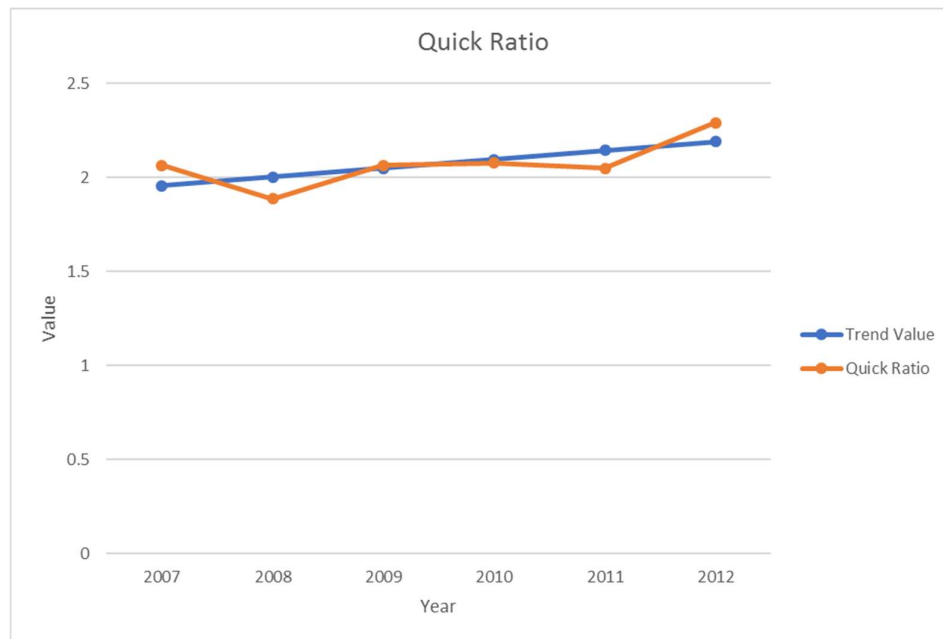


Figure 4-27: LFA Type N Trend for Quick Ratio [Source Own]

**Gross Profit Ratio:**

Trend Equation for Gross Profit Ratio is  $Y_t = 0.199 + (-0.001X)$

The trend value is on a gradual decline with a negative slope of 0.001; indicating a picture of stability but decline in performance of farms of LFA Type N as measured using the indicator Gross Profit Ratio.

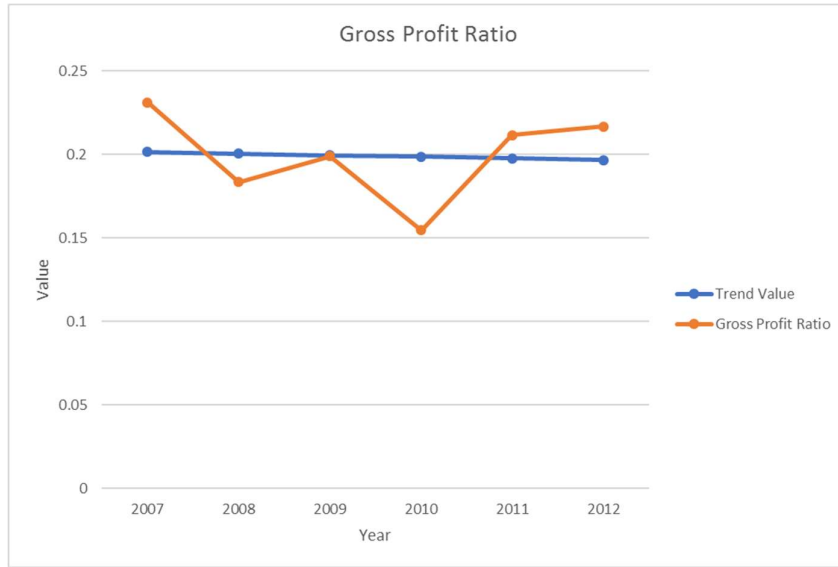


Figure 4-28: LFA Type N Trend for Gross Profit Ratio [Source Own]

### Operating ROA Ratio:

Trend Equation for Operating ROA Ratio is  $Y_t = 0.0329 + (-0.0004X)$

The trend value is on a gradual decline with a negative slope of 0.0004; indicating a picture of slight stability but decline in performance of farms of LFA Type N as measured using the indicator Operating ROA Ratio.

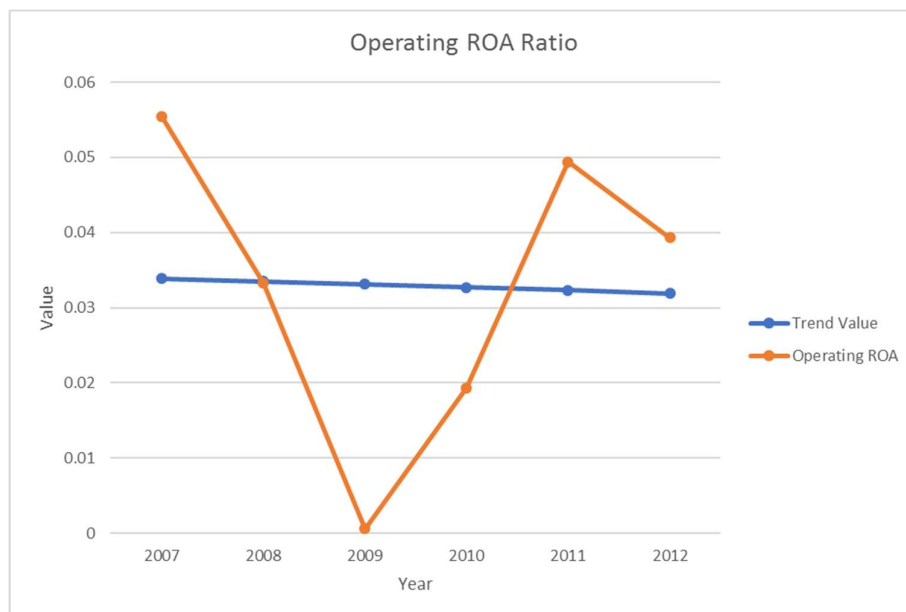


Figure 4-29: LFA Type N Trend for Operating ROA Ratio [Source Own]

### Current Cash Debt Coverage Ratio:

Trend Equation for Current Cash Debt Coverage Ratio is  $Y_t = 5.156 + 0.063X$

The trend value is on the increase with a positive slope of 0.063; indicating a continuous increment in performance of farms of LFA Type N as measured using the indicator Current Cash-Debt Ratio.

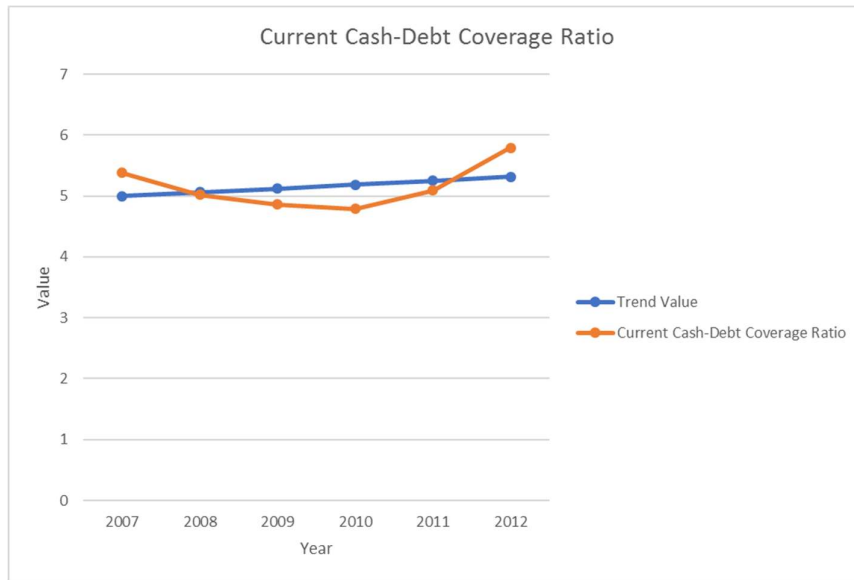


Figure 4-30: LFA Type N Trend for Current Cash-Debt Coverage Ratio [Source Own]

### Debt Ratio:

Trend Equation for Debt Ratio is  $Y_t = 0.296 + (-0.009X)$

The trend value is on a decline with a negative slope of 0.009; indicating a continuous decline in performance of farms of LFA Type N as measured using the indicator Debt Ratio.

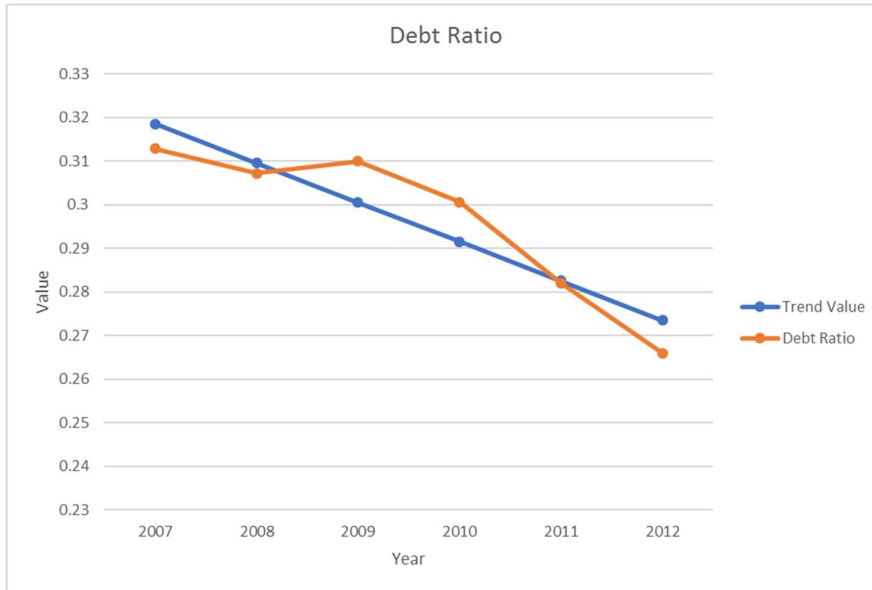


Figure 4-31: LFA Type N Trend for Debt Ratio [Source Own]

**Expensiveness:**

Trend Equation for Expensiveness is  $Y_t = 1.356 + 0.338X$

The trend value is on the increase with a positive slope of 0.338; indicating a continuous increment in the Expensiveness of farms of LFA Type N.

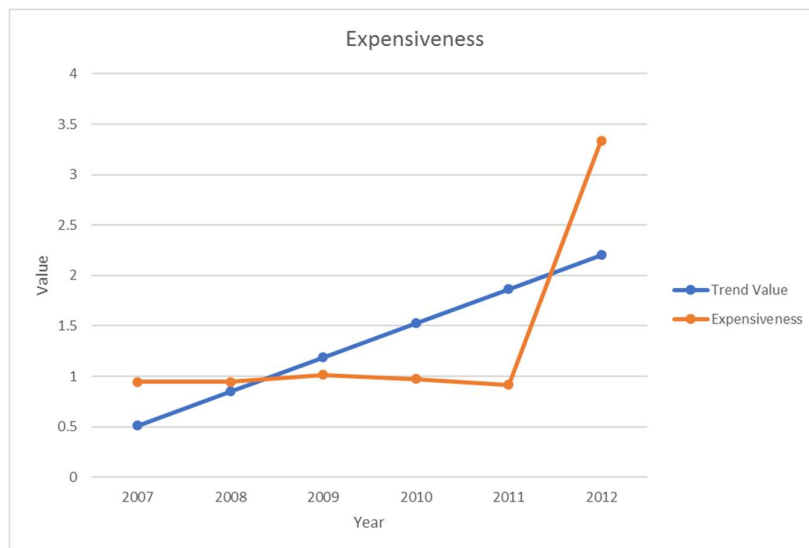


Figure 4-32: LFA Type N Trend for Expensiveness [Source Own]

## LFA Type O:

### **Current Ratio:**

Trend Equation for Current Ratio is  $Y_t = 4.355 + 0.143X$

The trend value is on the increase with a positive slope of 0.143; indicating a continuous increment in performance of farms of LFA Type O as measured using the indicator Current Ratio.

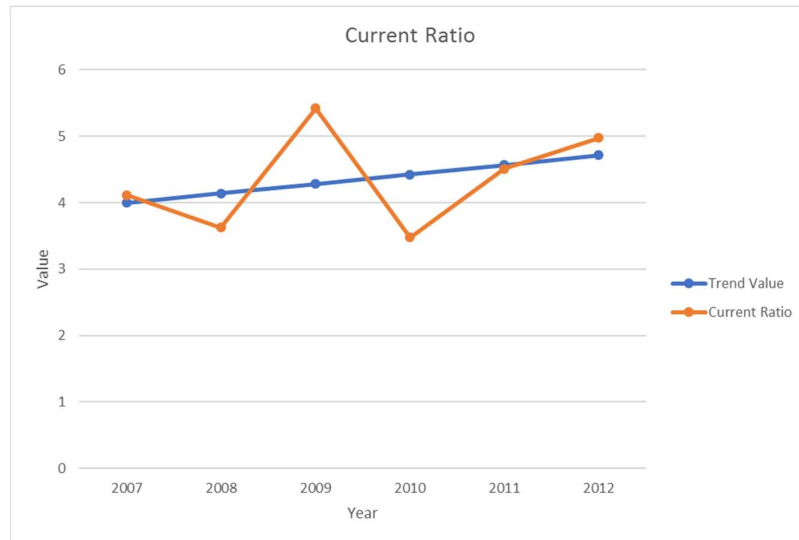


Figure 4-33: LFA Type O Trend for Current Ratio [Source Own]

### **Quick Ratio:**

Trend Equation for Quick Ratio is  $Y_t = 2.072 + 0.082X$

The trend value is on the increase with a positive slope of 0.082; indicating a continuous increment in performance of farms of LFA Type O as measured using the indicator Quick Ratio.

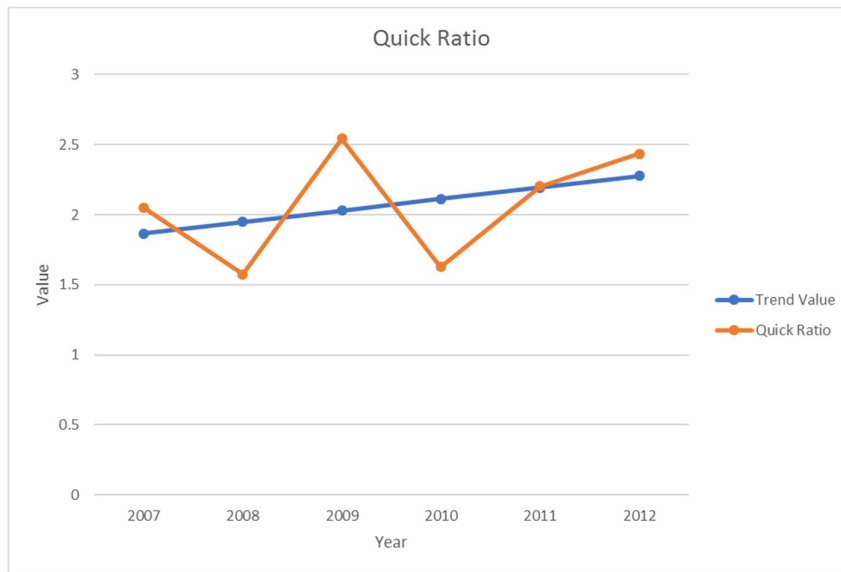


Figure 4-34: LFA Type O Trend for Quick Ratio [Source Own]

### Gross Profit Ratio:

Trend Equation for Gross Profit Ratio is  $Y_t = 0.093 + 0.009X$

The trend value is on the increase with a positive slope of 0.009; indicating a continuous increment in performance of farms of LFA Type O as measured using the indicator Gross Profit Ratio.

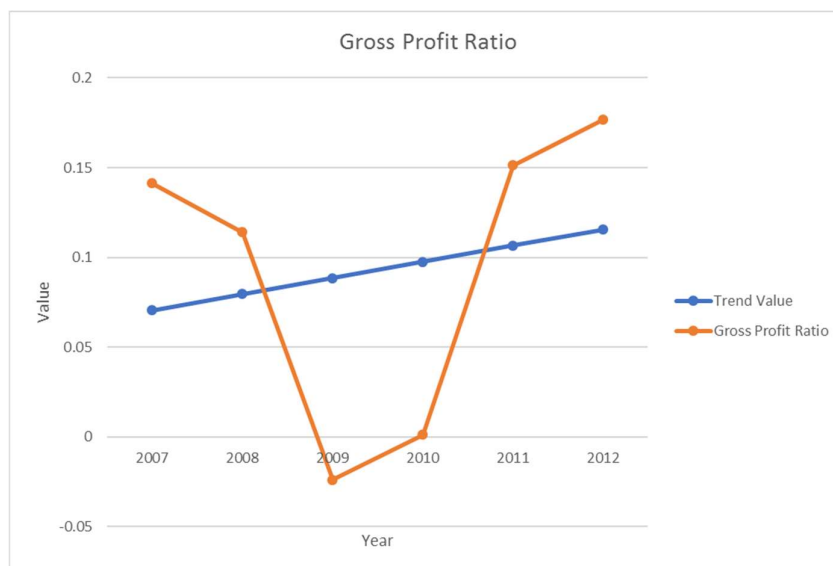


Figure 4-35: LFA Type O Trend for Gross Profit Ratio [Source Own]



### Operating ROA Ratio:

Trend Equation for Operating ROA Ratio is  $Y_t = 0.027 + 0.001X$

The trend value is on the increase with a positive slope of 0.001; indicating a continuous increment in performance of farms of LFA Type O as measured using the indicator Operating ROA Ratio.

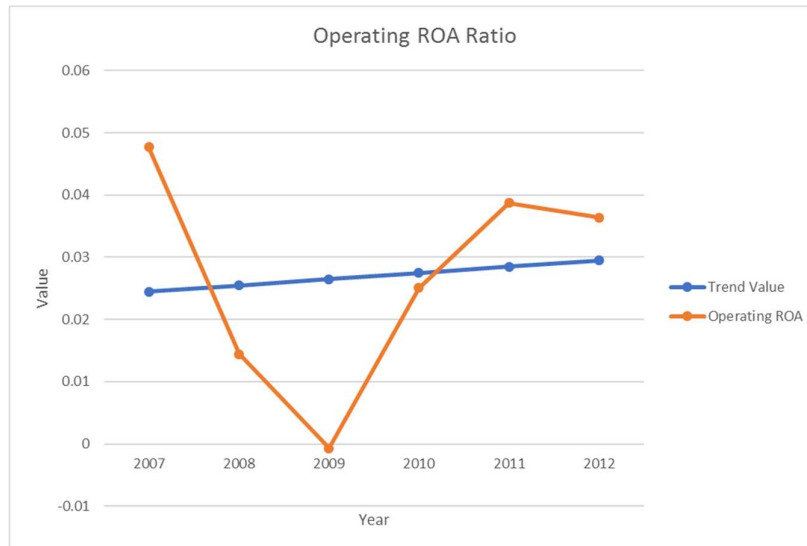


Figure 4-36: LFA Type O Trend for Operating ROA Ratio [Source Own]

### Current Cash Debt Coverage Ratio:

Trend Equation for Current Cash Debt Coverage Ratio is  $Y_t = 4.663 + 0.119X$

The trend value is on the increase with a positive slope of 0.119; indicating a continuous increment in performance of farms of LFA Type O as measured using the indicator Current Cash-Debt Ratio.

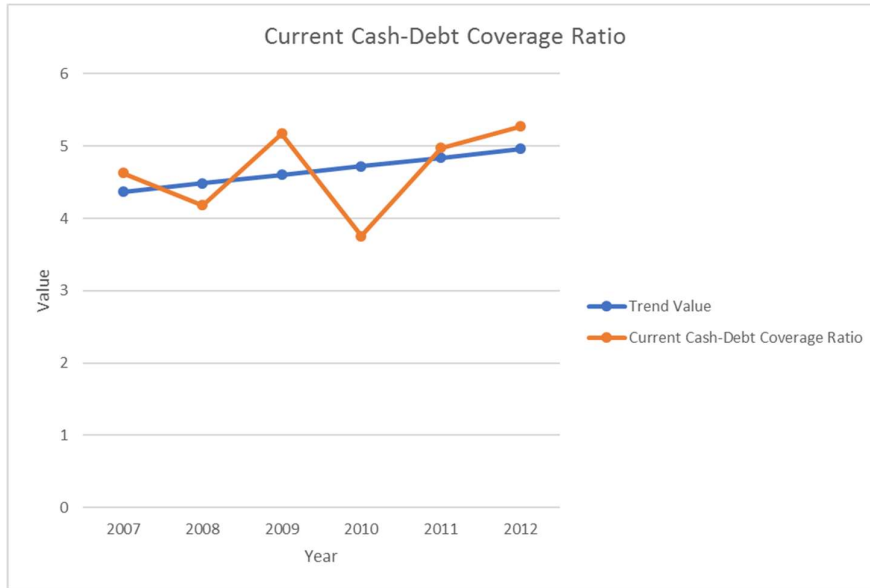


Figure 4-37: LFA Type O Trend for Current Cash-Debt Coverage Ratio [Source Own]

**Debt Ratio:**

Trend Equation for Debt Ratio is  $Y_t = 0.332 + (-0.008X)$

The trend value is on a decline with a negative slope of 0.008; indicating a continuous decline in performance of farms of LFA Type O as measured using the indicator Debt Ratio.

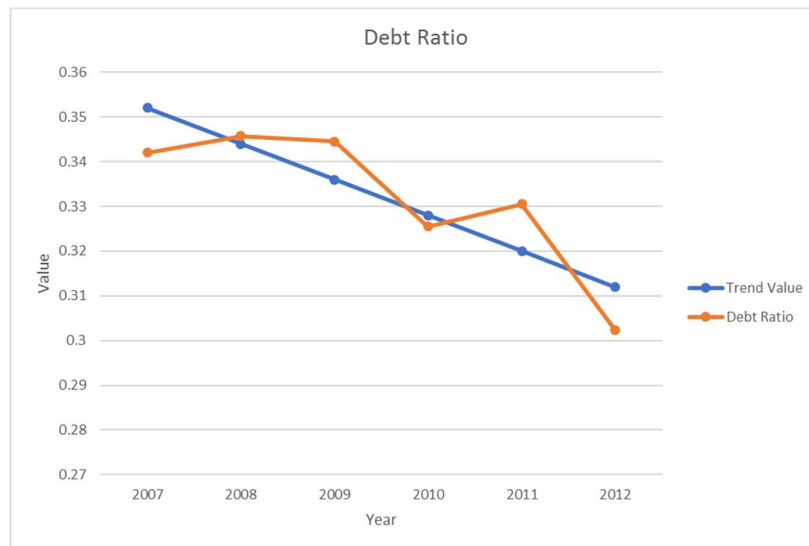


Figure 4-38: LFA Type O Trend for Debt Ratio [Source Own]

### Expensiveness:

Trend Equation for Expensiveness is  $Y_t = 1.392 + 0.069X$

The trend value is on the increase with a positive slope of 0.069; indicating a continuous increment in the Expensiveness of farms of LFA Type O.

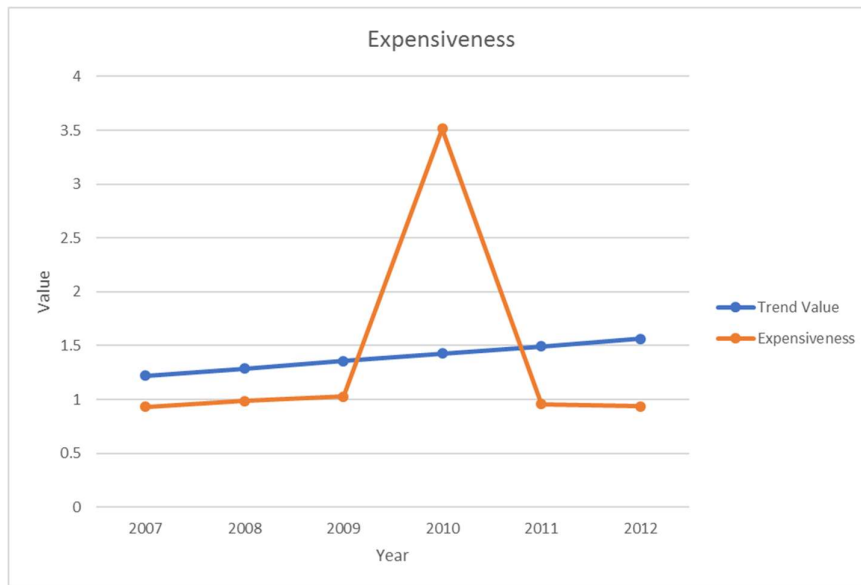


Figure 4-39: LFA Type O Trend for Expensiveness [Source Own]

### LFA Type S:

#### Current Ratio:

Trend Equation for Current Ratio is  $Y_t = 4.656 + (-0.063X)$

The trend value is on a decline with a negative slope of 0.063; indicating a continuous decline in performance of farms of LFA Type S as measured using the indicator Current Ratio.

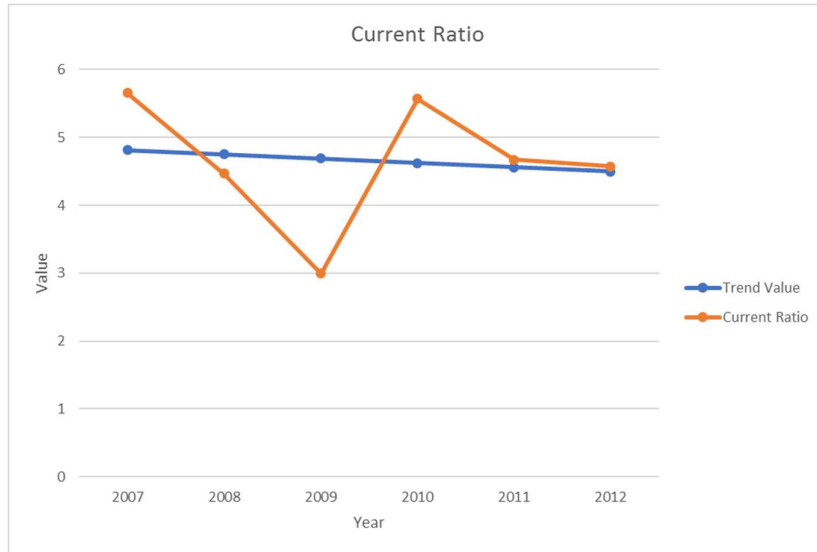


Figure 4-40: LFA Type S Trend for Current Ratio [Source Own]

**Quick Ratio:**

Trend Equation for Quick Ratio is  $Y_t = 3.056 + (-0.040X)$

The trend value is on a decline with a negative slope of 0.040; indicating a continuous decline in performance of farms of LFA Type S as measured using the indicator Quick Ratio.

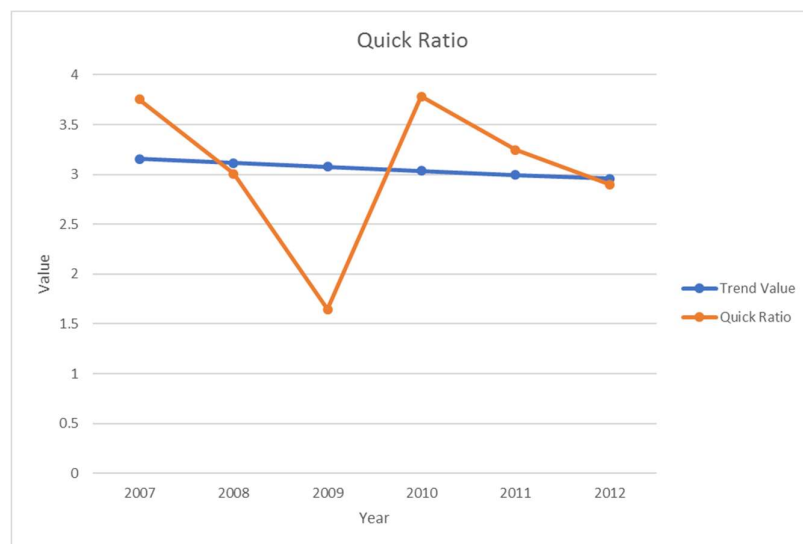


Figure 4-41: LFA Type S Trend for Quick Ratio [Source Own]

### Gross Profit Ratio:

Trend Equation for Gross Profit Ratio is  $Y_t = -0.143 + (-0.016X)$

The trend value is on a decline with a negative slope of 0.016; indicating a continuous decline in performance of farms of LFA Type S as measured using the indicator Gross Profit Ratio.



Figure 4-42: LFA Type S Trend for Gross Profit Ratio [Source Own]

### Operating ROA Ratio:

Trend Equation for Operating ROA is  $Y_t = 0.053 + (-0.005X)$

The trend value is on a decline with a negative slope of 0.005; indicating a continuous decline in performance of farms of LFA Type S as measured using the indicator Operating ROA Ratio.

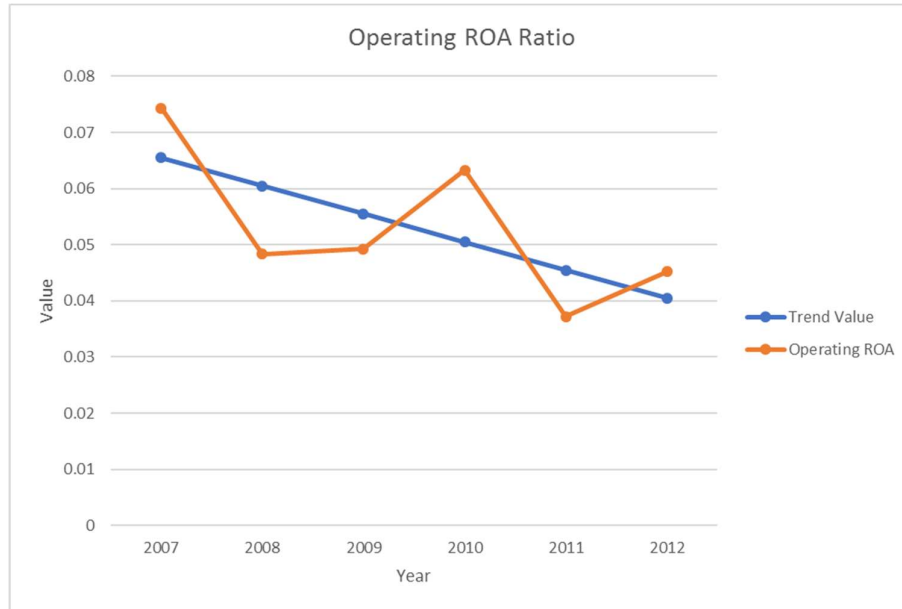


Figure 4-43: LFA Type S Trend for Operating ROA Ratio [Source Own]

**Current Cash Debt Coverage Ratio:**

Trend Equation for Current Cash Debt Coverage is  $Y_t = 3.671 + (-0.046X)$

The trend value is on a decline with a negative slope of 0.046; indicating a continuous decline in performance of farms of LFA Type S as measured using the indicator Current Cash-Debt Coverage Ratio.

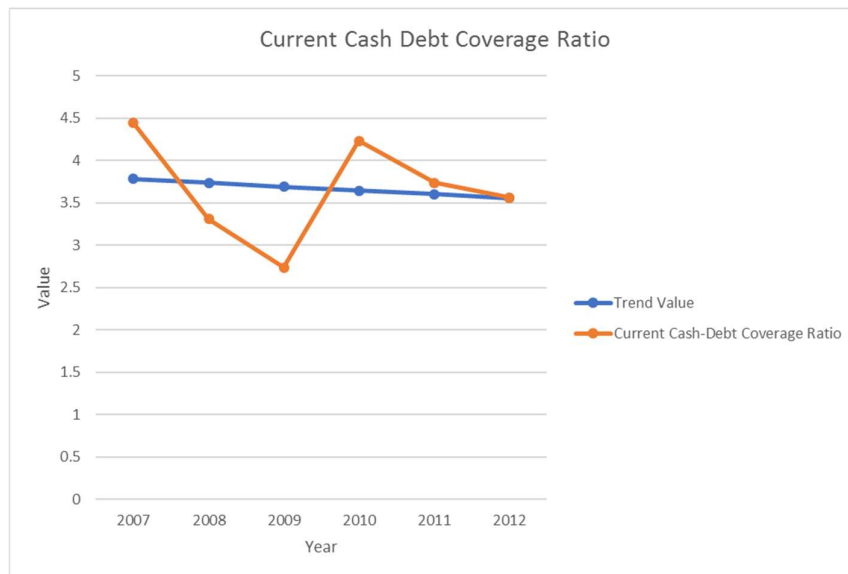


Figure 4-44: LFA Type S Trend for Current Cash-Debt Coverage Ratio [Source Own]

### Debt Ratio:

Trend Equation for Expensiveness is  $Y_t = 0.355 + (-0.017X)$

The trend value is on a decline with a negative slope of 0.017; indicating a continuous decline in performance of farms of LFA Type S as measured using the indicator Debt Ratio.

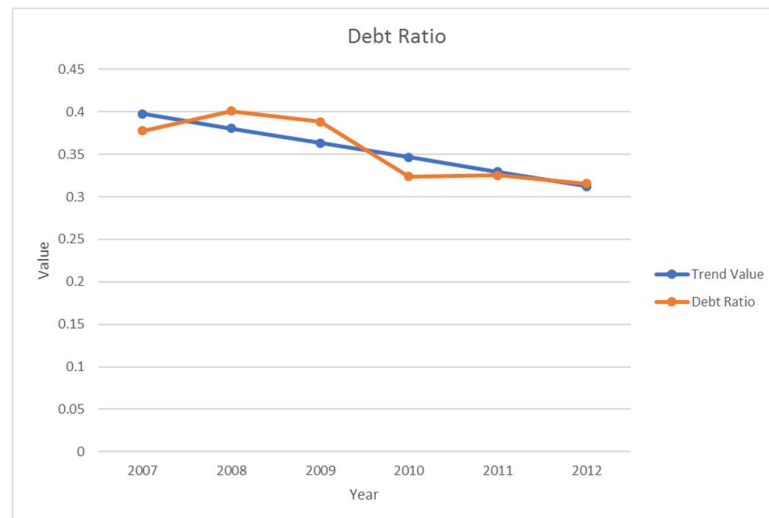


Figure 4-45: LFA Type S Trend for Debt Ratio [Source Own]

### Expensiveness:

Trend Equation for Expensiveness is  $Y_t = 0.943 + 0.015X$

The trend value is on the increase with a positive slope of 0.015; indicating a continuous increment in the Expensiveness of farms of LFA Type S.

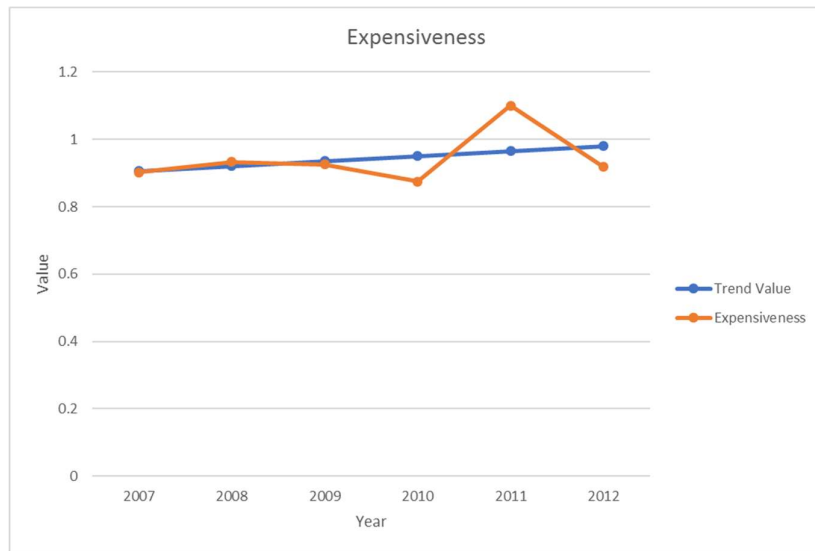


Figure 4-46: LFA Type S Trend for Expensiveness [Source Own]

### Summary of Analysis

LFA type	H	N	O	S
Current Ratio	Red	Green	Green	Red
Quick Ratio	Red	Green	Green	Red
Gross Profit Ratio	Red	Red	Green	Red
Operating ROA	Red	Red	Green	Red
Current Cash-Debt Coverage Ratio	Red	Green	Green	Red
Debt Ratio	Red	Red	Red	Red
Expensiveness	Red	Red	Red	Red

Table 4-5: Summary Table for Trends [Source Own]

#### Legend:

Indicates declining Performance (Note that positive slope in Expensiveness shows declining performance).

Indicates increasing Performance (Note that negative slope in Expensiveness shows declining performance).

For LFA Type H and S, all indicators show a decrease in farm performance over time.

All farms show a declining performance as measured by Debt Ratio and Expensiveness.



## 4.4 Regression Analysis

### 4.4.1 Regression Analysis of Current Ratio

Checking of Linear pattern was done using Scatter Plot; data is of non-linear pattern. Refer to appendix 13 for details.

#### Transformation

The values of Current Ratio were transformed logarithmically, so that the linear regression equation is now of the format below;

$$\log y = \beta + \beta_1 X_1 + \dots + \beta_n X_n$$

#### Correlation Matrix

Correlation Coefficients, using the observations 1 - 6561  
5% critical value (two-tailed) = 0.0242 for n = 6561

UtilizedAgricu~	fixedassets	currentassets	LFpaymentsCZK	
1.0000	0.3784	0.6796	0.1812	UtilizedAgricu~
	1.0000	0.7556	0.4306	fixedassets
		1.0000	0.2412	currentassets
			1.0000	LFpaymentsCZK
Administrative~	totalliabiliti~			
0.3974	0.6344	UtilizedAgricu~		
0.3860	0.5621	fixedassets		
0.6090	0.7838	currentassets		
0.0675	0.1541	LFpaymentsCZK		
1.0000	0.6849	Administrative~		
	1.0000	totalliabiliti~		

Figure 4-47: Correlation Matrix for Current Ratio [Source: Own]

From the matrix; no two variables used for the analysis has a correlation > |0.8|

## Ordinary Least Square Analysis

```

Model 9: OLS, using observations 1-6561 (n = 6466)
Missing or incomplete observations dropped: 95
Dependent variable: l_CurrentRatio
Heteroskedasticity-robust standard errors, variant HC1

      coefficient    std. error    t-ratio    p-value
-----
const          0.885970    0.0233839    37.89    7.66e-284 ***
UtilizedAgricult~  0.000149281  2.77608e-05    5.377    7.82e-08 ***
totalliabilities -1.12806e-05  4.47634e-07   -25.20    9.61e-134 ***
LFApaymentsCZK   7.20432e-08  1.00538e-08    7.166    8.59e-013 ***
Administrativean~ 3.29583e-06  1.62303e-06    2.031    0.0423 **
fixedassets     -9.38387e-07  1.57504e-07   -5.958    2.69e-09 ***
currentassets    1.08353e-05  1.01743e-06   10.65    2.89e-026 ***

Mean dependent var    1.075977    S.D. dependent var    0.952656
Sum squared resid    4847.912    S.E. of regression    0.866353
R-squared            0.173745    Adjusted R-squared    0.172977
F(6, 6459)          139.9497    P-value(F)            2.6e-167
Log-likelihood       -8243.722    Akaike criterion      16501.44
Schwarz criterion    16548.86    Hannan-Quinn          16517.85

Log-likelihood for CurrentRatio = -15201

Breusch-Pagan test for heteroskedasticity -
Null hypothesis: heteroskedasticity not present
Test statistic: LM = 407.936
with p-value = P(Chi-square(6) > 407.936) = 5.49873e-085

Test for normality of residual -
Null hypothesis: error is normally distributed
Test statistic: Chi-square(2) = 931.483
with p-value = 5.38267e-203

```

Figure 4-48: OLS Analysis for Current Ratio [Source: Own]

Deduced Equation:

$$\log y = \beta + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Where,

y = Current Ratio

$\beta$ , intercept = 0.88597

$X_1$  = Utilized Agricultural Area (hectares)

$B_1$ , Co-efficient of  $X_1$  = 0.000149

$X_2$  = Utilized Agricultural Area (hectares);

$B_2$ , Co-efficient of  $X_1 = -1.128e^{-0}$

$X_3$  = Utilized Agricultural Area (hectares);

$B_3$ , Co-efficient of  $X_1 = 7.20432e^{-08}$

$X_4$  = Utilized Agricultural Area (hectares);

$B_4$ , Co-efficient of  $X_1 = 3.29583e^{-06}$

$X_5$  = Utilized Agricultural Area (hectares);

$B_5$ , Co-efficient of  $X_1 = -9.38387e^{-07}$

$X_6$  = Utilized Agricultural Area (hectares);

$B_6$ , Co-efficient of  $X_1 = 1.08353e^{-05}$

Since, all parameters have a p-value that is less than 0.05(alpha level); they are all significant to the model. The F-test p-value is also less than 0.05, the model is significant.

Also, the co-efficient implies that if any of the explanatory variables is increased by a unit, the Current Ratio will increase by approximately 1.00.

If the Utilized Agricultural Area is increased by 1 hectare the Current Ratio of the farm will increase by 1.000.

Note the adjusted R-Square is 0.173; implying that the model explains approximately about 17.3% changes in Current Ratio.

The assumptions of this regression; no-Autocorrelation, and Normality of Residuals were also fulfilled as the p-value of the Normality of Residual test and Heteroskedasticity are both less than 0.05 which is the alpha level.

## CHAPTER 5

### 5. CONCLUSION

The Less Favoured Area or Area with Natural Constraint which affect the amount of agricultural area available for cultivation with attendance cost.

The EU Common Agricultural Policy payment is to ensure a fair standard of living for farming communities and to ensure that they are encouraged to continue with the agricultural activity both for ecological and economic purposes.

The Czech Republic as a member of the European Union, is subject to the EU Common Agricultural Policy, hence the objective of this work was to evaluate the performance of Czech farm economy.

Business Performance Indicators; Current Ratio, Quick Ratio, Gross Profit Ratio, Current Cash-Debt Coverage Ratio, Debt Ratio, Operating Return On Assets Ratio, and Expensiveness were defined and derived, and they were compared across LFA Type.

It was discovered that farms across LFA Types have the similar level of performance has the comparison of their means show no significant differences. It must be noted that the comparison were done at a confidence level of 95%.

Trend Analysis of the indicators were done, which depicts an increasing decline in all performance indicators measured for LFA Type H and S. LFA Type O have the following indicators on the upward trend; Current Ratio, Quick Ratio, Gross Profit Ratio, Operating Return on Asset Ratio, and Current Cash-Debt Coverage Ratio. Also, Current Ratio, Quick Ratio, and Current Cash-Debt Coverage Ratio are on the upward trend for LFA Type N. All other indicators showed declining level of performance.

Regression Analysis of Current Ratio was done to determine factors responsible for its variation, the following factors were found to be of significance; Utilized Agricultural Area, Total Liabilities of farm, LFA Payments, Administrative and Other costs, Fixed and Current Assets.

However, the explain-ability of variation in current ratio by the afore-mentioned factors is about 17% indicating that there are other factors of significance not captured in the available data.

## REFERENCES

- European Parliament and Council (2013) 'Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005', Official Journal of the European Union, , pp. 500-542.
- European Parliament and Council (2013) 'Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the Common Agricultural Policy and repealing council regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009', Official Journal of the European Union, , pp. 619–656.
- Ragonnaud, G. (2016) Second pillar of the CAP: Rural development policy | EU fact-sheets| European parliament.  
Available at:  
[http://www.europarl.europa.eu/atyourservice/en/displayFtu.html?ftuid=FTU\\_5.2.6.html](http://www.europarl.europa.eu/atyourservice/en/displayFtu.html?ftuid=FTU_5.2.6.html)  
(Accessed: 23 May 2016).
- European Commission (2008) LFA - aid to farmers in less Favoured areas - European commission.  
Available at:  
[http://ec.europa.eu/agriculture/rurdev/lfa/index\\_en.htm](http://ec.europa.eu/agriculture/rurdev/lfa/index_en.htm)  
(Accessed: 2 June 2016).
- Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) Mountain farmers in Austria, BMLFUW.  
Available at:  
<https://www.bmlfuw.gv.at/en/agriculture/Rural-development/Mountainfarmers.html>  
(Accessed: 2 June 2016).
- Hovorka, G. (2006) 'The influence of agricultural policy on the structure of mountain', Online journal of the Ministry of Agriculture, Forestry, Environment and Water Management, , pp. 7–18.
- Organisation for Economic Co-operation and Development (2014) OECD Regional Outlook.  
Available at:  
<http://www.oecd.org/gov/regional-policy/Belgium.pdf>  
(Accessed: 3 June 2016).

- Department of Agriculture and Rural Development (no date) Guide to the 2017 Areas of Natural Constraint Scheme.

Available at:

<https://www.daera-ni.gov.uk/sites/default/files/publications/dard/guide-to-areas-of-natural-constraint-2017.PDF>

(Accessed: 6 June 2016).
- The Scottish Government Rural Payment and Services (2015) Rural Development: Less Favoured Area Support Scheme full guidance.

Available at:

<https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/lfass/>

(Accessed: 6 June 2016).
- Rural Business Research, Harvey, D. and Scott, C. (2015) Farm Business Survey 2013/2014 Hill Farming in England.

Available at:

[http://www.fbspartnership.co.uk/documents/2013\\_14/Hill\\_Farming\\_2013-14.pdf](http://www.fbspartnership.co.uk/documents/2013_14/Hill_Farming_2013-14.pdf)

(Accessed: 6 June 2016).
- National Assembly of Wales (2011) An introduction to Glastir and other UK Agri-environment schemes.

Available at:

<http://www.assembly.wales/Research%20Documents/An%20introduction%20to%20Glastir%20and%20other%20UK%20agrienvironment%20schemes%20-%20Research%20paper-15022011-210272/11-012-English.pdf>

(Accessed: 6 June 2016).
- LAND USE POLICY GROUP (2003) The Review of Area-based Less Favoured Area Payments across Great Britain.

Available at:

[www.lupg.org](http://www.lupg.org)

(Accessed: 6 June 2016).
- European Commission (no date) Factsheet on 2014-2020 Rural Development Programme for the Czech Republic.

Available at:

[http://ec.europa.eu/agriculture/rural-development-2014-2020/country-files/cz/factsheet\\_en.pdf](http://ec.europa.eu/agriculture/rural-development-2014-2020/country-files/cz/factsheet_en.pdf)

(Accessed: 7 June 2016).

- Research Institute of Agricultural Economics, Prague, Czech Republic and ŠTOLBOVÁ, M. (2007) Comparative analysis of Less-Favoured Areas payments.  
Available at:  
<http://agriculturejournals.cz/publicFiles/00391.pdf>  
(Accessed: 8 June 2016).
- Research Institute of Agricultural Economics, Prague, Czech Republic and Štolbová, M. (2008) Eligibility criteria for less-favoured areas payments.  
Available at:  
<http://www.agriculturejournals.cz/publicFiles/01234.pdf>  
(Accessed: 8 June 2016).
- EUROSTAT (2008) Farm structure statistics.  
Available at:  
[http://ec.europa.eu/eurostat/statistics-explained/index.php/Farm\\_structure\\_statistics](http://ec.europa.eu/eurostat/statistics-explained/index.php/Farm_structure_statistics)  
(Accessed: 8 June 2016).
- Perrier-Cornet, P. (2010) 'The LFAs policies in France and the European Union', INRA, France: PRIMAFF Symposium, .
- Ministry of Agriculture, VÚZE Prague (2008) 'RURAL DEVELOPMENT PROGRAMME OF THE CZECH REPUBLIC FOR 2007 - 2013', , pp. 87–89.
- Performance measurement (2015) in Wikipedia. Available at: [https://en.wikipedia.org/wiki/Performance\\_measurement](https://en.wikipedia.org/wiki/Performance_measurement) (Accessed: 1 September 2016).
- Neely, A. and Otley, D. (2002) 'Business Performance Measurement: Theory and Practice', Cranfield School of Management, , p. 3.
- Moullin, M. (2007) 'Performance measurement definitions: Linking performance measurement and organisational excellence', (International journal of health care quality assurance, 20(3), pp. 181–183.
- Classification of Financial Ratios (2015) Available at: <http://www.accountingformanagement.org/classification-of-financial-ratios/> (Accessed: 1 September 2016).
- Basu, C. (2016) 'Four basic types of financial ratios used to measure a company's performance', Small Business Chron, .
- NetMBA Business Knowledge Center (2002) Financial ratios. Available at: <http://www.netmba.com/finance/financial/ratios/> (Accessed: 1 September 2016).
- Robinson, R, T., Henry, Elaine, L, W. and Pirie (2012) CFA Institute Investment Series: International Financial Statement Analysis. 2nd edn. Wiley.

- Barry, C.C. (2016) Financial ratios - expenses. Available at: <http://www.referenceforbusiness.com/encyclopedia/Fa-For/Financial-Ratios.html> (Accessed: 1 September 2016).
- Accounting for Management (2015) Absolute Liquid Ratio. Available at: <http://www.accountingformanagement.org/absolute-liquid-ratio/> (Accessed: 5 September 2016).
- Accounting for Management (2015) Current cash debt coverage ratio. Available at: <http://www.accountingformanagement.org/current-cash-debt-coverage-ratio/> (Accessed: 5 September 2016).
- Accounting for Management (2015) Classification of financial ratios. Available at: <http://www.accountingformanagement.org/classification-of-financial-ratios/> (Accessed: 5 September 2016).
- Reference for Business (2016) Financial Ratios. Available at: <http://www.referenceforbusiness.com/encyclopedia/Fa-For/Financial-Ratios.html> (Accessed: 5 September 2016).
- Accounting for Management (2015) Gross Profit Ratio. Available at: <http://www.accountingformanagement.org/gross-profit-ratio/> (Accessed: 29 September 2016).
- Accounting for Management (2015) Operating Ratio. Available at: <http://www.accountingformanagement.org/operating-ratio/> (Accessed: 29 September 2016).
- NetMBA (2002) Financial ratios. Available at: <http://www.netmba.com/finance/financial/ratios/> (Accessed: 29 September 2016).
- Reference for Business (2016) Financial ratios - expenses. Available at: <http://www.referenceforbusiness.com/encyclopedia/Fa-For/Financial-Ratios.html> (Accessed: 29 September 2016).
- Finance Train (2013) Operating return on assets (ROA). Available at: <http://financetrain.com/operating-return-assets-roa/> (Accessed: 29 September 2016).
- Investopedia.com (2010) 'Operating expense ratio - OER', in Available at: <http://www.investopedia.com/terms/o/operating-expense-ratio.asp> (Accessed: 29 September 2016).
- Accounting Tools (2013) Is depreciation an operating expense? Available at: <http://www.accountingtools.com/questions-and-answers/is-depreciation-an-operating-expense.html> (Accessed: 29 September 2016).



- Michigan State University Extension (2014) Financial ratios part 19 of 21: Depreciation-expense ratio.  
Available at:  
[http://msue.anr.msu.edu/news/financial\\_ratios\\_part\\_19\\_of\\_21\\_depreciation\\_expense\\_ratio](http://msue.anr.msu.edu/news/financial_ratios_part_19_of_21_depreciation_expense_ratio)  
(Accessed: 29 September 2016).
- Doehring, T.A. (2012) ANALYZING THE EFFICIENCY OF YOUR OPERATION. Available at:  
<http://www.centrec.com/assets/efficiency.pdf> (Accessed: 29 September 2016).
- Ready Ratios (2013) Interest Coverage Ratio.  
Available at:  
[http://www.readyratios.com/reference/debt/interest\\_coverage\\_ratio\\_icr.html](http://www.readyratios.com/reference/debt/interest_coverage_ratio_icr.html) (Accessed: 29 September 2016).
- Accounting for Management (2015) Classification of Financial Ratios.  
Available at: <http://www.accountingformanagement.org/classification-of-financial-ratios/>  
(Accessed: 30 September 2016).
- Accounting Tools (no date) Inventory turnover ratio | stock turnover ratio. Available at:  
<http://www.accountingtools.com/inventory-turnover-ratio> (Accessed: 30 September 2016).
- NetMBA (2002) Financial ratios.  
Available at: <http://www.netmba.com/finance/financial/ratios/>  
(Accessed: 1 October 2016).
- Accounting for Management (2015) Receivables turnover ratio.  
Available at:  
<http://www.accountingformanagement.org/receiveables-turnover-ratio/>  
(Accessed: 1 October 2016).
- Accounting for Management (2015a) Accounts payable turnover ratio.  
Available at:  
<http://www.accountingformanagement.org/accounts-payable-turnover-ratio/>  
(Accessed: 1 October 2016).
- Accounting for Management (2015) Asset turnover ratio.  
Available at:  
<http://www.accountingformanagement.org/asset-turnover-ratio/>  
(Accessed: 1 October 2016).
- Accounting Tools (no date) Proprietary ratio | equity ratio. Available at:  
<http://www.accountingtools.com/proprietary-ratio> (Accessed: 8 October 2016).

- Don, R. and Hearst Newspapers, LLC (no date) The Fixed Asset-To-Equity Capital Ratio. Available at: <http://smallbusiness.chron.com/fixed-assettoequity-capital-ratio-50520.html> (Accessed: October 2016).
- Accounting for Management (2015) Current assets to equity ratio. Available at: <http://www.accountingformanagement.org/current-assets-to-equity-ratio/> (Accessed: 8 October 2016).
- Brigham, E.F. and Ehrhardt, M.C. (2002) A corporate finance: A focused approach. 4th edn. Cincinnati, OH, United States: South-Western, Division of Thomson Learning.
- FEBMAT- Finance, Economics, Business, Management, Accounting, Taxes (2016) 'Indicators of indebtedness and financial structure', .

## APPENDIX

### APPENDIX 1: DIRECT PAYMENT CEILING FOR EU MEMBER STATES

*(current prices in thousand EUR)*

	Annex VIII Reg 73/2009		Annex II direct payments Regulation				TOTAL 2015-2020
	Financial year 2015	Financial year 2016	Financial year 2017	Financial year 2018	Financial year 2019	Financial year 2020	
Belgium	544 047	536 076	528 124	520 170	512 718	505 266	3 146 401
Bulgaria	642 103	721 251	792 449	793 226	794 759	796 292	4 540 080
Czech Republic	875 305	874 484	873 671	872 830	872 819	872 809	5 241 918
Denmark	926 075	916 580	907 108	897 625	889 004	880 384	5 416 776
Germany	5 178 178	5 144 264	5 110 446	5 076 522	5 047 458	5 018 395	30 575 263
Estonia	110 018	121 870	133 701	145 504	157 435	169 366	837 894
Ireland	1 216 547	1 215 003	1 213 470	1 211 899	1 211 482	1 211 066	7 279 467
Greece	2 047 187	2 039 122	2 015 116	1 991 083	1 969 129	1 947 177	12 008 814
Spain	4 833 647	4 842 658	4 851 682	4 866 665	4 880 049	4 893 433	29 168 134
France	7 586 341	7 553 677	7 521 123	7 488 380	7 462 790	7 437 200	45 049 511
Croatia	113 908	130 550	149 200	186 500	223 800	261 100	1 065 058
Italy	3 953 394	3 902 039	3 850 805	3 799 540	3 751 937	3 704 337	22 962 052
Cyprus	51 344	50 784	50 225	49 666	49 155	48 643	299 817
Latvia	168 886	195 649	222 363	249 020	275 887	302 754	1 414 559
Lithuania	393 226	417 890	442 510	467 070	492 049	517 028	2 729 773
Luxembourg	33 662	33 603	33 545	33 486	33 459	33 431	201 186
Hungary	1 272 786	1 271 593	1 270 410	1 269 187	1 269 172	1 269 158	7 622 306
Malta	5 240	5 127	5 015	4 904	4 797	4 689	29 772
Netherlands	793 319	780 815	768 340	755 862	744 116	732 370	4 574 822
Austria	693 716	693 065	692 421	691 754	691 746	691 738	4 154 440
Poland	2 970 020	2 987 267	3 004 501	3 021 602	3 041 560	3 061 518	18 086 468
Portugal	557 667	565 816	573 954	582 057	590 706	599 355	3 469 555
Romania	1 428 531	1 629 889	1 813 795	1 842 446	1 872 821	1 903 195	10 490 677
Slovenia	138 980	137 987	136 997	136 003	135 141	134 278	819 386
Slovakia	377 419	380 680	383 938	387 177	390 781	394 385	2 314 380
Finland	523 247	523 333	523 422	523 493	524 062	524 631	3 142 188
Sweden	696 487	696 890	697 295	697 678	698 723	699 768	4 186 841
United Kingdom	3 548 576	3 555 915	3 563 262	3 570 477	3 581 080	3 591 683	21 410 993
<b>Total EU-28</b>	<b>41 679 856</b>	<b>41 923 877</b>	<b>42 128 888</b>	<b>42 131 826</b>	<b>42 168 635</b>	<b>42 205 449</b>	<b>252 238 531</b>

(Source: [http://ec.europa.eu/agriculture/cap-funding/budget/mff-2014-2020/mff-figures-and-cap\\_en.pdf](http://ec.europa.eu/agriculture/cap-funding/budget/mff-2014-2020/mff-figures-and-cap_en.pdf))

## APPENDIX 2: RURAL DEVELOPMENT SUPPORT FOR EU MEMBER STATES

(current prices in EUR)

	2014	2015	2016	2017	2018	2019	2020	TOTAL 2014-2020
Belgium	78 342 401	78 499 837	78 660 375	78 824 076	78 991 202	79 158 713	79 314 155	551 790 759
Bulgaria	335 499 038	335 057 822	334 607 538	334 147 994	333 680 052	333 187 306	332 604 216	2 338 783 966
Czech Republic	314 349 445	312 969 048	311 560 782	310 124 078	308 659 490	307 149 050	305 522 103	2 170 333 996
Denmark	90 287 658	90 168 920	90 047 742	89 924 072	89 798 142	89 665 537	89 508 619	629 400 690
Germany	1 178 778 847	1 177 251 936	1 175 693 642	1 174 103 302	1 172 483 899	1 170 778 658	1 168 760 766	8 217 851 050
Estonia	103 626 144	103 651 030	103 676 345	103 702 093	103 728 583	103 751 180	103 751 183	725 886 558
Ireland	313 148 955	313 059 463	312 967 965	312 874 411	312 779 690	312 669 355	312 485 314	2 189 985 153
Greece	601 051 830	600 533 693	600 004 906	599 465 245	598 915 722	598 337 071	597 652 326	4 195 960 793
Spain	1 187 488 617	1 186 425 595	1 185 344 141	1 184 244 005	1 183 112 678	1 182 137 718	1 182 076 067	8 290 828 821
France	1 404 875 907	1 408 287 165	1 411 769 545	1 415 324 592	1 418 941 328	1 422 813 729	1 427 718 983	9 909 731 249
Croatia	332 167 500	332 167 500	332 167 500	332 167 500	332 167 500	332 167 500	332 167 500	2 325 172 500
Italy	1 480 213 402	1 483 373 476	1 486 595 990	1 489 882 162	1 493 236 530	1 496 609 799	1 499 799 408	10 429 710 767
Cyprus	18 895 839	18 893 552	18 891 207	18 888 801	18 886 389	18 883 108	18 875 481	132 214 377
Latvia	138 327 376	138 361 424	138 396 059	138 431 289	138 467 528	138 498 589	138 499 517	968 981 782
Lithuania	230 392 975	230 412 316	230 431 887	230 451 686	230 472 391	230 483 599	230 443 386	1 613 088 240
Luxembourg	14 226 474	14 272 231	14 318 896	14 366 484	14 415 051	14 464 074	14 511 390	100 574 600
Hungary	495 668 727	495 016 871	494 351 618	493 672 684	492 981 342	492 253 356	491 391 895	3 455 336 493
Malta	13 880 143	13 965 035	14 051 619	14 139 927	14 230 023	14 321 504	14 412 647	99 000 898
Netherlands	87 118 078	87 003 509	86 886 585	86 767 256	86 645 747	86 517 797	86 366 388	607 305 360
Austria	557 806 503	559 329 914	560 883 465	562 467 745	564 084 777	565 713 368	567 266 225	3 937 551 997
Poland	1 569 517 638	1 567 453 560	1 565 347 059	1 563 197 238	1 561 008 130	1 558 702 987	1 555 975 202	10 941 201 814
Portugal	577 031 070	577 895 019	578 775 888	579 674 001	580 591 241	581 504 133	582 317 022	4 057 788 374
Romania	1 149 848 554	1 148 336 385	1 146 793 135	1 145 218 149	1 143 614 381	1 141 925 604	1 139 927 194	8 015 663 402
Slovenia	118 678 072	119 006 876	119 342 187	119 684 133	120 033 142	120 384 760	120 720 633	837 849 803
Slovakia	271 154 575	270 797 979	270 434 053	270 062 644	269 684 447	269 286 203	268 814 943	1 890 234 844
Finland	335 440 884	336 933 734	338 456 263	340 009 057	341 593 485	343 198 337	344 776 578	2 380 408 338
Sweden	248 858 535	249 014 757	249 173 940	249 336 135	249 502 108	249 660 989	249 768 786	1 745 315 250
United Kingdom	371 473 873	370 520 030	369 548 156	368 557 938	367 544 511	366 577 113	365 935 870	2 580 157 491
<b>Total EU-28</b>	<b>13 618 149 060</b>	<b>13 618 658 677</b>	<b>13 619 178 488</b>	<b>13 619 708 697</b>	<b>13 620 249 509</b>	<b>13 620 801 137</b>	<b>13 621 363 797</b>	<b>95 338 109 365</b>
Technical assistance	34 130 699	34 131 977	34 133 279	34 134 608	34 135 964	34 137 346	34 138 756	238 942 629
<b>Total</b>	<b>13 652 279 759</b>	<b>13 652 790 654</b>	<b>13 653 311 767</b>	<b>13 653 843 305</b>	<b>13 654 385 473</b>	<b>13 654 938 483</b>	<b>13 655 502 553</b>	<b>95 577 051 994</b>

(Source: [http://ec.europa.eu/agriculture/cap-funding/budget/mff-2014-2020/mff-figures-and-cap\\_en.pdf](http://ec.europa.eu/agriculture/cap-funding/budget/mff-2014-2020/mff-figures-and-cap_en.pdf))

## APPENDIX 3: BIOPHYSICAL CRITERIA FOR THE DELIMITATION OF AREAS FACING NATURAL CONSTRAINTS

CRITERION	DEFINITION	THRESHOLD
CLIMATE		
Low Temperature (*)	Length of growing period (number of days) defined by number of days with daily average temperature > 5 °C (LGPT5) or	≤ 180 days
	Thermal-time sum (degree-days) for Growing Period defined by accumulated daily average temperature > 5 °C	≤ 1 500 degree-days
Dryness	Ratio of the annual precipitation (P) to the annual potential evapotranspiration (PET)	P/PET ≤ 0.5
CLIMATE AND SOIL		
Excess Soil Moisture	Number of days at or above field capacity	≥ 230 days
SOIL		
Limited Soil Drainage (*)	Areas which are water logged for significant duration of the year	Wet within 80 cm from the surface for over 6 months, or wet within 40 cm for over 11 months or  Poorly or very poorly drained soil or  Gleyic colour pattern within 40 cm from the surface
Unfavourable Texture and Stoniness (*)	Relative abundance of clay, silt, sand, organic matter (weight %) and coarse material (volumetric %) fractions	≥ 15 % of topsoil volume is coarse material, including rock outcrop, boulder or  texture class in half or more (cumulatively) of the 100 cm soil surface is sand, loamy sand defined as:  Silt % + (2 × clay %) ≤ 30 % or
		Topsoil texture class is heavy clay

		( $\geq 60$ % clay) or
		Organic soil (organic matter $\geq 30$ %) of at least 40 cm or
		Topsoil contains 30 % or more clay, and there are vertic properties within 100 cm of the soil surface
Shallow Rooting Depth	Depth (cm) from soil surface to coherent hard rock or hard pan	$\leq 30$ cm

CRITERION	DEFINITION	THRESHOLD
Poor Chemical Properties (*)	Presence of salts, exchangeable sodium, excessive acidity	Salinity: $\geq 4$ deci-Siemens per meter (dS/m) in topsoil or
		Sodicity: $\geq 6$ Exchangeable Sodium Percentage (ESP) in half or more (cumulatively) of the 100 cm soil surface layer or
		Soil Acidity: $\text{pH} \leq 5$ (in water) in topsoil
TERRAIN		
Steep Slope	Change of elevation with respect to planimetric distance (%)	$\geq 15$ %

## APPENDIX 4: ALLOCATION OF EAFRD FUNDS TO MEMBER STATES

Country	Code	Allocation (million Euro)
Austria	AT	3938
Belgium	BE	648
Bulgaria	BG	2367
Croatia	HR	2026
Cyprus	CY	132
Czech	CZ	2306
Denmark	DK	919
Estonia	EE	823
Finland	FL	2380
France	FR	11385
Germany	DE	9446
Greece	EL	4718
Hungary	HU	3431
Ireland	IE	2191
Italy	IT	10444
Latvia	LV	1076
Lithuania	LT	1613
Luxembourg	LU	101
Malta	MT	97
Netherlands	NL	765
Poland	PL	8698
Portugal	PT	4058
Romania	RO	8128
Slovakia	SK	1560
Slovenia	SI	838
Spain	ES	8297
Sweden	SE	1764
United Kingdom	UK	5200



## APPENDIX 5: AMOUNTS AND SUPPORT RATES

Article	Subject	Maximum amount in EUR or rate	
15(8)	Advisory services, farm management and farm relief services	1 500	Per advice
		200 000	Per three years for the training of advisors
16(2)	Information and promotion activities	70 %	Of the eligible costs of the action
16(4)	Quality schemes or agricultural products and foodstuffs	3 000	Per holding per year
17(3)	Investment in physical assets		Agricultural sector
		50 %	Of the amount of eligible investment in less developed regions and in all regions whose GDP per capita for the 2007 - 2013 period was less than 75 % of the average of the EU-25 for the reference period but whose GDP per capita is above 75 % of the GDP average of the EU-27.
		75 %	Of the amount of eligible investment in outermost regions
		75 %	Of the amount of eligible investment in Croatia for the implementation of Council Directive 91/676/EEC ( <sup>1</sup> ) within a maximum period of four years from the date of accession pursuant to Article 3(2) and Article 5(1) of that Directive
		75 %	Of the amount of eligible investment in the smaller Aegean islands
	40 %	Of the amount of eligible investment in other regions  The above rates may be increased by an additional 20 percentage points, provided that maximum combined support does not exceed 90 %, for:	

	<ul style="list-style-type: none"> <li>— Young farmers as defined in this Regulation, or who have already set up during the five years preceding the application for support;</li> <li>— Collective investments and integrated projects, including those linked to a merger of producer organisations;</li> <li>— Areas facing natural constraints and other specific as referred to in Article 32;</li> <li>— Operations supported in the framework of the EIP;</li> <li>— Investments linked to operations under Articles 28 and 29</li> </ul>
--	--

Article	Subject	amount in EUR or rate	
			Processing and marketing of products listed in Annex I to the TFEU
		50 %	Of the amount of eligible investment in less developed regions and in all regions whose GDP per capita for the 2007 - 2013 period was less than 75 % of the average of the EU-25 for the reference period but whose GDP per capita is above 75 % of the GDP average of the EU-27
		75 %	Of the amount of eligible investment in outermost regions
		75 %	Of the amount of eligible investment in the smaller Aegean islands
		40 %	Of the amount of eligible investment in other regions  The above rates may be increased by an additional 20 percentage points, provided that maximum combined support does not exceed 90 %, for operations supported in the framework of the EIP or those linked to a merger of producer organisations

17(4)	Investment in physical assets	100 %	Non-productive investments and agricultural and forestry infrastructure
18(5)	Restoring agricultural production potential damaged by natural disasters and introduction of appropriate prevention actions	80 %	Of the amount of eligible investment costs for prevention operations carried out by individual farmers.
		100 %	Of the amount of eligible investment costs for prevention operations carried out collectively by more than one beneficiary.
		100 %	Of the amount of eligible investment costs for operations to restore agricultural land and production potential damaged by natural disasters and catastrophic events.
19(6)	Farm and business development	70 000	Per young farmer under Article 19(1)(a)(i)
		70 000	Per beneficiary under Article 19(1)(a)(ii)
		15 000	Per small farm under Article 19(1)(a)(iii)
23(3)	Establishment of agroforestry systems	80 %	Of the amount of eligible investment for the establishment of agroforestry systems

Article	Subject	Maximum amount in EUR or rate	
26(4)	Investments in forestry technologies and in processing, in mobilising and in the marketing of forestry products	65 %	Of the amount of eligible investment in less developed regions
		75 %	Of the amount of eligible investment in outermost regions
		75 %	Of the amount of eligible investment in the smaller Aegean islands
		40 %	Of the amount of eligible investment in other regions
27(4)	Setting up of producer groups and organisations	10 %	As a percentage of marketed production during the first five years following recognition The support shall be degressive.
		100 000	Maximum amount per year in all cases.
28(8)	Agri-environment-climate	600 (*)	Per ha per year for annual crops
		900 (*)	Per ha per year for specialised perennial crops
		450 (*)	Per ha per year for other land uses
		200 (*)	Per livestock unit ("LU") per year for local breeds in danger of being lost to farmers
29(5)	Organic farming	600 (*)	Per ha per year for annual crops
		900 (*)	Per ha per year for specialised perennial crops
		450 (*)	Per ha per year for other land uses

30(7)	Natura 2000 and Water Framework Directive payments	500 (*)	Per ha per year maximum in the initial period not exceeding five years
		200 (*)	Per ha per year maximum
		50 (**)	Per ha per year minimum for Water Framework Directive payments
31(3)	Payments to areas facing natural or other specific constraints	25	Minimum per ha per year on average of the area of the beneficiary receiving support
		250 (*)	Maximum per ha per year
		450 (*)	Maximum per ha per year in mountain areas as defined in Article 32(2)
33(3)	Animal welfare	500	Per LU

Article	Subject	Maximum amount in EUR or rate	
34(3)	Forest-environmental and climate services and forest conservation	200 (*)	Per ha per year
37(5)	Crop, animal and plant insurance	65 %	Of the insurance premium due
38(5)	Mutual funds for adverse climatic events, animal and plant diseases, pest infestations and environmental incidents	65 %	Of the eligible costs.
39(5)	Income stabilisation tool	65 %	Of the eligible costs

## APPENDIX 6: IACS LAND USE CODES ALLOWED FOR LFASS SCOTLAND

Mixed brassica for stock feeds	MBSF
Kale and cabbages for stock feed	OCS-K
Fodder beet	OCS-B
Permanent grassland	PGRS
Ripe for stock feed	RAST
Rough grazing	RGR
Rotational grass year 1	TGRS1
Rotational grass year 2	TGRS2
Rotational grass year 3	TGRS3
Rotational grass year 4	TGRS4
Rotational grass year 5	TGRS5
Turnips for stock feed	TSF
Swedes for stock feed	SSF
Open woodland (grazed)	WDG
Arable silage for stock feed (includes recognized seed mixtures of cereals, peas, beans, and/or grass or ensiled cereal crops under-sown with grass for future grazing/cutting but excludes ensiled stands of whole crops which can be claimed for the Basic Payment Scheme under the WCC code)	ASSF

## APPENDIX 7: GRAZING CATEGORY FOR LFASS SCOTLAND

<b>Grazing Category</b>	<b>Minimum Stocking Density Limit</b>
A	0.09 livestock units/hectare
B	0.15 livestock units/hectare
C	0.30 livestock units/hectare
D	0.45 livestock units/hectare

## APPENDIX 8: HOLDING CLASSIFICATION FOR LFASS SCOTLAND

Grazing category	Standard area	Fragile mainland-area of disadvantage	Very fragile island areas
	Rate per adjusted hectare (£)	Rate per adjusted hectare (£)	Rate per adjusted hectare (£)
More disadvantaged land (categories A and B)	52.16	62.10	71.35
Less disadvantaged land (categories C and D)	34.12	54.51	63.00



## APPENDIX 9: Normality Test of Indicators for the LFA Type H

Details below are as gotten from Statistical Analysis using Kolmogorov-Smirnov's Goodness of Fit test for Normality.

Note: Current C-D C Ratio stands for Current Cash-Debt Coverage Ratio

For 2007

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	0.038	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2008

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2009

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2010

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2011

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2012

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	0.019	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

## APPENDIX 10: Normality Test of Indicators for the LFA Type N

Details below are as gotten from Statistical Analysis using Kolmogorov-Smirnov's Goodness of Fit test for Normality

Note: Current C-D C Ratio stands for Current Cash-Debt Coverage Ratio

For 2007

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2008

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2009

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2010

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2011

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2012

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

## APPENDIX 11: Normality Test of Indicators for the LFA Type O

Details below are as gotten from Statistical Analysis using Kolmogorov-Smirnov's Goodness of Fit test for Normality

Note: Current C-D C Ratio stands for Current Cash-Debt Coverage Ratio

For 2007

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2008

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2009

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2010

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2011

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2012

Alpha value ( $\alpha$ ): 0.05



When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

## APPENDIX 12: Normality Test of Indicators for the LFA Type S

Details below are as gotten from Statistical Analysis using Kolmogorov-Smirnov's Goodness of Fit test for Normality

Note: Current C-D C Ratio stands for Current Cash-Debt Coverage Ratio

For 2007

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	0.088	Normally Distributed
7	Expensiveness	0.014	Not Normally Distributed

For 2008

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2009

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2010

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

For 2011

Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	<0.010	Not Normally Distributed

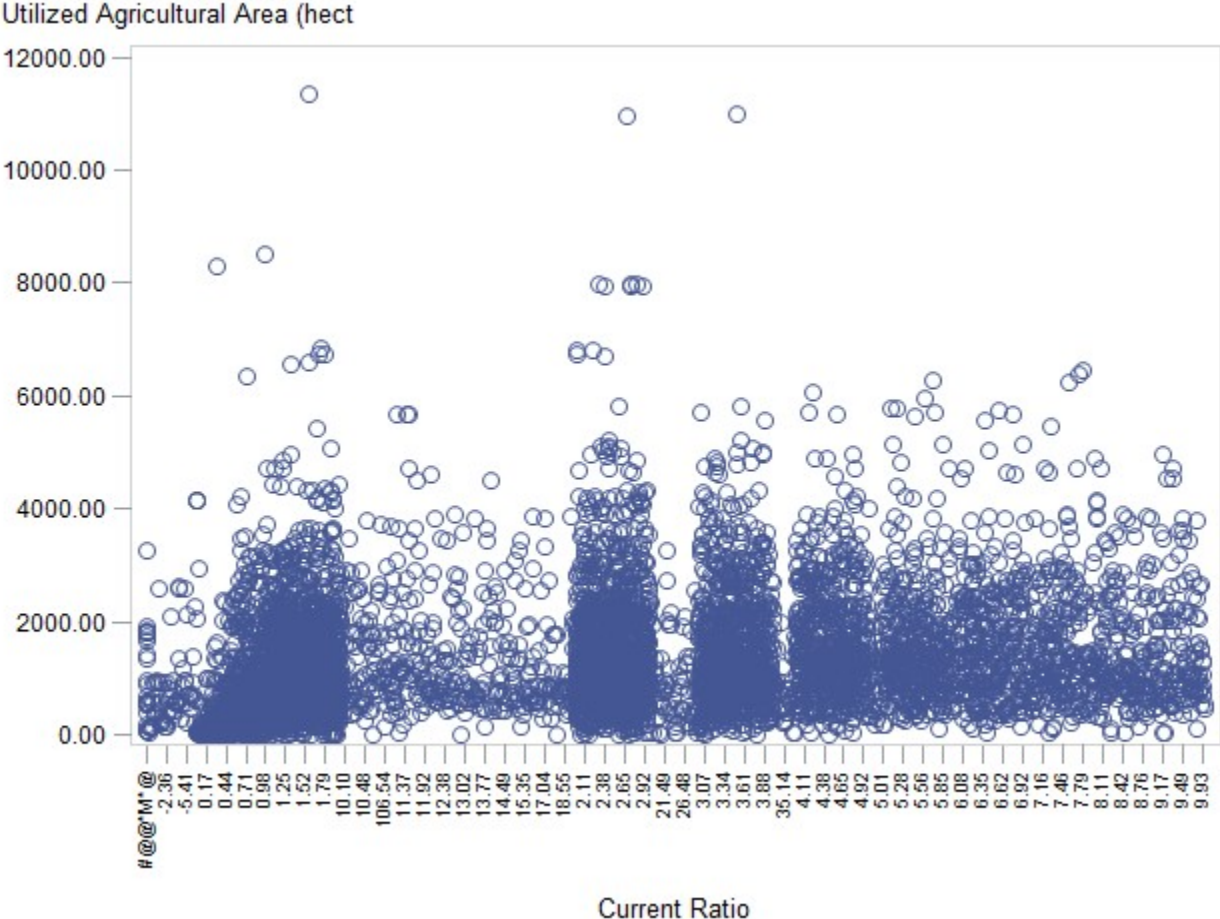
For 2012

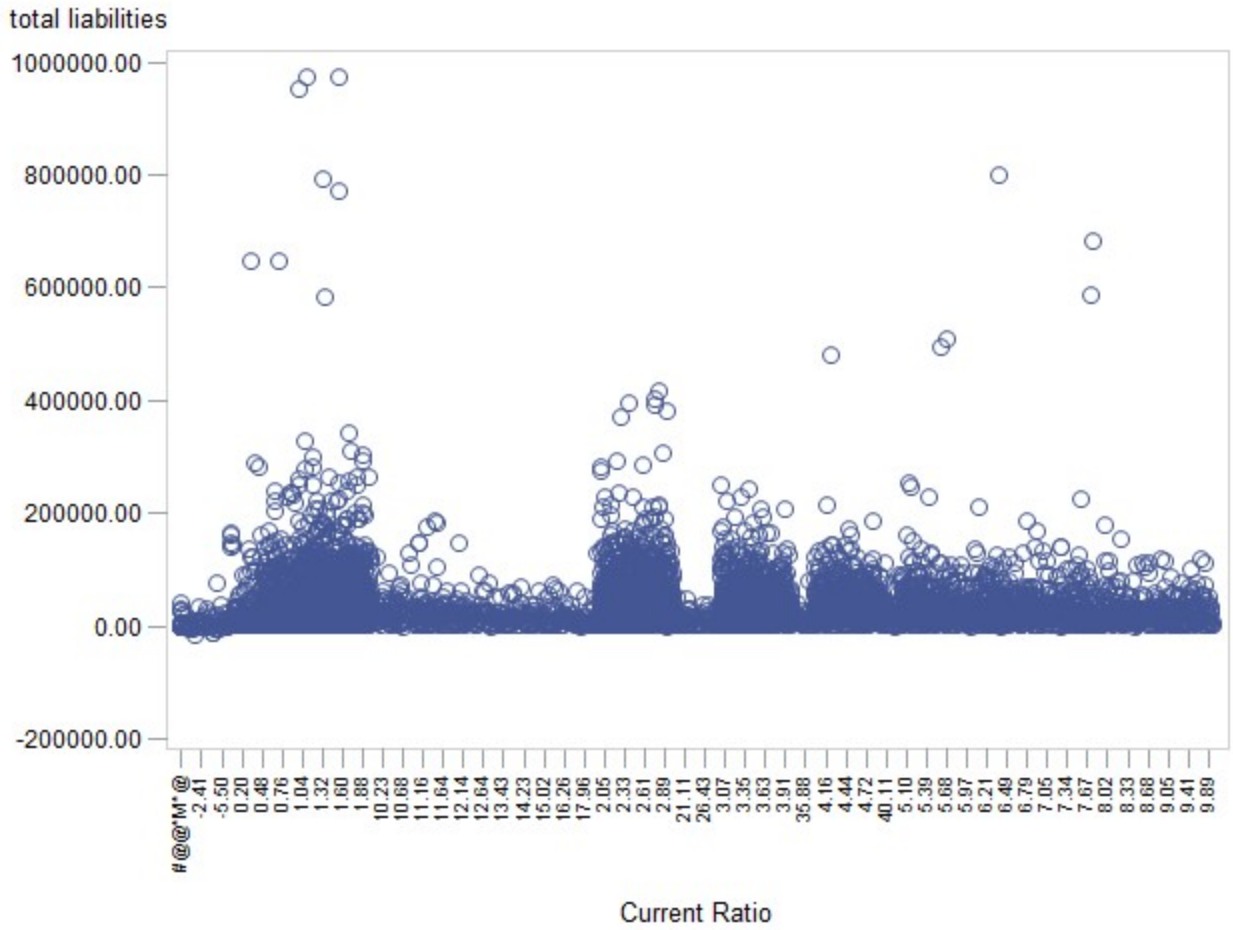
Alpha value ( $\alpha$ ): 0.05

When p-value is less than alpha; the distribution is not normal

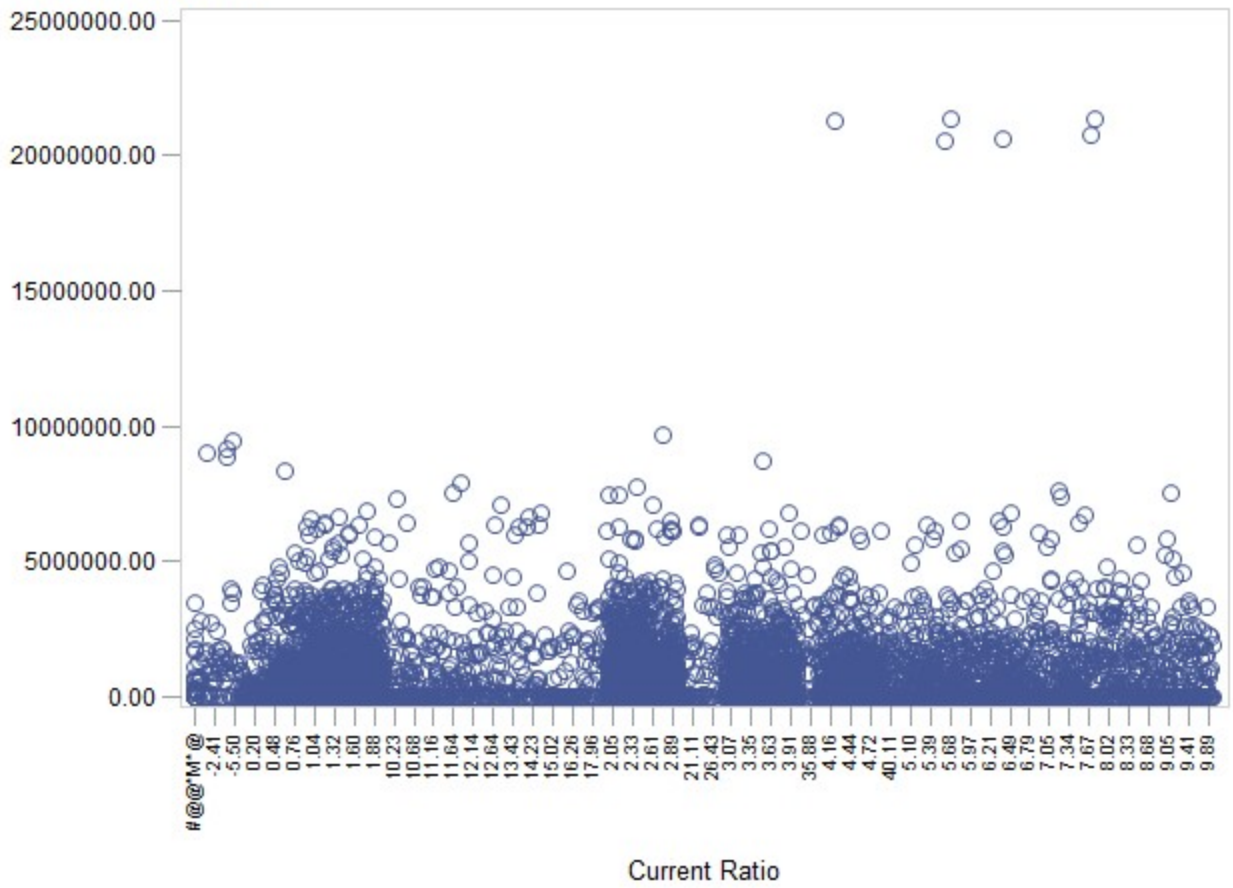
<b>S/N</b>	<b>Indicator</b>	<b>P-value</b>	<b>Inference</b>
1	Current Ratio	<0.010	Not Normally Distributed
2	Quick Ratio	<0.010	Not Normally Distributed
3	Gross Profit Ratio	<0.010	Not Normally Distributed
4	Current C-D C Ratio	<0.010	Not Normally Distributed
5	Operating ROA	<0.010	Not Normally Distributed
6	Debt Ratio	<0.010	Not Normally Distributed
7	Expensiveness	0.110	Normally Distributed

**APPENDIX 13: SCATTER PLOTS FOR CURRENT RATIO WITH OTHER VARIABLES**





LFA payments (CZK)



Administrative and other costs

