

An Empirical Analysis Of The Impact Of Aid On Poverty in Selected Southern Africa Development Community (SADC) Countries: 2009-2013.

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Abstract: *The empirical studies on the effects of aid on poverty in developing countries has reached varying conclusions. The majority of the studies used panels of countries in Africa, Asia, Latin America and Sub-Saharan Africa. This study used a panel data analysis from thirteen Southern Africa Development Community (SADC) countries for the period 2009-2013. The study utilised the Fixed Effects or Least-Squares dummy variable regression models (LSDV), to find the impact of aid on poverty. By pooling the data from all the thirteen SADC countries, aid is found to have an adversely poverty related effect. The LSDV regression model was employed to find whether aid affect poverty differently in the included countries and the effect of time periods. The results were tested using the F-test and shows that the impact of aid is significantly different across the SADC countries. The effect of aid on poverty was found to be time invariant.*

Key words: *Aid, Poverty, Panel data, fixed effects, SADC*

I. Introduction

The component of main objectives of SADC formation is to promote sustainable and equitable economic growth and socio-economic development that will ensure poverty alleviation to enhance the standard and quality of life of the people of Southern Africa, SADC Regional Indicative Development Plan (2003). Due to debt positions of many SADC countries, access to external sources of funds, other than official sources on highly concessional terms, remains limited. As a result they remain highly dependent on Official Development Assistant (ODA) and aid for this purpose. Despite the continued influx of ODA and aid, population in the SADC region lives below the international poverty line of US\$2 per day, SADC Regional Indicative Development Plan (1999). This is a marvel given that overall donor financial assistance is targeted far more effectively at poverty reduction than it was in the past as stressed by Goldin et al (2002). Therefore this study seeks to find the impact of aid on poverty in SADC for the period 2009-2013. This period is important given that it is after the Paris Declaration on Aid Effectiveness of 2005 and the subsequent Windhoek Declaration of 2006 which were both premised on models to make aid effective in SADC countries but details of the Paris and Windhoek declarations shall not be covered in this study. However, the study used data from thirteen SADC countries (Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Seychelles, South Africa, Swaziland, Tanzania and Zambia) excluding Namibia and Zimbabwe because of some missing data for these countries. There are numerous studies that were conducted in different settings on the impact of aid on poverty that reached various conclusions. Some of the studies concentrated on panel data from Asian, Latin American, African, and Sub-Saharan Africa (SSA) states whilst some combined the data from the Least Developed Countries. The studies used different proxies for poverty. However, they find mixed results. There is a shortage of studies on impact of aid on poverty in Africa's regional groupings individually. This study is using data from SADC countries as a way of bridging this gap in literature. The work uses income per capita (proxy for poverty) as a dependant variable. Of the studies that examined the impact of aid on poverty, there is a shortage of studies that have tried to consider the unique characteristics of the countries involved for the analysis. Therefore, the aim of this study is to two fold. It intends to find the impact of aid on poverty and establish whether individuality and time effects are important among the SADC countries. In this study aid is used to refer to net ODA and aid.

History of SADC

The Southern African Development Co-ordinating Conference (SADCC) was established in 1980, by the so-called front line states with the specific aim of reducing economic dependence on apartheid South Africa, which was still excluded from the African integration plan. SADCC was not a market integration arrangement; the front line states constituting the arrangement adopted a broad development mandate. In the 1990s, the membership of the organization increased with the accession of Namibia in 1990. In anticipation of South Africa's democratic transition in the early 1990s, SADCC transformed from the loose association of a coordination conference into SADC, a formal treaty-based organization in 1992 and South Africa joined SADC

in 1994, Mauritius in 1995, and Seychelles and the Democratic Republic of Congo (DRC) in 1997. Madagascar joined SADC in 2005 to make the current membership of SADC fifteen states. Seychelles, a member from 1997–2004, re-joined the group in August 2008. Advancing Regional Integration in Southern Africa Report (2014) and Burgess (2009). The study is going to consider the period 2009-2013 when the current membership has been in full operation.

Table 1. Aidflows to SADC in 1000 US dollars

Country	2009	2010	2011	2012	2013
Angola	1238 710	238230	194250	242350	287610
Botswana	279 160	156 140	120 150	73 860	108 380
CDR	2 356 850	3 486 160	5 534 410	2 859 380	2 572 220
Lesotho	122 390	256 230	264 840	570 970	534 220
Madagascar	443 960	410 080	443 270	378 690	449 760
Malawi	771 390	1022 850	799 640	1 174 602	1 125 880
Mauritius	154 970	125 270	185 330	177 890	148 320
Mozambique	2 012 407	1 951 530	2 084 980	2 096 820	2 314 140
Seychelles	22 760	56 040	22 100	35 580	25 400
South Africa	1 074 540	1 030 540	1 403 150	1 067 150	1 292 950
Swaziland	56 030	91 450	124 900	88 150	115 930
Tanzania	2 933 140	2 958 180	2 445 770	2831 890	3 430 280
Zambia	1267 060	914 370	1035 060	957 720	1 142 420
Total	30 933 367	12 690 070	14 657 850	12 555 052	24 447 510

Source: World Bank development indicators database and author's calculations

Table 1 above shows that total net ODA and aid flows to the thirteen SADC countries was high in 2009, falls sharply in 2010, picked up in 2011 then falls again in 2012 and rose sharply in 2013.

Table 2 below show highlights of poverty indicators in the thirteen SADC countries. The table shows that average income per capita was increasing over the period 2009 to 2013. Infant mortality ratio was falling showing improvement in infant healthy. Average life expectancy was slowly improving with time.

Table 2. Poverty indicators in selected SADC countries.

Year	Average Life expectancy	Average mortality 100 000	Maternal ratio per	Infant mortality ratio Below 5 years per 100 000	Average income per capita
2009	55	407		56	2950.2
2010	55	394		54	2 616.7
2011	56	419		52	3 614.5
2012	57	392		50	3 845.3
2013	57	396		48	4 036.7

Source: World Bank development indicators database and author's calculations

All the calculations omitted data for Zimbabwe and Namibia. Maternal mortality ratio average also excluded data for Seychelles which is missing.

Objectives of the study

The study seeks to answer the following questions:

1. What is the impact of aid on poverty in SADC countries?
2. Does the impact of aid on poverty in SADC differs with country characteristics?
3. What is the effect of time factor in the way in which aid affect poverty?

II. Theoretical literature

The theoretical framework is acknowledged from the issue of aid as a source of development finance. According to Williamson (2009), two competing theories (the public interest theory and the public choice theory) have emerged. The public interest theory argues that foreign aid is necessary to fill a financing or investment gap, and this will in turn lift countries out of a so-called poverty trap. This remains the core argument for the use of aid. A contrasting theory, a public choice perspective, contends that aid is ineffective and possibly damaging to receiving countries. Public choice model applied to aid is that those involved in the process may fail to facilitate coordination and cooperation that is necessary to achieve development. Instead, these various groups may actually contribute to the persistence of low growth as they pursue their own narrow interests.

2.1 Aid and poverty

Gillanders (2010) analysed the impact of aid on development using a panel of sub-Saharan countries and finds that the results for human development were generally ambiguous but suggest that aid may induce small increases in the variable used as a proxy for human development, the growth rate of life expectancy at birth. The increase was larger and unambiguous in democracies and in good institutional environments. Aid dependent countries see positive responses while the rest show a negative impact.

McGillivray (2005) surveys empirical literature on the macro level effectiveness of aid, paying special attention to empirical studies of these inflows and economic growth. The survey finds overwhelming evidence that aid increases growth and other poverty-relevant variables. By implication, therefore, it can be inferred that poverty would be higher in the absence of aid. Given that the majority of the literature finds that aid is effective in promoting growth, and by implication in reducing poverty. This result holds on average for all countries poverty is undoubtedly higher in sub-Saharan Africa and the Pacific as a result of the declines in aid to these regions during the 1990s. The finding of this study suggests that poverty would be higher in the absence of aid.

Abdullahi and Muoghalu (2006) examined trends and magnitude of poverty in Africa and the impact of foreign aid assistance on the poverty level and made the following conclusion "Poverty is a mass phenomenon in Africa where majority of the poor live. About half of the population in Sub-Saharan Africa lives in poverty and this has continued to worsen. Whichever way poverty is defined, whether in purely monetary terms or using sustainable human development paradigm, poverty is increasing in Africa. Poverty level has continued to increase amidst economic growth." The conclusion of this study is that that aid is not assisting in reducing poverty in Africa.

Ijaiya and Ijaiya (2004) as cited in Abdullahi and Muoghalu (2006) conducted an empirical study on the impact of foreign aid on poverty reduction in Sub-Saharan Africa (SSA) and find no significant relationship between the aid assistance and poverty reduction. Abdullahi and Muoghalu remarked that the inconclusive relationship between aid and poverty or economic growth appears to be global, and not unique to Africa or the SSA."

In a unique analysis, Williamson (2009) used a sample of studies to explain why aid fails to produce the desired outcomes in least developing countries. The study was done by compiling empirical literature that only show that aid is ineffective. By doing that, the conclusion that aid is not effective in producing the desired outcomes was reached. However, Abuzeid (2009) used a sample of studies to show that aid is effective in reducing poverty. Also, the study was done by setting together the empirical literature that show that aid is effective in reducing poverty and likewise, the opposite conclusion that aid is effective was reached. Their explanations avails conflicting results concerning the impact of aid on poverty.

Andrews (2009) analysed (based on available literature) if there is a correlation between aid and development in African countries and concluded an ambiguous nature of empirical literature on aid effectiveness. The paper adds that there is no a firm evidence that aid has led to development or underdevelopment in Africa.

Ekanayake and Dasha (2008) used a panel of 83 countries from Africa, Asia and Latin-America to find the impact of aid on growth. The panel used data from 1980-2007. The major point emerging from this work is that foreign aid has a mixed impact on economic growth of developing countries. When the model was estimated for different regions, foreign aid variable has a negative sign in three out of four cases, indicating that foreign aid appears to have an adverse effect on economic growth in developing countries. However, this variable is positive for African region indicating that foreign aid has a positive effect on economic growth in African countries. When the model was estimated for different income levels, foreign aid variable has a positive sign in three out of four cases, indicating that foreign aid appears to have a positive effect on economic growth in developing countries.

In a related study, Moreira (2005) used cross country data of 48 developing countries covering the period 1970 to 1998 to examine the impact of foreign aid to growth and finds that foreign aid contributes to economic growth. Therefore, by implication aid causes development.

III. Methodology

This research uses fixed effects approach and three models are going to be estimated. The first model is estimated using Ordinary Least Squares (OLS) by making an assumption that there are no differences in country characteristics and time effects (this assumption makes it a restricted model). Hence aid is assumed to affect the poverty level equally in all the countries and across the different time dimensions. The model is estimated by pooling the data from all the thirteen countries and run using OLS. The model is specified as follows.

$$PC_{it} = \beta_1 + \beta_2 AID_{it} + \beta_3 ED_{it} + \beta_4 E_{it} + PR_{it} + IM_{it} + \varepsilon_{it}$$

Where,

$i = 1, 2, 3, \dots, 13$

$t = 1, 2, 3, 4, 5$

PC is income per-capita
 AID is net official development assistance and aid
 ED is central government total external debt
 E is the ratio of exports to GDP
 PR is personal remittances
 IM is the ratio of imports to GDP
 ε_{it} is the error term

The second model is the Least Squares Dummy variable (LSDV) regression model. This model assumes that the slope coefficients are the same over time but the intercepts vary across the countries. The differential intercept dummies are used to provide for country differences. This is done by assigning each country a dummy variable, however one country is left without a dummy. This is done to avoid errors in estimation Gujarati (2004). Angola is selected to be a benchmark country. There is no special characteristic for Angola to be selected as a benchmark. Each country can be used in turn to be a benchmark however that is not done in this study. The second model is given as:

$$PC_{ij} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \alpha_7 D_{7i} + \alpha_8 D_{8i} + \alpha_9 D_{9i} + \alpha_{10} D_{10i} + \alpha_{11} D_{11i} + \alpha_{12} D_{12i} + \beta_2 AID_{it} + \beta_3 ED_{it} + \beta_4 E_{it} + PR_{it} + IM_{it} + \varepsilon_{it}$$

Where, the D_i 's are the differential intercepts to provide for country differences.

D_{2i} = 1 if the data belong to Botswana

D_{2i} = 0 otherwise

D_{3i} = 1 if the data belongs to DRC

= 0 otherwise

D_{4i} = 1 if the data belongs to Lesotho

= 0 otherwise

D_{5i} = 1 if the data belongs to Madagascar

= 0 otherwise

D_{6i} = 1 if the data belongs to Mauritius

= 0 otherwise

D_{7i} = 1 if the data belongs to Malawi

= 0 otherwise

D_{8i} = 1 if the data belongs to Mozambique

= 0 otherwise

D_{9i} = 1 if the data belongs to Seychelles

= 0 otherwise

D_{10i} = 1 if the data belongs to Swaziland

= 0 otherwise

D_{11i} = 1 if the data belongs to Tanzania

= 0 otherwise

D_{12i} = 1 if the data belongs to Zambia

= 0 otherwise

D_{13i} = 1 if the data belongs to Tanzania

= 0 otherwise

After this unrestricted regression model is run the restricted F test is conducted to compare it to the restricted model.

The final model is going to consider the time effects by introducing one dummy for each year from 2009 to 2012. The year 2013 is the benchmark year and is not given a dummy to avoid errors in estimation, Gujarati (2004). The effect of aid on poverty may be affected by time variable and so may differ across the years. This may be due to changes in factors that affect the ways in which the aid is used by the recipient countries such as corruption. The model is estimated as

$$PC_{ij} = \gamma_0 + \gamma_1 D_9 + \gamma_2 D_{10} + \gamma_3 D_{11} + \gamma_4 D_{12} + \beta_2 AID_{it} + \beta_3 ED_{it} + \beta_4 E_{it} + PR_{it} + IM_{it} + \varepsilon_{it}$$

Where

D_9 = 1 when in 2009

= 0 otherwise

D_{10} = 1 when in 2010

= 0 otherwise

D11= 1 when in 2011

= 0 otherwise

D12= 1 when in 2012

= 0 otherwise

The year 2013 is used as a bench mark year

Description of variables

Income per capita

Income per capita is gross national income divided by midyear population. This variable is used as a dependant variable, a proxy for poverty. When there income per capita increases it show that poverty level is reduced and low values of income per capita show that the poverty level is increasing.

Aid

In this study aid refers to net official development assistance and net official aid. Net official development assistance (ODA) consists of disbursements of loans made on concessional terms and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. Net official aid refers to aid flows (net of repayments) from official donors to countries and territories of the DAC list of recipients. Official aid is provided under terms and conditions similar to those for ODA. The apriori sign of aid is positive.

Central government external debt stocks

External debt is debt owed to non-residents repayable in currency, goods or services. Total external debt is the sum of public, publicly guaranteed and private non-guaranteed long term debt, use of IMF credit and short term debt. This is expected to have a negative effect on the measure of poverty.

Exports

Exports of goods and services represents the value of all goods and other services provided to the rest of the world. This is expected to have a positive impact to the measure of poverty.

Personal remittances

Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. This variable is expected to have a positive impact to development.

Imports

Imports of goods and services represents the value of all the goods and other market services received from the rest of the world. This is expected to have a negatively related to per capita income.

3.1 Data

The data used in this research is obtained from the World Bank development indicators. However, there was missing data for Namibia and Zimbabwe for some variable and this rendered the two countries dropped from the analysis. The data for other poverty variables such as the rural poverty gap is missing. The missing of data for some variables becomes a limiting factor. Befitting proxy for poverty however was used.

IV. Results and discussions

The table 3 below shows the summary of results of the pooled regression model.

Table 3. Pooled regression results

Variable	Coefficient	t-value	Probability
Aid	-5.15	-2.33	0.0233
External debt (ED)	7.59	3.90	0.0003
Exports/GDP	126.05	4.83	0.0000
Personal remittances	-3.62	-1.76	0.0840
Imports/GDP	2.65	0.133	0.8944

$$R^2 = 0.70$$

The fitted model of the pooled regression is $PC = -1738.45 - 5.15AID + 7.59ED + 126.05E - 3.62PR + 2.65IM$

The pooled regression model shows that aid has a substantial negative poverty related impact and is significant at 5% level. The coefficient of -5.15 implies that the effect of one thousand dollar increase in aid increases poverty by about 5%. This relationship may be due to misappropriation of aid resources such that the aid will no longer serve its intended use. The results are in line with what other researchers find. For example, Abdullahi and Muoghali (2006) find that aid is not assisting in reducing poverty in Africa. The results also support the public choice theory which contends that aid is ineffective in reducing poverty in recipient countries. External debt has a positive effect on poverty and is statistically significant at 1% level. The result means that a one thousand dollar increase in external debt will reduce poverty by 7.6%. Exports have a positive effect on poverty at 1% level of significance. The coefficient means that increasing the proportion of exports to GDP will reduce the poverty. Personal remittances were found to affect poverty negatively at 10% level of significance. This result is not supported by theory. Imports were found to be having a positive impact but insignificant in affecting poverty.

4.1 Results of the F-test of the Least squares dummy variable regression model.

The second model, the Least squares dummy variable regression model was run (See result 2 and 4 in Appendix). The restricted F test was done to find the correct model. The null hypothesis tested is that the dummy variables are simultaneously zeros. The alternative hypothesis is that at least one dummy variable differs from zero. If the null hypothesis is not rejected, it means that the country differences are not important in determining the impact of poverty in SADC. The test results show that the null hypothesis is rejected at 5% level of significance and the conclusion is that there is enough statistical evidence to suggest that at least one dummy variable differs from zero. Therefore it is concluded that country differences are important in determining the impact of aid on poverty in the SADC countries.

4.2. The results of time effects

The third model to consider the effect of time was run (See result 3 in appendix) and the restricted F test was conducted (See result 5). The null hypothesis tested is that the dummy variables to cater for time periods are simultaneously zero. The results show that the null hypothesis is not rejected at 5% significant level because there is not enough evidence to suggest that one of the dummy variable differs from zero. This result is also supported by a small increase in the R^2 in the third model. R^2 of the restricted model is 0.70 while R^2 of the unrestricted third model is 0.71. The conclusion is that the time effect is not important in affecting the impact of aid on poverty in SADC countries.

V. Recommendations and conclusion

The recommendations are that the SADC countries should make a concerted effort to make aid effective to reduce poverty. The countries may also aim to stimulate domestic production through other means so as to increase the exports since the share of exports to GDP have a positively significant impact on poverty. The governments of SADC countries should also try to service the debt so that they would be able to receive debt in future. The researcher concludes that the further research is needed especially to find the impact of aid on other poverty measures which are not income per capita.

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Appendix

Result 1:Pooled data regression results

Dependent Variable: PC

Method: Least Squares

Date: 12/20/15 Time: 13:47

Sample (adjusted): 1 64

Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AID	-5.15E-07	2.21E-07	-2.330751	0.0233
ED	7.59E-08	1.95E-08	3.897884	0.0003
E	126.0522	26.10990	4.827754	0.0000
PR	-3.62E-06	2.06E-06	-1.758001	0.0840
IM	2.654985	19.91637	0.133307	0.8944
C	-1738.448	1010.920	-1.719668	0.0908
R-squared	0.704642	Mean dependent var		3638.519
Adjusted R-squared	0.679180	S.D. dependent var		3850.554
S.E. of regression	2180.990	Akaike info criterion		18.30201
Sum squared resid	2.76E+08	Schwarz criterion		18.50440
Log likelihood	-579.6642	Hannan-Quinn criter.		18.38174
F-statistic	27.67438	Durbin-Watson stat		0.780211
Prob(F-statistic)	0.000000			

Result 2: Least Squares dummy variable regression model

Dependent Variable: PC

Method: Panel Least Squares

Date: 12/20/15 Time: 13:23

Sample: 2009 2013

Periods included: 5

Cross-sections included: 13

Total panel (balanced) observations: 65

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AID	-6.16E-08	1.18E-07	-0.523083	0.6034
ED	4.68E-08	1.45E-08	3.238890	0.0022
E	63.95230	20.02348	3.193866	0.0025
PR	-2.11E-07	1.38E-06	-0.153249	0.8789
IM	-34.00536	16.61522	-2.046639	0.0463
D2	4780.011	559.7236	8.539949	0.0000
D3	-1394.884	603.1941	-2.312496	0.0252
D4	1115.846	1353.610	0.824348	0.4139
D5	-488.8969	857.8920	-0.569882	0.5715
D6	-863.4084	625.7513	-1.379795	0.1742
D7	6280.428	589.6330	10.65142	0.0000
D8	-34.39296	821.2298	-0.041880	0.9668
D9	5970.669	1460.923	4.086916	0.0002
D10	9765.675	1083.260	9.015082	0.0000
D11	306.8476	2005.397	0.153011	0.8790
D12	1177.411	617.6411	1.906303	0.0627
D13	-409.1814	714.3419	-0.572809	0.5695
C	733.2616	830.4417	0.882978	0.3817
R-squared	0.967462	Mean dependent var		3609.606
Adjusted R-squared	0.955693	S.D. dependent var		3827.457
S.E. of regression	805.6518	Akaike info criterion		16.45079
Sum squared resid	30506513	Schwarz criterion		17.05292

Log likelihood	-516.6506	Hannan-Quinn criter.	16.68837
F-statistic	82.20363	Durbin-Watson stat	1.038065
Prob(F-statistic)	0.000000		

Result 3: The model with time effects.

Dependent Variable: PC

Method: Panel Least Squares

Date: 12/20/15 Time: 14:52

Sample: 2009 2013

Periods included: 5

Cross-sections included: 13

Total panel (unbalanced) observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AID	-5.82E-07	2.35E-07	-2.480458	0.0163
ED	7.74E-08	2.03E-08	3.810987	0.0004
E	121.3729	27.41730	4.426873	0.0000
PR	-3.92E-06	2.15E-06	-1.822247	0.0740
IM	3.980021	20.63135	0.192911	0.8478
D9	-850.9611	893.5634	-0.952323	0.3452
D10	-693.6484	893.9370	-0.775948	0.4412
D11	193.9714	923.7377	0.209985	0.8345
D12	-377.8077	889.3191	-0.424828	0.6727
C	-1154.662	1190.863	-0.969601	0.3366

R-squared	0.714936	Mean dependent var	3638.519
Adjusted R-squared	0.667425	S.D. dependent var	3850.554
S.E. of regression	2220.586	Akaike info criterion	18.39153
Sum squared resid	2.66E+08	Schwarz criterion	18.72886
Log likelihood	-578.5290	Hannan-Quinn criter.	18.52442
F-statistic	15.04791	Durbin-Watson stat	0.398199

Result 4. F-test of the second model

$$H_0: D_2 = D_3 = D_4 = \dots = D_{13} = 0$$

H_1 : At least one of the dummy variable differs from zero.

$$F = [(R^2_{UR} - R^2_R)/m] / [(1 - R^2_{UR}) / (n - k)] = [(0.9674 - 0.7046) / 12] / [1 - 0.9674 / 47] = 31.57$$

$$F_{0.05, 12, 47} = 2.00$$

Where

UR means un-restricted

R means restricted

n is the total number of observations

k is the total number of parameters in the un-restricted model

Result 5. F-test of the third model

$$H_0: D_9 = D_{10} = D_{11} = D_{12} = D_{13} = 0$$

H_1 : At least one the dummy variables differs from zero.

$$F = [(R^2_{UR} - R^2_R)/m] / [(1 - R^2_{UR}) / (n - k)] = [(0.7149 - 0.7046) / 4] / [1 - 0.7149 / 55] = 0.497$$

$$F_{0.05, 4, 55} = 2.61$$

The decision is that we do not reject the null hypothesis at 5% significant level.