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Effect Of Government Social Expenditure On Economic Growth In Nigeria (1981-2016)

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Abstract: ***The study examined effect of government social expenditure on economic growth in Nigeria from 1981 to 2016. The study used three explanatory variables (education expenditure, health expenditure and community and social services expenditure) and one explained variable (agriculture output). Test carried out include unit root test, co-integration test, causality test and ordinary least square. The study revealed that: There is positive significant relationship between health expenditure and agriculture output in Nigeria, there is negative and insignificant relationship between education expenditure and agriculture output in Nigeria, there is positive and significant relationship between community and social services expenditure and agriculture output in Nigeria. Based on the findings, the study recommends that, all tiers of government should implement policies that will aid improve on our health facilities. Government should also improve on community and social services; that, expenditure on community and social services will not reduce our income; rather it will assist in channeling youths to engage in productive activities which will lead to economic growth. Finally, federal government should put more effort to relate with the principal officers in the educational institutions so as to improve on our agriculture produce.***

Keywords: ***Agriculture output, education expenditure, health expenditure and community and social services expenditure.***

I. INTRODUCTION

Provision of social facilities for the satisfaction of citizenry and attainment of desire economic growth and development has always been the main objectives of the government of any nation. It is expected that if the available resources are fairly distributed to key sectors, it could lead to economic growth and development. Social community services, health and education are part of such social facilities and could play a vital role on a path to sustainable economic growth. Education and health are crucial in human and economic development as these vital sectors could support the production and as well motivate the highly needed manpower which could aids the country's economic growth and development (Nwodo and Ukaegbu 2017). Provision of social goods and services is an active instrument for government in controlling the direction of the economy. Okoro (2013) defines it as those social goods and services provided through the public sector. Udoffia and Godson (2016) described it as those expenses incurred by the government in the provision of social goods and services.

Nigeria is still ranked as one of the poorest in the world and presently in a midst of economic recession. A recent report from the National Bureau of Statistics shows that Nigeria relative poverty measurement stood at 69%. This created an avenue for various scholars to verify opposing theoretical views.

II. LITERATURE REVIEW

Over the years, provision of social facilities has been on a fluctuating rate in Nigeria, this may be due to lack of

consensus as to the impact of provision of social facilities on the growth of the nation's economy.

Some scholars have argued that increasing government expenditure on provision of social facilities is a vital instrument to stimulate aggregate demand in an economy and can bring about crowed-in effects on private sector. High levels of government spending on social facilities can lead to creation of employment, productivity and investment via multiplier effects on aggregate demand (Nkiru and Daniel 2013). Economic growth and development are the key objectives of government, and the expenditure on social and community services are the root to achieving such objectives (Mutiu and Olusijibomi 2013).

On the contrary, Ram, (1986) asserted that government expenditure on such services likely reduce economic growth. Government activities are carried out inefficiently and excessive burdens are placed on the government which automatically reduces the productivity of the system (Marta, Santiago, and Daniela 2017).

In Nigeria, whether to spend on social and community services still remains a debate as the effort put in by previous and present administrations have not yielded positive evidence, the nation's economy is in recession, rated high in poverty, high level of unemployment and unfavorable exchange rate situation. The problem could be due to inadequate mix in the spending and need verification.

The study stands to provide answers to the above conflicts and also to know the relative impact of public social expenditure on economic growth in Nigeria.

There is no theoretically consensus on the impact of public social expenditure and economic growth. In the Keynesian theory, increasing government expenditure on social and community services leads to higher economic growth. Contrary to this view, is the Neo-classical theory; which is of the view that government expenditure on social and community services does not have any effect on the growth of the national output.

Several authors have examined the impact of public social expenditure and economic growth.

Marta, Santiago and Daniela (2017) used panel technique to analyze the relationship between government expenditure and economic growth in EU countries from 1994 to 2012. Employing government expenditure, gross domestic product per capita and gross domestic product, the result revealed a negative relationship between government expenditure and economic growth. Francesco and Cosimo (2016) examined the government size and economic growth in Italy, using Auto Regressive Integrated Moving Average and descriptive Statistics for measuring economic growth rate, public expenditure, public revenue, primary budget, public debt and fluctuating debt between 1861 and 2008. The results show a non linear relationship between the size of public sector and economic growth. Jolanta (2012) Regressed public expenditure on capital formation and productivity growth in Lithuania, using government expenditure and gross fixed capital formation in the study from 2000 to 2010. The result shows a negative relationship between government expenditure and gross fixed capital formation. Emmanuel, Pius and Greenwell (2013) examined the impact of government expenditure on economic growth in Malawi from 1980 to 2007 using agriculture, education, health, social protection, transport and economic growth. The results from error correction mechanism revealed no significant relation among the variables on the short run. Defense and agriculture was positive but education, health, social protection and transport was negative on the long run. Fageer, Tongsheng and Rehmat (2015) used Granger causality test to examine the impact of public expenditure on economic growth in Pakistan between 1972 and 2013, using government expenditure, national income. From the result no long run relationship between public expenditure and the national income was found. In the same vein, Odo, Igberi, Udude and Chukwu (2016) used Granger causality test to examine public expenditure and economic growth in South Africa between 1980 and 2014, using government expenditure, real gross domestic product, total revenue and inflation rate. The results show a negative insignificant relationship between total government expenditure and all economic indicators used in the study. Bol and Willy (2016) using public expenditure, infrastructure, production, social services and security as variables to know the relationship between public expenditure and economic growth in South Sudan from 2006 to 2014 with Random effect model. Government expenditure on social services sector was found to be negative with economic growth.

Victor (2015) examined education expenditure and economic growth in Ghana from 1970 to 2012, using education expenditure, real gross domestic product, gross capital formation and labor participation with the application of regression technique, the results revealed positive and significant relationship between education expenditure and all indicators of economic growth used in the study. In a similar note, Koffi (2017) examined the relationship between public expenditure, private investment and economic growth in Togo from 1980 to 2013. Using the two stage least square method, the result shows a positive significant relationship between public expenditure and economic growth.

Usman, Mobolaji, Kilishi, Yaru and Yakubo (2011) evidence from Nigeria, examined public expenditure and economic growth from 1970 to 2008 by measuring human capital, education, health, building infrastructure, transport & communication, social services, gross domestic product, domestic capital and foreign capital inflow, using regression analysis. The result indicated that public spending has no impact on growth, on the short run but does on the long run. Tajudeen and Ismail (2013) using Auto Regressive Distributed Lag Specification, analyzed the impact of public expenditure and economic growth in Nigeria, with time series date ranging from 1970 to 2010 with gross domestic product, total government capital expenditure and total government recurrent expenditure as variables. From the results, total public spending on economic growth was found negative. Abu and Abdullahi (2010) examined government expenditure and economic growth in Nigeria from1970 to 2007, with total capital expenditure, total recurrent expenditure, total education expenditure, transport & communication, health, defense and agriculture as variables. Using regression analysis, total capital expenditure, total recurrent expenditure and education expenditure was negative with economic growth, while transport & communication, health has positive effect on

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economic growth. Nwodo and Ukaegbu (2017) ascertained public social expenditure mix and economic growth in Nigeria from1981 to 2015, using Auto Regressive Distributed Lag Specification, by employing gross domestic product and expenses on education and health. Negative and significant relationship was found. Oziengbe (2013) examined the relative effect of federal capital and recurrent expenditure on Nigeria's economy from 1980 to 2015, using regression technique, the result shows that recurrent expenditure with gross domestic product was negative while capital expenditure with gross domestic product was positive.

Kareen, Bakare, Ademoyewa, Bashir, Ologunla and Arije (2014) examined the impact of public sector spending on economic growth of Nigeria between 1960 and 2010 using agriculture, social and community services, health and services and gross domestic product with the use of regression technique, the result indicated, capital and recurrent expenditure contributed positively to economic growth. Danmola, Olateju and Abba (2013) investigated the nexus between public expenditure and economic growth by testing Wagner's law time series. Gross domestic product, capital expenditure and recurrent was tested using Granger causality test, positive relationship was found between government expenditure and economic growth. Nkiru and Daniel (2013) examined the impact of government expenditure on economic growth in Nigeria from 1977 to 2012, using regression technique for measuring real gross domestic product, education and infrastructure, expenditure on education has positive impact on economic growth. Mutiu and Olusijibomi (2013) ascertained public expenditure and economic growth nexus between 1970 and 2009, with regression method for real gross domestic product, social and community services, gross domestic product and public sector expenditure, the result indicated positive relationship among the variables. Miftahu and Rosni (2017) examined public sector spending and economic growth in Nigeria, using education, health and gross domestic product as variables. The Auto-Regressive Distributed Lag Specification result indicated significant and positive relationship among the variables. Udoffia and Godson (2016) examined the impact of federal government expenditure on economic growth from 1980 to 2014, employing regression analysis on capital expenditure; recurrent expenditure and real gross domestic product in Nigeria, capital and recurrent expenditure have positive effect on real gross domestic product. Agbonkhese and Asekome (2014) used regression technique to analyze the impact of public expenditure on the growth of Nigerian economy by considering gross domestic product, total public expenditure, credit to economy, private capital formation and exchange rate from 1981 to 2011. The results show positive relationship between the dependent and independent variables in the study. Conelius, Nkamare and Ogar (2016) investigated government expenditure and its implications on Nigerian economy between 1980 and 2012, using regression analysis with gross domestic product, recurrent expenditure and capital expenditure; significant and positive result was found between the dependent variable and the independent variables. Chioma, Eze and Chukwuani (2016) analyzed the relationship between public expenditure and national income from 1986 to 2005, applying correlation analysis, employing gross domestic product, capital expenditure; community and social expenditure in Nigeria. The result shows that, community and social services has a positive and significant effect on the Nigeria's national income. Njoku, Ugwu and Chigbu (2014) investigated the effect of public expenditure on economic growth from 1961 to 2013, employing regression analyzing, using capital administration, recurrent social and community services and economic growth in Nigeria. Capital and recurrent expenditure contributed positively to economic growth for the period in the study. In a similar note, Ogunmuyiwa and Adelowokan (2015) measured the impact of public expenditure on economic growth in Nigeria with the use of time series data from 1970to 2008, employing regression method on gross domestic product, capital expenditure and recurrent expenditure. Public expenditure has a positive impact on economic growth.

The relationship between public social expenditure and economic growth has been conceptually, theoretically and empirically reviewed above. It is clear from the above that the few studies that have examined the impact of public social expenditure and economic growth with specific economic growth indicators have varying results. In other words, there is no theoretical and empirical consensus on the impact of public social expenditure and economic growth. The research studies also looked at different regions of the world such as Africa and beyond; however, we found very few studies on the public social expenditure and economic growth.

In Nigeria, a major option to get the nation's economy out of recession lies in the agricultural sector. The studies reviewed so far have not measured the relative impact of education expenditure; health expenditure and community service expenditure on agricultural output in Nigeria. This research is therefore set out to study the relative effect of expenditure in education, health and community services on agricultural output in Nigeria and try to fill the identified gaps with updated data.

III. METHODOLOGY

A. RESEARCH DESIGN

This study employed ex-post facto design as it is meant to investigate and analyze the relationship among variables. This research is designed specifically to measure the relative effect of government social expenditure on economic growth in Nigeria.

B. DATA ANALYSIS METHOD

For empirical investigation of long run relationship among public social expenditure and economic growth we have used Johansen Cointegration, and Causality Test for causal relationship. The reason for choosing these tests is to find out the causal relationship between variables and to know the long run relation. The period of study is 1981-2016. For this study the variables are education expenditure, health expenditure, community social services expenditure and agriculture output in Nigeria. The study also used descriptive statistics to describe the overall distribution and character of

the data. The regression was used to analyze the effect on the dependent variable by the independent variables. The purpose of the error correction mechanism (ECM) is to measure the speed of adjustment of the dependent variable to changes in the independent variables on the short-run and to their equilibrium levels. Augmented Dicky Fuller Test is used to check the stationary and non stationary in the data. The data sources are CBN statistical bulletin and journal publications.

C. MODEL SPECIFICATION AND VARIABLE DEFINITION

The study shall use three explanatory variables such as education expenditure (edu), health expenditure (hel) and community and social expenditure (cms). And these will be regressed against agriculture expenditure (agr) which is the explained variable. And all the variables will be used in their lag form.

The mathematical function of the relationship is as follows:

$$AGR = f(EDU, HEL, CMS) \quad 1$$

These above functions are transformed into the following explicit econometric models.

$$AGR = Ƙ_0 + Ƙ_1EDU + Ƙ_2HEL + Ƙ_3CMS + \mu \quad 2$$

Where;

$Ƙ_0$, = intercept (constant), $Ƙ_1$- $Ƙ_3$ = coefficients to be estimated, AGR = GDP on agriculture (proxy as economic growth), EDU = Expenditure on education, HEL= Expenditure on health, CMS= Expenditure on community and social services, μ - Stochastic variable and f - Functional notation.

The functional model above is further transformed into logarithms for standardization as this may minimize the differences in the magnitudes of different variables.

The lag form model is as follows:

$$LAGR = Ƙ_0 + Ƙ_1LEDU + Ƙ_2LHEL + Ƙ_3LCMS + \mu \quad 3$$

IV. DATA PRESENTATION

The data for this study is attached as appendix 1 to this work. It shows the variables used for this study on yearly basis from 1981 to 2016. EDU represents expenditure on education, HEL represent expenditure on health, CMS represents expenditure on community and social services and AGR represents gross domestic product in agriculture.

DESCRIPTIVE STATISTICS

Table 4.1 below shows the descriptive statistics of the data presented in table 4.1.

	AGR	EDU	HEL	CMS
Mean	5224.194	93.02972	54.42833	58.19111
Median	1384.005	27.36500	9.980000	7.840000
Maximum	21523.51	390.4200	257.7200	281.0000
Minimum	17.06000	0.160000	0.040000	0.030000
Std. Dev.	6714.524	126.3327	78.85358	96.38903
Skewness	1.096755	1.278974	1.379584	1.414370
Kurtosis	2.814070	3.169809	3.485883	3.220721
Jarque-Bera	7.269080	9.857902	11.77364	12.07573
Probability	0.026396	0.007234	0.002776	0.002387
Sum	188071.0	3349.070	1959.420	2094.880
Sum Sq. Dev.	1.58E+09	558598.4	217626.0	325179.6
Observations	36	36	36	36

Table 4.1: Descriptive Statistics

The descriptive statistics on table 4.1 shows that gross domestic product on agriculture (AGR) has a mean value of 5224.194, while the maximum and minimum values are 21523.51 and 17.06000 respectively. Expenditure on education (EDU) has a mean value of 93.02972, while the maximum and minimum values are 390.4200 and 0.16000 respectively. Expenditure on health (HEL) has a mean value of 54.42833, while the maximum and minimum values are 257.7200 and 0.04000 respectively. Expenditure on community and social services (CMS) has a mean value of 58.19111, while the maximum and minimum values are 281 and 0.03 respectively.

The Jarque-Bera statistic indicates that all the variables are not normally distributed with the following p-values: gross domestic product on agriculture (AGR =0.02), expenditure on education (EDU = 0.007), expenditure on health (HEL = 0.002) and expenditure on community and social services (CMS = 0.002).

	AGR	EDU	HEL	CMS
AGR	1.000000	0.968489	0.965781	0.923093
EDU	0.968489	1.000000	0.983192	0.925845
HEL	0.965781	0.983192	1.000000	0.915249
CMS	0.923093	0.925845	0.915249	1.000000

Table 4.2: Correlation Matrix

The correlation matrix on table 4.2 shows the correlation among the variables. AGR is shown to have a strong positive correlation of 0.968489 with EDU, 0.965781 with HEL, and 0.923093 with CMS; EDU has a positive strong correlation of 0.968489 with AGR, 0.983192 with HEL and 0.915249 with CMS. HEL has a strong positive correlation of 0.965781 with AGR, 0.983192 with EDU and 0.915249 with CMS. CMS has a strong positive correlation of 0.923093 with AGR, 0.925845 with EDU, and 0.915249 with HEL.

Variable	ADF value	Critical Values 1% 5% 10%	Conclusion
AGR	-5.112524	-4.262735 -3.552973 -3.209642	Stationary @ 1st dif.
EDU	-4.923211	-2.634731 -1.951000 -1.610907	Stationary @ Ist dif.
HEL	-3.553299	-2.647120 -1.952910 -1.610011	Stationary @ 1st dif.
CMS	-6.241961	-4.252879 -3.548490 -3.207094	Stationary @ 1st dif.

Source: Extracted from Unit Root Test Result (Appendix)

Table 4.3: Unit root test result

The Augmented Dickey-Fuller Unit Root test result as summarized above shows that all the variables are stationary at first difference.

Date: 01/17/18 Time: 21:59
Sample (adjusted): 1984 2016
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: LAG1AGR LAG1CMS LAG1EDU LAG1HEL
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value
None *	0.844700	120.2404	47.85613
At most 1 *	0.620755	58.78126	29.79707
At most 2 *	0.540913	26.78539	15.49471
At most 3	0.032618	1.094350	3.841466

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value
None *	0.844700	61.45917	27.58434
At most 1 *	0.620755	31.99587	21.13162
At most 2 *	0.540913	25.69104	14.26460
At most 3	0.032618	1.094350	3.841466

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 4.4: Summary of co-integration test

Both trace test and Maximum Eigenvalue test indicated that there are three co-integrating equation existing between the dependent and independent variables. This reveals that there is a long-run equilibrium relationship between the dependent and independent variables.

Dependent Variable: D(LAG1AGR)
Method: Least Squares
Date: 01/17/18 Time: 22:40
Sample (adjusted): 1985 2016
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	452.3240	125.8728	3.593501	0.0013
D(LAG1EDU)	-5.221602	5.661591	-0.922285	0.3645
D(LAG1HEL)	17.10257	7.822049	2.186457	0.0376
D(LAG1CMS)	10.65365	3.838936	2.775158	0.0099
ECM(-1)	-0.169426	0.098245	-1.724531	0.0460

R-squared	0.281605	Mean dependent var	612.9116
Adjusted R-squared	0.175176	S.D. dependent var	711.3060
S.E. of regression	646.0069	Akaike info criterion	15.92210
Sum squared resid	11267772	Schwarz criterion	16.15112
Log likelihood	-249.7536	Hannan-Quinn criter.	15.99801
F-statistic	2.645942	Durbin-Watson stat	1.088151
Prob(F-statistic)	0.055246		

Table 4.5: Regression with ecm

The result above shows that, EDU has a coefficient of -5.221602 meaning that one percentage change in expenditure in education leads to 5.221602 percent change in agriculture output in the negative direction in Nigeria. This indicates that there is a high response of agriculture output to changes in expenditure in education in the negative direction, but this is not statistically significant at 5% level.

Hel has a coefficient of 17.10257 meaning that one percent change in health expenditure leads to 17.10257 percent change in agriculture output in the positive direction in Nigeria. This indicates that there is a high response of agriculture output to the changes of health expenditure and this is also significant at 5 percent level.

CMS has a coefficient of 10.65365 meaning that one percent change in community and social service expenditure leads to 10.65365 percent change in agriculture output in the positive direction in Nigeria. This also indicates a high response of agriculture output to the changes of community and social services expenditure and is also statistically significant at 5 percent level.

The results further show that r-squared is 0.281606 while adjusted r-squared is 0.175176 indicating that 17.5176 percent of changes in agriculture output are attributable to the combined effect of the expenditure in education, health and community and social services in Nigeria.

Overall, the results show that F-statistic is 2.645942 with a probability of 0.05 indicating that the combined impact of the independent variables on economic growth represented by agriculture output is statistically significant.

Furthermore, the Error Correction Co-efficient is appropriately signed with a value of -0.169426 with a probability of 0.0460, which is significant at 5% level of significance. The co-efficient indicates that the model has a 16.9426 percent speed of adjustment from equilibrium position on the long run.

Pairwise Granger Causality Tests
Date: 01/17/18 Time: 22:00
Sample: 1981 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LAG1CMS does not Granger Cause LAG1AGR	33	1.80799	0.1826
LAG1AGR does not Granger Cause LAG1CMS		4.70247	0.0173
LAG1EDU does not Granger Cause LAG1AGR	33	0.11939	0.8879
LAG1AGR does not Granger Cause LAG1EDU		10.7313	0.0003
LAG1HEL does not Granger Cause LAG1AGR	33	1.84523	0.1767
LAG1AGR does not Granger Cause LAG1HEL		13.4310	8.E-05

Table 4.6: Granger Causality Test Result

The causality test indicated a unidirectional causation running from agriculture output to community and social services expenditure and education expenditure in Nigeria.

V. DISCUSSION OF RESULTS

The evaluation of the slop of the coefficients of the explanatory variables indicated the existence of positive relationship between health expenditure, community and social services expenditure and agriculture output of Nigeria. The relationship between education expenditure, and agriculture output is found to be negative.

Generally, our model suggests a significant relationship between government social expenditure and economic growth using the f-statistics. The coefficient of determination (R^2) 28% Meaning 28% change in real exchange rate is influenced by the predictor variables while the remaining 72% is explained by other variables not captured in the model.

The findings of this study are not in line with that of Bol and Willy (2016) that government expenditure on social services is found to be negative with economic growth. This may be due to difference in environment, as their work was based on South African data while this work is purely on Nigerian data. Also this work employed regression, while their methodology was random effect model. It is also not line with the findings of Nwodo and Ukaegbu (2017) that found a negative relationship between public social expenditure and economic growth, but concur with the findings of Miftahu and Rosni (2017), and Mutiu and Olusijibomi (2013) that the relationship between public social expenditure and economic growth is positive.

A. SUMMARY OF FINDINGS

The research work investigated the effect of government social expenditure on economic growth in Nigeria from 1981 to 2016. The following findings were inferred from the study:

That government social expenditure represented by expenditure on education, health and community and social services which shows different results. Expenditure on health and community and social services are found to be positively related with agriculture output. While expenditure on education, has a negative relationship with agriculture output. Among all the variables, only expenditure on education is not significant, others are significant. Generally, our model suggests the existence of a significant relationship between government social expenditure and economic growth in Nigeria using the f-statistics and R^2 with particular reference to the period under review.

B. CONCLUSION

The study examined the relationship between government social expenditure and economic growth in Nigeria from 1981 to 2016. Based on the findings, the study concludes that:

- ✓ There is positive significant relationship between health expenditure and agriculture output in Nigeria.
- ✓ There is negative and insignificant relationship between expenditure on education and agriculture output in Nigeria
- ✓ There is positive and significant relationship between community and social services expenditure and agriculture output in Nigeria.

C. RECOMMENDATIONS

Based on the findings of the study, we therefore recommend the following;

- ✓ All the tiers of government should implement policies that will aid improve on our health facilities. Health improvement on the society from the evidence will lead to economic growth.
- ✓ Government should improve on community and social services. The expenditure on community and social services will not reduce our income; rather it will assist in channeling youths to engage in productive activities which will lead to economic growth. Also the youths will see the society as a social environment and not to see it as a place to implement criminal activities.
- ✓ Federal government should put more effort to relate with the principal officers in the educational institutions so as to improve on our agriculture produce. Evidence from the study is a clear indication that effort put in by government in education is not reflecting on our agriculture output.

APPENDIX

Year	Agriculture	Education	Health	Community serv.
1981	17.06	0.17	0.08	0.04
1982	20.13	0.19	0.1	0.05
1983	23.8	0.16	0.08	0.04
1984	30.37	0.2	0.1	0.05
1985	34.24	0.26	0.13	0.07
1986	35.7	0.26	0.13	0.07
1987	50.29	0.23	0.04	0.03
1988	73.76	1.46	0.42	23
1989	88.26	3.01	0.58	0.64
1990	106.63	2.4	0.5	0.49
1991	123.24	1.26	0.62	0.8
1992	184.12	0.29	0.15	0.89
1993	295.32	8.88	3.87	1.91
1994	445.27	7.38	2.09	0.61
1995	790.14	9.75	3.32	0.75
1996	1070.51	11.5	3.02	1.47
1997	1211.46	14.85	3.89	3.32
1998	1341.04	13.59	4.74	3.11
1999	1426.97	43.61	16.64	11.12
2000	1508.41	57.96	15.22	11.61
2001	2015.42	39.88	24.52	15.23
2002	4585.93	80.53	40.62	31.03
2003	4935.93	64.78	33.27	4.56
2004	4935.26	76.53	34.2	23.66
2005	6032.33	82.8	55.66	13.19
2006	7513.3	119.02	62.25	12.9

2007	8551.98	150.78	81.91	23.99
2008	10100.33	163.98	98.22	70.73
2009	11625.44	137.12	90.2	126.87
2010	13048.89	170.8	99.1	281
2011	14037.83	335.8	231.8	217.84
2012	15816	348.4	197.9	243.76
2013	16816.55	390.42	197.99	273.66
2014	18018.61	343.75	195.98	235.03
2015	19636.97	325.19	257.72	224.11
2016	21523.51	341.88	202.36	237.25

	AGR	EDU	HEL	CMS
Mean	5224.194	93.02972	54.42833	58.19111
Median	1384.005	27.36500	9.980000	7.840000
Maximum	21523.51	390.4200	257.7200	281.0000
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Std. Dev.	6714.524	126.3327	78.85358	96.38903
Skewness	1.096755	1.278974	1.379584	1.414370
Kurtosis	2.814070	3.169809	3.485883	3.220721
Jarque-Bera	7.269080	9.857902	11.77364	12.07573
Probability	0.026396	0.007234	0.002776	0.002387
Sum	188071.0	3349.070	1959.420	2094.880
Sum Sq. Dev.	1.58E+09	558598.4	217626.0	325179.6
Observations	36	36	36	36

ADF @ Level
Null Hypothesis: AGR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.887374	0.9997
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(AGR)
Method: Least Squares
Date: 01/17/18 Time: 21:00
Sample (adjusted): 1982 2016
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGR(-1)	0.024178	0.027246	0.887374	0.3815
C	-274.4235	206.5726	-1.328460	0.1934
@TREND(1981)	42.99132	16.47146	2.610049	0.0137

R-squared	0.627800	Mean dependent var	614.4700
Adjusted R-squared	0.604538	S.D. dependent var	728.6121
S.E. of regression	458.1934	Akaike info criterion	15.17428
Sum squared resid	6718117.	Schwarz criterion	15.30759
Log likelihood	-262.5498	Hannan-Quinn criter.	15.22030
F-statistic	26.98768	Durbin-Watson stat	1.975528
Prob(F-statistic)	0.000000		

ADF @ 1st Diff
Null Hypothesis: D(AGR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.112524	0.0012
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(AGR,2)
Method: Least Squares
Date: 01/17/18 Time: 21:09
Sample (adjusted): 1984 2016
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AGR(-1))	-1.254627	0.245403	-5.112524	0.0000
D(AGR(-1),2)	0.291461	0.176140	1.654712	0.1088
C	-599.8242	211.6791	-2.833649	0.0083
@TREND(1981)	73.07511	15.81807	4.619723	0.0001

R-squared	0.533056	Mean dependent var	57.05667
Adjusted R-squared	0.484752	S.D. dependent var	636.7946
S.E. of regression	457.0963	Akaike info criterion	15.20088
Sum squared resid	6059173.	Schwarz criterion	15.38227
Log likelihood	-246.8145	Hannan-Quinn criter.	15.26191
F-statistic	11.03533	Durbin-Watson stat	1.955260
Prob(F-statistic)	0.000053		

Edu @ Level

Null Hypothesis: EDU has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.555808	0.7899

Test critical values:	1% level	-4.243644
	5% level	-3.544284
	10% level	-3.204699

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EDU)
Method: Least Squares
Date: 01/17/18 Time: 21:30
Sample (adjusted): 1982 2016
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EDU(-1)	-0.129311	0.083115	-1.555808	0.1296
C	-16.34168	13.34672	-1.224397	0.2297
@TREND(1981)	2.067510	0.978600	2.112723	0.0425

R-squared	0.126447	Mean dependent var	9.763143
Adjusted R-squared	0.071850	S.D. dependent var	32.80107
S.E. of regression	31.60074	Akaike info criterion	9.826054
Sum squared resid	31955.41	Schwarz criterion	9.959370
Log likelihood	-168.9560	Hannan-Quinn criter.	9.872075
F-statistic	2.315998	Durbin-Watson stat	1.863371
Prob(F-statistic)	0.114982		

Edu @ 1st Diff

Null Hypothesis: D(EDU) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.923211	0.0000
Test critical values:	1% level	-2.634731	
	5% level	-1.951000	
	10% level	-1.610907	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EDU,2)
Method: Least Squares
Date: 01/17/18 Time: 21:34
Sample (adjusted): 1983 2016
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EDU(-1))	-0.850419	0.172737	-4.923211	0.0000

R-squared	0.423390	Mean dependent var	0.490294
Adjusted R-squared	0.423390	S.D. dependent var	45.29003
S.E. of regression	34.39090	Akaike info criterion	9.942432
Sum squared resid	39030.23	Schwarz criterion	9.987325
Log likelihood	-168.0213	Hannan-Quinn criter.	9.957742
Durbin-Watson stat	2.000561		

Cms @ Level

Null Hypothesis: CMS has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.576494	0.7819
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CMS)
Method: Least Squares
Date: 01/17/18 Time: 21:40
Sample (adjusted): 1982 2016
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CMS(-1)	-0.140390	0.089052	-1.576494	0.1247
C	-13.66142	12.69501	-1.076125	0.2899
@TREND(1981)	1.549449	0.805659	1.923206	0.0634

R-squared	0.104913	Mean dependent var	6.777429
Adjusted R-squared	0.048971	S.D. dependent var	33.20334
S.E. of regression	32.38014	Akaike info criterion	9.874784
Sum squared resid	33551.15	Schwarz criterion	10.00810
Log likelihood	-169.8087	Hannan-Quinn criter.	9.920805
F-statistic	1.875367	Durbin-Watson stat	2.084780
Prob(F-statistic)	0.169762		

CMS @ 1st Diff

Null Hypothesis: D(CMS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.241961	0.0001
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CMS,2)
Method: Least Squares
Date: 01/17/18 Time: 21:42
Sample (adjusted): 1983 2016
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CMS(-1))	-1.113853	0.178446	-6.241961	0.0000
C	-5.236016	12.45075	-0.420538	0.6770
@TREND(1981)	0.700693	0.603597	1.160862	0.2546

R-squared	0.556903	Mean dependent var	0.386176
Adjusted R-squared	0.528316	S.D. dependent var	49.39345
S.E. of regression	33.92305	Akaike info criterion	9.970164
Sum squared resid	35673.98	Schwarz criterion	10.10484
Log likelihood	-166.4928	Hannan-Quinn criter.	10.01609
F-statistic	19.48105	Durbin-Watson stat	1.990981
Prob(F-statistic)	0.000003		

Hel @ Level

Null Hypothesis: HEL has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 8 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.336543	1.0000
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(HEL)
Method: Least Squares
Date: 01/17/18 Time: 21:45
Sample (adjusted): 1990 2016
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HEL(-1)	1.656033	0.708754	2.336543	0.0328
D(HEL(-1))	-2.327155	0.813648	-2.860151	0.0113
D(HEL(-2))	-2.232941	0.921561	-2.422998	0.0276
D(HEL(-3))	-2.885494	1.113449	-2.591492	0.0197
D(HEL(-4))	-2.136316	1.262473	-1.692167	0.1100
D(HEL(-5))	-3.277415	1.328911	-2.466242	0.0253
D(HEL(-6))	-0.558990	1.339031	-0.417459	0.6819
D(HEL(-7))	-2.865472	1.141099	-2.511153	0.0231
D(HEL(-8))	-3.305277	1.075229	-3.074023	0.0073
C	-34.36379	13.64763	-2.517931	0.0228
@TREND(1981)	2.775507	0.874781	3.172803	0.0059

R-squared	0.884948	Mean dependent var	7.473333
Adjusted R-squared	0.813041	S.D. dependent var	31.62016
S.E. of regression	13.67217	Akaike info criterion	8.360169
Sum squared resid	2990.853	Schwarz criterion	8.888102
Log likelihood	-101.8623	Hannan-Quinn criter.	8.517151
F-statistic	12.30678	Durbin-Watson stat	2.132106
Prob(F-statistic)	0.000010		

Hel @ 1st Diff

Null Hypothesis: D(HEL) has a unit root
Exogenous: None
Lag Length: 5 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		3.553299	0.9997
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(HEL,2)
Method: Least Squares
Date: 01/17/18 Time: 21:47
Sample (adjusted): 1988 2016
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(HEL(-1))	1.600184	0.450338	3.553299	0.0017
D(HEL(-1),2)	-3.057993	0.474219	-6.448484	0.0000
D(HEL(-2),2)	-3.548293	0.527234	-6.730020	0.0000
D(HEL(-3),2)	-4.119702	0.610868	-6.744014	0.0000
D(HEL(-4),2)	-3.471374	0.586370	-5.920105	0.0000
D(HEL(-5),2)	-3.698716	0.591191	-6.256384	0.0000

R-squared	0.897877	Mean dependent var	-1.905862

Adjusted R-squared	0.875676	S.D. dependent var	48.09076
S.E. of regression	16.95662	Akaike info criterion	8.681185
Sum squared resid	6613.120	Schwarz criterion	8.964074
Log likelihood	-119.8772	Hannan-Quinn criter.	8.769782
Durbin-Watson stat	1.748080		

Dependent Variable: LAG1AGR
Method: Least Squares
Date: 01/17/18 Time: 21:53
Sample (adjusted): 1982 2016
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	674.2233	314.7666	2.141978	0.0402
LAG1EDU	19.73532	11.61904	1.698533	0.0994
LAG1CMS	11.58738	6.861193	1.688829	0.1013
LAG1HEL	35.32990	17.38953	2.031677	0.0508

R-squared	0.948348	Mean dependent var	4758.500
Adjusted R-squared	0.943349	S.D. dependent var	6194.663
S.E. of regression	1474.416	Akaike info criterion	17.53712
Sum squared resid	67390963	Schwarz criterion	17.71488
Log likelihood	-302.8996	Hannan-Quinn criter.	17.59848
F-statistic	189.7233	Durbin-Watson stat	0.910647
Prob(F-statistic)	0.000000		

Johansen Co-integration result

Date: 01/17/18 Time: 21:59
Sample (adjusted): 1984 2016
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: LAG1AGR LAG1CMS LAG1EDU LAG1HEL
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.844700	120.2404	47.85613	0.0000
At most 1 *	0.620755	58.78126	29.79707	0.0000
At most 2 *	0.540913	26.78539	15.49471	0.0007
At most 3	0.032618	1.094350	3.841466	0.2955

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.844700	61.45917	27.58434	0.0000
At most 1 *	0.620755	31.99587	21.13162	0.0010
At most 2 *	0.540913	25.69104	14.26460	0.0005
At most 3	0.032618	1.094350	3.841466	0.2955

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LAG1AGR	LAG1CMS	LAG1EDU	LAG1HEL
-0.000434	-0.015308	0.080118	-0.071831
0.000769	0.040199	0.021427	-0.151690
0.000899	-0.011989	-0.056615	0.056044
-0.000593	0.015577	-0.024077	0.080996

Unrestricted Adjustment Coefficients (alpha):

D(LAG1AGR)	306.2606	-130.0603	147.8899	43.85769
D(LAG1CMS)	-5.693825	-16.68787	13.47471	-2.141116
D(LAG1EDU)	-12.28755	4.253956	6.944717	3.156398
D(LAG1HEL)	1.943779	11.98638	4.490563	1.416402

1 Cointegrating Equation(s):	Log likelihood	-659.7768

Normalized cointegrating coefficients (standard error in parentheses)

LAG1AGR	LAG1CMS	LAG1EDU	LAG1HEL
1.000000	35.24647	-184.4769	165.3946
	(8.66089)	(18.1330)	(35.1932)

Adjustment coefficients (standard error in parentheses)

D(LAG1AGR)	-0.133009
	(0.03171)
D(LAG1CMS)	0.002473
	(0.00255)
D(LAG1EDU)	0.005336
	(0.00178)
D(LAG1HEL)	-0.000844
	(0.00152)

2 Cointegrating Equation(s):	Log likelihood	-643.7788

Normalized cointegrating coefficients (standard error in

parentheses)

LAG1AGR	LAG1CMS	LAG1EDU	LAG1HEL
1.000000	0.000000	-624.4332	916.6856
		(67.4699)	(118.631)
0.000000	1.000000	12.48228	-21.31536
		(1.52199)	(2.67607)

Adjustment coefficients (standard error in parentheses)

D(LAG1AGR)	-0.233058	-9.916372	
	(0.06058)	(2.94990)	
D(LAG1CMS)	-0.010364	-0.583674	
	(0.00434)	(0.21143)	
D(LAG1EDU)	0.008609	0.359096	
	(0.00354)	(0.17234)	
D(LAG1HEL)	0.008376	0.452084	
	(0.00233)	(0.11328)	

3 Cointegrating Equation(s):	Log likelihood	-630.9333

Normalized cointegrating coefficients (standard error in parentheses)

LAG1AGR	LAG1CMS	LAG1EDU	LAG1HEL
1.000000	0.000000	0.000000	-60.04893
			(4.17414)
0.000000	1.000000	0.000000	-1.790650
			(0.09075)
0.000000	0.000000	1.000000	-1.564194
			(0.02844)

Adjustment coefficients (standard error in parentheses)

D(LAG1AGR)	-0.100113	-11.68943	13.37757
	(0.07864)	(2.78616)	(6.26535)
D(LAG1CMS)	0.001749	-0.745223	-1.576616
	(0.00526)	(0.18646)	(0.41929)
D(LAG1EDU)	0.014852	0.275836	-1.286488
	(0.00476)	(0.16866)	(0.37928)
D(LAG1HEL)	0.012413	0.398246	0.158325
	(0.00314)	(0.11109)	(0.24980)

Pairwise Granger Causality Tests
Date: 01/17/18 Time: 22:00
Sample: 1981 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LAG1CMS does not Granger Cause LAG1AGR	33	1.80799	0.1826
LAG1AGR does not Granger Cause LAG1CMS		4.70247	0.0173
LAG1EDU does not Granger Cause LAG1AGR	33	0.11939	0.8879
LAG1AGR does not Granger Cause LAG1EDU		10.7313	0.0003
LAG1HEL does not Granger Cause LAG1AGR	33	1.84523	0.1767
LAG1AGR does not Granger Cause LAG1HEL		13.4310	8.E-05
LAG1EDU does not Granger Cause LAG1CMS	33	2.14841	0.1355
LAG1CMS does not Granger Cause LAG1EDU		13.1529	9.E-05
LAG1HEL does not Granger Cause LAG1CMS	33	5.07480	0.0132
LAG1CMS does not Granger Cause LAG1HEL		12.3575	0.0001
LAG1HEL does not Granger Cause LAG1EDU	33	3.26087	0.0533
LAG1EDU does not Granger Cause LAG1HEL		0.38731	0.6825

ADF @ 1st Diff.

Null Hypothesis: D(U) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.355914	0.0000
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(U,2)
Method: Least Squares
Date: 01/17/18 Time: 22:30
Sample (adjusted): 1984 2016
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(U(-1))	-1.147848	0.180595	-6.355914	0.0000
C	32.57483	549.2897	0.059304	0.9531
@TREND(1981)	1.057523	25.84743	0.040914	0.9676

R-squared	0.573857	Mean dependent var	-2.179979
Adjusted R-squared	0.545447	S.D. dependent var	2096.888
S.E. of regression	1413.733	Akaike info criterion	17.43236
Sum squared resid	59959271	Schwarz criterion	17.56841
Log likelihood	-284.6340	Hannan-Quinn criter.	17.47814
F-statistic	20.19941	Durbin-Watson stat	2.042228
Prob(F-statistic)	0.000003		

Regression with ecm

Dependent Variable: D(LAG1AGR)
Method: Least Squares
Date: 01/17/18 Time: 22:40
Sample (adjusted): 1985 2016
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	452.3240	125.8728	3.593501	0.0013
D(LAG1EDU)	-5.221602	5.661591	-0.922285	0.3645
D(LAG1HEL)	17.10257	7.822049	2.186457	0.0376
D(LAG1CMS)	10.65365	3.838936	2.775158	0.0099
ECM(-1)	-0.169426	0.098245	-1.724531	0.0460

R-squared	0.281605	Mean dependent var	612.9116
Adjusted R-squared	0.175176	S.D. dependent var	711.3060
S.E. of regression	646.0069	Akaike info criterion	15.92210
Sum squared resid	11267772	Schwarz criterion	16.15112
Log likelihood	-249.7536	Hannan-Quinn criter.	15.99801
F-statistic	2.645942	Durbin-Watson stat	1.088151
Prob(F-statistic)	0.055246		

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