

Human Capital Development and Economic Growth in Morocco

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Abstract

The growth of an economy depends strongly on the quality of its human capital. However, many factors related to human capital can slow and handicap the economic growth of a country. This article studies the relationship between human capital development and economic growth in Morocco by using ordinary least square method (OLS). The aim is to analyze the relationship using total government expenditure on health and education, and the enrolment data of tertiary, secondary and primary schools as proxy for human capital. The analysis shows that high level of human capital development in Morocco holds the key to nation's socio-economic development and also that is the greatest catalyst of the improvement of the standard of living of the Moroccan population, it demonstrates also that a high level of human capital development can, with the right policy decisions, translate into a various cycle of good and important growth in the economy.

Keywords: Human capital, Economic growth, Education, Health, Standard of living, Incomes.

1. Introduction

In any country, the most valuable assets are people, it is very essential for any economy that those assets be deployed sensibly and effectively. The main purpose of this research is to assess and evaluate the positive effect and impact of the human capital development on the economic growth of Morocco. Therefore, to achieve this purpose, we will examine the structure of the human development in the national economic leaning, in other word, the various mean of human capital development in relation to human productivity. The following question will be answered:

“To which extend the human capital development will affect and impact the Moroccan's economic growth?”

A Human capital refers to the abilities and skills of human resources and human capital development refers to the process of acquiring and increasing the number of persons who have the skills, education and experience which are critical for the economic growth of the country (Harbison, 1962). It refers also to the stock of competencies, knowledge, social and personality attributes, including creativity, embodied in the ability to perform labor in order produce economic value (Harbison, 1962). The economic growth refers to the increase in the amount of the goods and services produced by a given economy over time. It is usually measured as the percent rate of increase in real gross domestic product called also real GDP.

A growing productivity is the main source of per capita output in any country, whatever is the country level of development, whether with a market economy or centrally planned. Still, the growth of per capita output is an important element of economic welfare (Abramowitz, 1981). Experience proved that human resources are the major component of productivity and economic expansion.

Productive people created the equipment and the technology, and without innovative ideas and the creativity of human resources, there might not be any successful productive programs. The impact of human capital development and economic growth in recent times emphasized the growth theory (Romer, 1986; Lucas, 1988). In Lucas and Romer's work, they say that eventually, output per unit of input could increase even when inputs exhaustively accounted for. To be more precise, it seems that the origin of growth is related to an advanced human capital and a growing knowledge base. An implication of Lucas' hypothesis on human capital is highly connected to investing in people and the way they evolve as creative and productive resources (Harbison, 1962). Human capital development is becoming a major subject for policy makers and specialists involved in economic development nationally and internationally since the economy is moving towards a knowledge-based sector like R&D and ICT in services or manufacturing. This issue has been discussed and analyzed in many studies since 1960, the year of human capital theory introduction.

In the world wide economy, two parts are distinguished the developed countries (DCs) and the less developed countries (LDCs). DCs are characterized by high efficiency in production while the LDCs are characterized by a low one. Morocco is classified under the LDCs, according to the level of human capital development and per capita income. As a country Morocco is immensely endowed both in natural and human resources. Reaching a complete capital development seems to be a difficult task to Morocco even with its potential resources, knowing that the priority is given to sustainable human capital development or people oriented development by many countries and organizations like USAID. As a way of understanding more comprehensively the human capital development in Morocco, a review of its economy has become quite suitable.

Hence, people empowerment and the use of the economic success in productive projects are really needed in a Moroccan context. Therefore, in order to maximize economic growth, Moroccan economy should be able to eliminate or minimize those constraints towards human capital development.

As soon as we talk about the human capital, we don't have to forget the very important factor that affects directly the productivity, this factor is health. In a simple sense, health is wealth; poor health is a deprivation that is part of poverty. Amartya Sen (1999) has characterized poverty as "capability deprivation", where a person lacks the "substantive freedoms" he or she needs to lead "the kind of life he or she has reason to value". The (HDI), Human Development Index, which was introduced in 1990 by Mahbub ul Haq and colleagues, reproduced in "the most basic human capabilities leading a long life, being knowledgeable, and enjoying a decent standard of living" (UNDP, 1990) that can be represented as education, income and health, which are, indeed, the most important pillars of Human Capital Development.

Now a day, cross the word, the gap in living standards between rich and poor is going large. According to Maddison (2001) the ratio of per-capita GDP in the richest group of nations to per-capita GDP in the poorest grew from 11 in 1950 to 19 in 1998. In addition to this, according to Mayer's (2002), the same ratio between richest and poorest convergence groups grew by a factor of 2.6 from 1960 to 1995. This situation is shown also in Morocco. The challenge to Moroccan economists is to find solutions that will help to close this gap by raising the growth rates of the country.

The slow rate of Moroccan's economic growth regardless of the huge contribution of government, in term of expenditure, is the main incentive that pushes me to look deeply on how we can improve our economic growth. The effect of human capital development on economic growth generates positive trends on economic progress. This work will help the government to change and develop new policies and regulations regarding human capital development to help and support a growing economy.

2. Literature review

2.1 Construct definition

Skills and human capital development become a major concern for policy makers and experts involved in economic development nationally and internationally since the economy is moving towards knowledge-based sectors (e.g., ICT in manufacturing and services, R&D). However, the effect of education and training on economy both at a national and regional level is not deeply analyzed and not studied in detail. This issue has been discussed and analyzed only in few studies since the introduction of human capital theory in the 1960s.

In the other hand, health is a direct source of human wellbeing and also a factor that lead us to raise our income levels. It may have large effects on prospective lifespans. Many studies show that health affects directly the productivity, children's education and also the physical and cognitive development of the person.

Human capital theory views schooling and training as investment in skills and competences (Schultz, 1960 and 1961). It is debated that based on national expectation of return on investment, individuals make decisions on the education and training they receive as a way of augmenting their productivity. By analogy, some studies analyzed the relationship between the educational level of the workforce and their skills and measurements of technological activities (Nelson and Phelps, 1966). It predicts also that life expectancy will impact human capital attainment.

According to this theory, an educated or a skilled employee can easily adopt new technologies and therefore can help his firm evolving, thus reinforcing returns on education and training. Some studies looked into the effects of education and training on the workforce and the level of aggregation these two factors can have.

2.2 Theories of Human Capital Development and Economic Growth:

In this research, I will use the combination of the theories of human capital development and economic growth that have been generally dominated by the three theories below:

2.2.1 Human Capital Theory

This theory demonstrates that there is a positive relationship between the levels of workers' cognitive skills and productivity and efficiency. Theodore, Schultz, Gary Becker and Jacob Mincer introduced the perception that people invest in education in order to increase their stock of human capabilities which can be formed by combining instinctive abilities with investment in human beings. Examples of such investments include expenditure on education, on-the-job training, health, and nutrition. However, during the time, the stock of human capital increases in a period only when gross investment exceeds depreciation.

2.2.2 The Modernization Theory

It focuses on how education transforms an individual's value, belief and behavior. In fact, introduction to modernization institutions such as schools, factories, and mass media pound modern values and attitudes (like openness to new idea, independences from traditional authorities, willingness to plan and calculate further exigencies and growing sense of personal and social efficacy). According to those theorists, these normative and attitudinal changes continue throughout the life cycle, permanently altering the individual's relationship with the social structure. The level of individual modernity attained by the society increases according to the number of people exposed to modernization institutions.

2.2.3 The dependence theory

This theory started from Marxist conceptualizations based on the dynamic world system that constructs conditions for economic transformation in both the core and periphery of the world economy. However, some features of the world polity such as state fiscal strength, degrees and regime centralization and external political integration may contribute to economic growth in the developing world.

2.3 What has been done and what results were achieved in previous works?

The high correlation between human capital development and the development of a country has being analyzed in many studies and inspired many economists.

However, the results at an international level show there is no association between increase in human capital attributable to the rising educational attainments of the labor force and the rate of growth of output per worker. In the Solo-Swan (1956) and Ramsey (1956) models, in order to determine the dynamic evolution of output, it is sufficient to rely on the equation describing physical capital accumulation. It's important to have an additional sector to be able to measure the growth of human capital and to state how the growth can be drawn. The return of every single person is an assumption that should be included to demonstrate a positive growth. The growth of human capital is assumed to be the same for a given effort, whatever the level of human capital attained. The positive growth can be in a steady state when the mechanism generating human capital has stable return. We assume also that the rate of output growth is positive and increasing in the productivity of education or training in the creation of human capital.

From many studies and reviews, human capital development affects to a large extent economic growth positively. In a relatively poor country, when government invests more in human capital, growth in economy is higher. It can be concluded that the higher is the educational level attainments the least is the gaps between the leading economies. However, a part from investing in education and training, the government should look at other forms of investment such as health that can serve as a stability force but cannot mean that the country will increase its relative per capita income position.

It's true that the government should diversify its investment to develop its human capital but can get into more detailed studies to know exactly where to invest more. Still, education is important and is a key sector where government should invest.

Richard Grabowski (2004), in his research about the effect of education in all levels on the economic growth of India between 1966 and 1996, found that there is a large amount of evidence that human capital development has a significant impact on the economic growth. He mentioned also that the primary education is the main causal force in the growth of economy.

David E. Bloom, David Canning and Jaypee Sevilla (2004) in their research about the effect of health on the economic growth, found that good health has a positive, sizable, and statistically significant effect on aggregate output.

Adedeji, S.O. and R.O. Bamidele (2003) in their research about the impact of HCD in the Nigeria's GDP between 1985 and 2009, found that there is a direct impact of human capital on economic growth.

Hyun H. Son (2010), in his paper, "Asian Development Bank Economics Working", found that between 1950 and 2010, education matters for output growth or productivity in the Philippines.

3. Theoretical framework and hypotheses

3.1 Present research model

The specification of the economic model is based, in general, on economic theory, the three theories of human capital development and also on relating human capital data that are available. In this study, we will use the modified model that was formulated in the works of Lucas (1988), Mankiw et Al (1992), Gemmell (1996). Below the final formulation of the economic model:

$$\ln RGDP = \alpha_0 + \alpha_1 \ln I_t + \alpha_2 \ln EMP_t + \alpha_3 \ln H_t + \mu_t \quad (1)$$

Where:

RGDP is the growth rate of real gross domestic product, I is the investment, EMP is the employment rate, H is human capital provided by total capital expenditure on health and education and Ln is the logarithm transformation.

Since all three variables are supposed to have positive effects on the economic growth, the model given can be expressed and studied following the conventional method as follow:

$$GDP = F(TGEE, TGEH, PSE, SSE, TSE) \quad (2)$$

Therefore, the model (1) can be represented by the following equation:

$$GDPT = \beta_1 + \beta_2 TGEE + \beta_3 TGEH + \beta_4 PSE + \beta_5 SSE + \beta_6 TSE + Ut$$

Where t is time and U_t represents the usual error term.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are expected to have a positive sign.

GDP: Gross domestic product (dependent variable)

TGEE: Total government expenditure on education (independent variable)

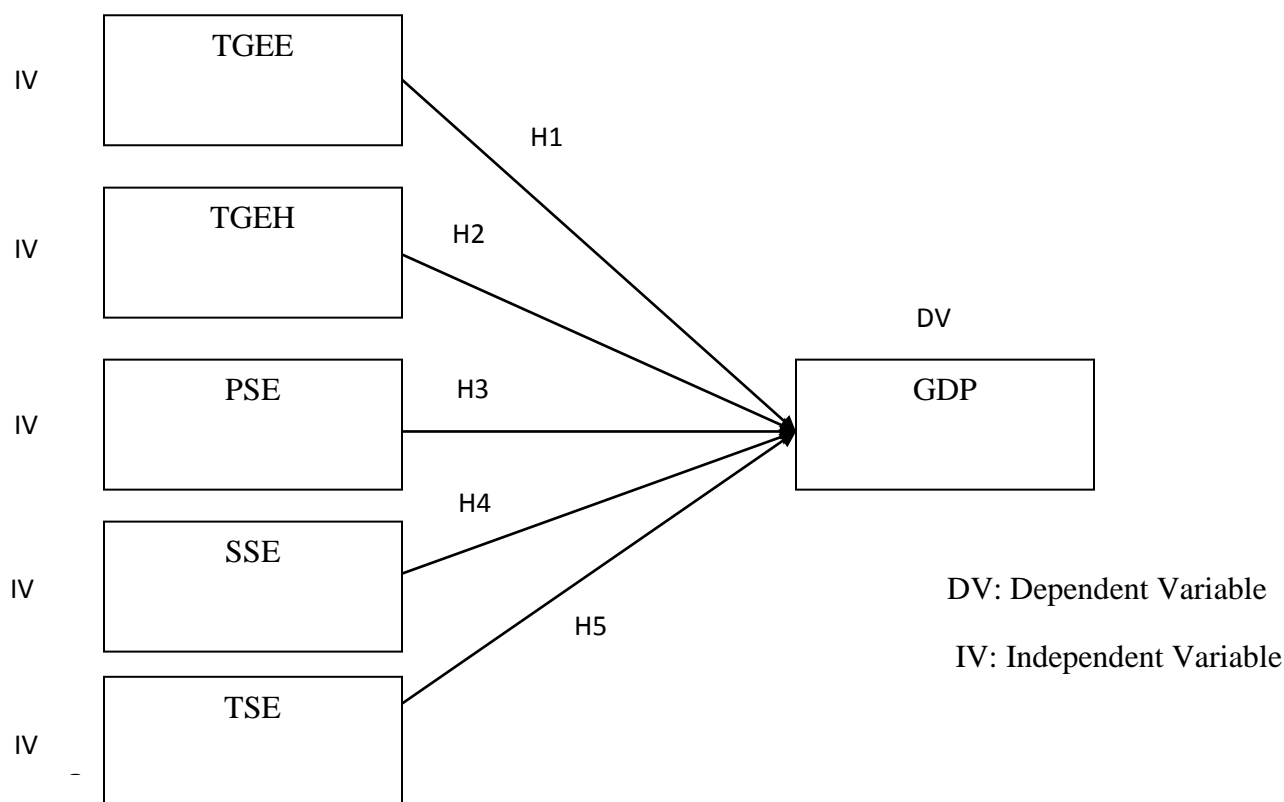
TGEH: Total government expenditure on health (independent variable)

PSE: Primary school enrolment (independent variable)

SSE: Secondary school enrolment (independent variable)

TSE: Tertiary school enrolment (independent variable)

From this, we can conclude that we will have one dependent variable, and five independent variables.



In this research, the goal is to study the relationship and the effect of the human capital development on the Moroccan economic growth, so to achieve this goal, five hypotheses will be studied, and they will cover the effect of the five independent variables on GDP:

- H1:** Total government expenditure on education is positively related to the growth of the Moroccan economy.
H2: Total government expenditure on health is positively related to the growth of the Moroccan economy.
H3: Primary school enrolment is positively related to the growth of the Moroccan economy.
H4: Secondary school enrolment is positively related to the growth of the Moroccan economy.
H5: Tertiary school enrolment is positively related to the growth of the Moroccan economy.

4. Research design and methodology

In this research we will use the basic macroeconomic variables of concern that were used in other empirical works and studies. Those variables will include: real gross domestic product growth rate (RGDPG), total government expenditure on education (TGEE), total government expenditure on health (TGEH), was used to substitute physical capital formation, enrolments into primary school enrolment (PSE), secondary school enrolment (SSE) and tertiary school enrolment (TSE) were used to proxy human capital development.

The economic model that we will be using will be estimated using annual data from 1973 – 2011 (38 years of data). All the data and statistics will be provided from World Bank Database (WBDB).

The estimation procedure follows the two steps procedure of Engle and Granger (1987), Granger (1986). The ordinary least squares method (OLS) will be adopted as the estimation technique through stepwise regression in order to avoid multi-collinearity of explanatory variables.

The error correction will be treated by the application of the co-integration theory. The variables will be examined in logarithmic forms in order to achieve the linearity. The data series will be tested for stationary by using the Augmented Dickey Fuller (ADF) test as the starting point to assess the order of integration.

5. Data analysis

The data that we will use in this research are all taken from the World Bank database; we will be using 39 years from 1973 till 2011, in other words, 39 observations. In the (Appendix 1) we have the real data.

However, and before running the data we should test the homogeneity of the data, it means that we have to test normality, linearity, homoscedasticity, stationarity and multicollinearity.

5.1 Normality test:

In statistics, normality tests are used to determine whether a data set is well-modeled by a normal distribution or not, or to compute how likely an underlying random variable is to be normally distributed. The results are shown in the (Appendix 3).

5.2 Linearity test:

In order to use OLS, a linear model is required, this means that the relationship between X and Y must be capable of being expressed diagrammatically using a straight line. The linearity test is The ability of a test to obtain results (within a given range) that vary in a way directly proportional to changes in the concentration (amount) of the analysis in the sample, or by a well-defined mathematical transformation. In this case, we will test the linearity of all five IV and DV. The results are shown in the (Appendix 4).

5.3 Homoscedasticity and heteroscedasticity

Homoscedasticity means that the variance of errors is the same across all levels of the independent variables. When the variance of errors differs at different values of the independent variables, heteroscedasticity is indicated. According to Berry and Feldman (1985) and Tabachnick and Fidell (1996) slight heteroscedasticity has little effect on significance tests; however, when heteroscedasticity is marked it can lead to serious distortion of findings and seriously weaken the analysis thus increasing the possibility of a Type I error. The results are shown in the (Appendix 5).

5.5 Stationarity

Stationarity is defined as a quality of a process in which the statistical parameters (mean and standard deviation) of the process do not change with time. The most important property of a stationary process is that the autocorrelation function depends on interval alone and does not change with the time at which the function was calculated.

After doing the root test, we found that all the variables are not stationary, the results shows that we will use the first differences for the GDP, TGEE, THE, PRE and TSE, for the variable SSE we will use the second differences. The new transformation of the data is shown in (Appendix 2).

5.6 Multicollinearity:

Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated, meaning that one can be linearly predicted from the others with a non-trivial degree of accuracy. In this situation the coefficient estimates may change erratically in response to small changes in the model or the data.

In our case since the data are not stationary, we test the multicollinearity of the Ln differences of the variables. The results are shown in the (Appendix 6).

6 Empirical Results and Discussions

6.1 Running the Data

In order to run all the data we have, we will use the SPSS software version 20, the dependent variable is the First Ln (GDP), the independent variables are: First Ln (TGEE), First Ln (TGEH), First Ln (PSE), Second Ln (SSE) and First Ln (TSE). The results are shown in the (Appendix 7)

6.2 Interpretation of results and discussion:

$$\text{First Ln (GDPt)} = \beta_1 + \beta_2 \text{ First Ln (TGEE)} + \beta_3 \text{ First Ln (TGEH)} + \beta_4 \text{ First Ln (PSE)} + \beta_5 \text{ Second Ln (SSE)} + \beta_6 \text{ First Ln (TSE)}.$$

Coefficients	β_1	β_2	β_3	β_4	β_5	β_6
Value	0	0.176	0.658	-0.105	0.06	0.114
Standard Error	0.08	0.079	0.107	0.123	0.005	0.059
T-Stat	0.917	1.280	5.113	-0.881	0.491	0.918
R ²						0.591
Adjusted R ²						0.525
Standard error of regression						0.295654650
Standard deviation of dependent variable						0.429142222
F - Statistics						8.969
Durbin – Watson statistics						2.743
Mean of dependent variables						0.401693486

6.2.1 Test of Significance of Parameters

This section involves tests in order to know the significance of each variable used in the model. Therefore, we can do this test either by using the standard error or by using the T – Statistics. In this case the standard error test will be used to determine if the parameter estimates are statistically relevant or not relevant.

6.2.2 Individual test of Significance

We have the critical value of 1%, 5% and 10% levels of significance are 2.719, 2.024 and 1.606. The T statistics for the variable First Ln (TGEH) is (5.113) which is greater than the T statistics for 1%, 5% and 10% levels of significance, consequently, we will reject the H0 and accept the H1 and conclude that the variable First Ln (TGEH) is individually statistically significant to the dependent variable First Ln (GDP).

The T statistics for the variables First Ln (TGEE) is (1.280), First Ln (PSE) is (-0.881), Second Ln (SSE) is (0.491) and First Ln (TSE) is (0.918) are relatively low compared to the T statistics for 1%, 5% and 10% levels of significance, consequently, we accept H0 and reject H1 and conclude that the four variables are not individually statistically significant to the dependent variable First Ln (GDP).

The comparison of the standard error of the dependent variable First Ln (GDP) with the mean of the dependent variable First Ln (GDP) indicates that the explanatory variables have an impact on the dependent variable since the value of the mean of the dependent variable First Ln (GDP) is (0.401693486) is greater than the standard error of the dependent variable which is (0.295654650). This result shows that the model used in the research is preferred.

The value of the Durbin Watson statistics is (2.743), since this value is between 0.2 and 5.0, which is the acceptance region, we can conclude that there is no autocorrelation.

In the used model, and from what we get from the results, we can observe that the explanatory variables First Ln (TGEE), First Ln (TGEH), First Ln (PSE), Second Ln (SSE) and First Ln (TSE) explain the variation in the dependent variable First Ln (GDP) to a large extent. We can see the evidence of this just by looking on the R² (0.591) which indicates that 59,1% of the dependent variable is explained by the variations in the set of independents variables, since the Moroccan economy does not depend only on health and education, hence, the 59,1% obtained by the model is a very good and significant results. The model used shows also a good fit with the Adjusted R² (0.525) which is good enough for a well performed model. This value shows that approximately 52.5% variation in GDP growth is explained by the explanatory variables, and this is rational since the Moroccan economy does not depend only on education and health.

6.2.3 Interpretation of results:

▪ TGEE

According to the results, the coefficient for the First Ln (TGEE) is positive, so we can accept the H1 and conclude that TGEE has a positive effect on the Moroccan's GDP. It means that 1 unit increase in the growth rate of TGEE will increase the percentage change in the GDP or the GDP Growth Rate by 0.176%. It means that the government should increase the total expenditure on education in order to have more impact on the economy.

Although it is the A priori expectation that the TGEE should significantly affect the GDP, but the results show the opposite, according to the T stat, this is could be a result of poor intention given by the government, or it could be due to wrong estimation on the percentage of the total government spending allocated to education's sector.

- TGEH

The coefficient for the First Ln (TGEH) is positive and significant, according to the Tstat; hence, we accept the H2 and conclude that TGHE has a positive effect on the Moroccan's GDP. It means that 1 unit increase in the growth rate of TGEH will increase the GDP Growth Rate by 0.658%. It means that the Moroccan government should invest more in Health and also improve its health system in order to enhance the economic growth. However, the results totally agree with A priori expectation that the TGEH should significantly affect the GDP; this is true since the economy is directly affected by the well-being of the population.

- PRE

The coefficient of the First Ln (PRE) is negative and not significant, according to the Tstat; therefore, we reject H3 and conclude that PRE has a negative effect on the Moroccan's GDP. It means that 1 unit increase in the growth rate of PRE will decrease the GDP Growth Rate by approximately 0.105%. The result totally disagrees with A priori expectation that the PRE will have a positive effect on the economy. Consequently, the Moroccan government should not focus more on the primary school; this may be due to the political decision of the Moroccan government in relation with the mandatory schooling of all children in urban and rural areas whose age is between 7 and 13 years old. This decision may have a negative effect in the rural areas since the majority of the kids are working in the lands with their families, if those kids went to school, nobody will replace them for working in the family's land. Hence, the family production will decrease, and affect negatively the family income and also the purchasing power in the rural areas. For the urban areas, since the internal market depend on the local production, we will have a decrease in the supply, increase in the import so the Delta(Import, export) will decrease and affect negatively the GDP Growth Rate. For my point of view, this is why the PRE affect negatively the GDP Growth Rate.

- SSE

The coefficient for the Second Ln (SSE) is positive and not significant, according to the T stat; hence, we accept the H4 and conclude that SSE has a positive effect on the Moroccan's GDP. It means that 1 unit increase in the growth rate of the growth rate of SSE will increase the GDP Growth Rate by 0.06%. It means that the Moroccan government should give more intention to the secondary school. However, it is the A priori expectation that the SSE should significantly affect the GDP, but the results show the opposite, this is could be a result of poor intention given by the government to the secondary school enrollment. It could be also due to inadequate funding and weak infrastructure in this sub-sector of education in Morocco.

- TRE

The coefficient for the First Ln (TRE) is positive and significant, according to the T stat; hence, we accept the H4 and conclude that TRE has a positive effect on the Moroccan's GDP. It means that 1 unit increase in the growth rate of TRE will increase the GDP Growth Rate by 0.114%. It means that the Moroccan government should give more intention to the tertiary school. However, it is the A priori expectation that the SSE should significantly affect the GDP, but the results show the opposite this is could be a result of poor intention given by the government. This could be due to the fact that the majority of the students choose some majors that not mismatch with the market job. It could be associated with the decay in most of the tertiary institutions, incessant strikes and disruption of academic activities, inadequate funding and weak infrastructure in this sub-sector of education in Morocco.

7 Conclusion and recommendations

This research is intended in finding the impact of human capital development on the economic growth in Morocco. It gives an efficient approach to deep understanding of the importance of human capital in Morocco. Thus, a high level of human capital development can, with the right policy decisions, translate into a various cycle of good and important growth in the economy. Those policies involved, like encouraging higher levels of investment in health and education, technology change and also improving the incomes, may pull the successes in human development into sustainable economic gain. This contrast clearly illustrates a very important conclusion for development sequencing; human development is a necessary prerequisite for a long term sustainable growth.

Human capital could show many effects in the sense that Morocco must attain a certain level of human development level before future economic growth become sustainable. However, this emphasis on levels is based on the differentiation between human capital and human development in endogenous growth theory. Despite the fact that the changes in human capital and labor quality are very important for the economy to growth, it is the level of human development that controls a nation's growth path.

Besides this, a valuation of the impact of human capital development was made, in this research, by using the government spending on education and health, the enrolment trend in primary, secondary and tertiary schools as guide. In order to have a statically and scientifically prove that the human capital development has a real impact on the Moroccan's economy, I used a statistical analysis where a multiple regression model was used with the aim to evaluate the relationship between the human capital development and economic growth in Morocco for the period of 1973-2011. This multiple regression performed on the model shows that all independent variables accounted for 59.1% variations in the gross domestic product growth of Morocco. The results show that high level of human capital development in Morocco holds the key to nation's socio-economic development and also that is the greatest catalyst of the improvement of the standard of living of the population.

The study recognizes the efforts and defies of the government and also of the agencies in dealing with all the problems of growth and development in our country. Hence, to give going on same positive path of growth and based on what I get as a conclusion from the study the following recommendations can help to some extent this growth:

- There should be an establishment of special agencies with the responsibilities of improving the skills and capabilities of human capital.
- More efforts should be made in order to improve the standard of education
- Substantial amount of government budgetary allocation should be directed towards educational sector.
- Introduce standardization of curricula and licensing and certification of teachers to improve standards
- Make sure that there is equilibrium between the job market needs and what the ministry of education is offering as majors in the universities.
- The on-going reform by the Government relating to the education sector as enunciated in the needs document should be sustained with great commitment and will.
- Government should continue to provide enabling environment by ensuring macroeconomic stability that will encourage increased investment in human capital by individuals and the private sector.
- Regular closure of tertiary institutions due to strikes, cult activities, and excesses of student unions, etc. should be addressed by the relevant authorities.
- Teachers/Lectures salaries and improved working conditions in educational institutions should be accorded high priority by the Government.
- Expand institutional capacity by strengthening the infrastructure of educational institutions to produce quality manpower.
- The effort of Government on increasing primary school enrolment through the free compulsory Universal Basic Education should be sustained. This could also be complemented by involving private organizations.
- Graduates drop-out rate from post-primary education need to be addressed, through effective synergy between post-primary and technical institutions to be able to address the technical manpower needs of the economy.
- In the rural areas, in order to get benefit from the mandatory schooling of children, the government should find an alternative solution to their families so that they can keep the same level of production.
- The government should invest more and more in Health. Thus improvements in health may increase output not only through labor productivity, but also through the accumulation of capital.
- The government should establish a National Quality Strategy that will follow three broad objectives. Those objectives will be used to guide and assess local and national efforts to improve the quality of health care.
 - ✓ Improve the overall quality, by making health care more patient-centered, reliable, accessible, and safe.
 - ✓ Improve the health of the Moroccan population by supporting proven interventions to address behavioral, social and, environmental determinants of health in addition to delivering higher-quality care.
 - ✓ Reduce the cost of quality health care.

8 Implications, Future researches and Limitations

8.1 Theoretical and practical implications

This study will be the first one in Morocco that will be dealing with economic growth focusing on human capital development as “a key for the growth of the economy”. The focus will be on the effect of education and health in terms of total government spending and total enrollment. However, this study can be a starting point for other researchers who have the aim to go more deeply in human capital development. The focus can be on gender for example in terms of total enrolment, type of institutions, private or public. In fact, the practical implication of this study, in my point of view, will be the use of the results obtained in the determination of government spending in education and health and in the definition of the futures financial laws.

In addition to this, in the future research, we can add the literacy rate, student enrolment and teacher-student ration in order to study the quality of education in Morocco. We can see the effect of the number of males and females enrolled in each level on the GDP. We can use also use instead of using PSE, SSE, TSE and TGEE we use a ratio = $TGEE / (PSE+SSE+TSE)$, the new model will be as follow:

$$GDP_t = \beta_1 + \beta_2 \text{Ratio} + \beta_3 \text{TGEH} + U_t$$

This model we allow us to know exactly the impact of total government spending on each student enrolled in the whole education’s cycle on the economic growth.

8.2 Who will benefit from our research?

This research will be helpful for the Moroccan economists and decision makers to know exactly in what extend the human capital is important and needed for the growth of the economy. It is also important for human resources specialists who plan and develop strategies in their domain. They can know how the economy will positively change only on investing in health, education and also improving the quality of the educational system. The results of the research can be used by the ministry of economy, ministry of health and ministry of education. The results of the research can be used also by the World Bank.

8.3 Study limitations

The only study limitations that I found in the beginning of the research is the fact that we cannot go deeply in the analysis in term of education and health because, in the world bank database I just found 39 years of data, I need more than that in term of data in order to have more significance of the results.

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Variable Code	Variable Name	Measure of the variable	Source
GDP	Gross domestic product	GDP Growth rate	Worldwide Governance Indicators: http://info.worldbank.org/governance/wgi/index.asp
TGEE	Total government expenditure on education	government expenditure	Worldwide Governance Indicators: http://info.worldbank.org/governance/wgi/index.asp
TGEH	Total government expenditure on health	government expenditure	Worldwide Governance Indicators: http://info.worldbank.org/governance/wgi/index.asp
PSE	Primary school enrolment	Number of student enrolled	Worldwide Governance Indicators: http://info.worldbank.org/governance/wgi/index.asp
SSE	Secondary school enrolment	Number of student enrolled	Worldwide Governance Indicators: http://info.worldbank.org/governance/wgi/index.asp
TSE	Tertiary school enrolment	Number of student enrolled	Worldwide Governance Indicators: http://info.worldbank.org/governance/wgi/index.asp

Table1: The variables of the Model

Appendix 3: Normality Test

➤ GDP

Descriptives

			Statistic	Std. Error
Morrocan's GDP (MAD)	Mean		3,44985E+11	22999790676
	95% Confidence Interval for Mean	Lower Bound	2,98424E+11	
		Upper Bound	3,91545E+11	
	5% Trimmed Mean		3,38998E+11	
	Median		3,18879E+11	
	Variance		2,063E+22	
	Std. Deviation		1,43634E+11	
	Minimum		1,4371E+011	
	Maximum		6,6417E+011	
	Range		5,2046E+11	
	Interquartile Range		2,1046E+11	
	Skewness		,647	,378
	Kurtosis		-,486	,741

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Morrocan's GDP (MAD)	,099	39	,200 [*]	,939	39	,063

From the results we have the significant value of Kolmogrove and Shapiro is greater than 0.05. Hence, we can conclude that the sampled population for GDP is normally distributed.

➤ TGEE:

Descriptives

			Statistic	Std. Error
Education Exp (MAD)	Mean		19452387138	1241430843
	95% Confidence Interval for Mean	Lower Bound	16939241785	
		Upper Bound	21965532491	
	5% Trimmed Mean		19231214600	
	Median		17484210161	
	Variance		6,010E+19	
	Std. Deviation		7752733128	
	Minimum		6488131174	
	Maximum		37129668568	
	Range		30641537394	
	Interquartile Range		11077012156	
	Skewness		,590	,378
	Kurtosis		-,266	,741

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Education Exp (MAD)	,132	39	,087	,953	39	,102

From the results we have the significant value of Kolmogrove and Shapiro is greater than 0.05. Hence, we can conclude that the sampled population for TGEE is normally distributed.

➤ TGHE:

Descriptives

			Statistic	Std. Error
Health Exp (MAD)	Mean		15280462537	1383475253
	95% Confidence Interval for Mean	Lower Bound	12479763309	
		Upper Bound	18081161765	
	5% Trimmed Mean		14791067193	
	Median		12181190117	
	Variance		7,465E+19	
	Std. Deviation		8639800185	
	Minimum		5359887125	
	Maximum		34670558346	
	Range		29310671221	
	Interquartile Range		14534038369	
	Skewness		,947	,378
	Kurtosis		-,375	,741

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Health Exp (MAD)	,125	39	,143	,864	39	,271

From the results we have the significant value of Kolmogrove and Shapiro is greater than 0.05. Hence, we can conclude that the sampled population for TGHE is normally distributed.

➤ PSE:

Descriptives

			Statistic	Std. Error
Enrolment in primary (Students)	Mean		2810094,28	145612,456
	95% Confidence Interval for Mean	Lower Bound	2515317,28	
		Upper Bound	3104871,29	
	5% Trimmed Mean		2822762,27	
	Median		2578566,00	
	Variance		8,269E+11	
	Std. Deviation		909349,499	
	Minimum		1275857	
	Maximum		4101157	
	Range		2825300	
	Interquartile Range		1687809	
	Skewness		,045	,378
	Kurtosis		-1,340	,741

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Enrolment in primary (Students)	,154	39	,021	,916	39	,007

From the results we have the significant value of Kolmogrove and Shapiro is greater than 0.05. Hence, we can conclude that the sampled population for PSE is normally distributed.

➤ SSE:

Descriptives

			Statistic	Std. Error
Enrolment in secondary (Students)	Mean		1400558,67	121548,805
	95% Confidence Interval for Mean	Lower Bound	1154495,98	
		Upper Bound	1646621,36	
	5% Trimmed Mean		1333580,14	
	Median		1375703,00	
	Variance		5,762E+11	
	Std. Deviation		759072,044	
	Minimum		335190	
	Maximum		4190937	
	Range		3855747	
	Interquartile Range		796940	
	Skewness		1,453	,378
	Kurtosis		3,913	,741

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Enrolment in secondary (Students)	,156	39	,074	,894	39	,091

From the results we have the significant value of Kolmogrove and Shapiro is greater than 0.05. Hence, we can conclude that the sampled population for SSE is normally distributed.

➤ TSE:

Descriptives

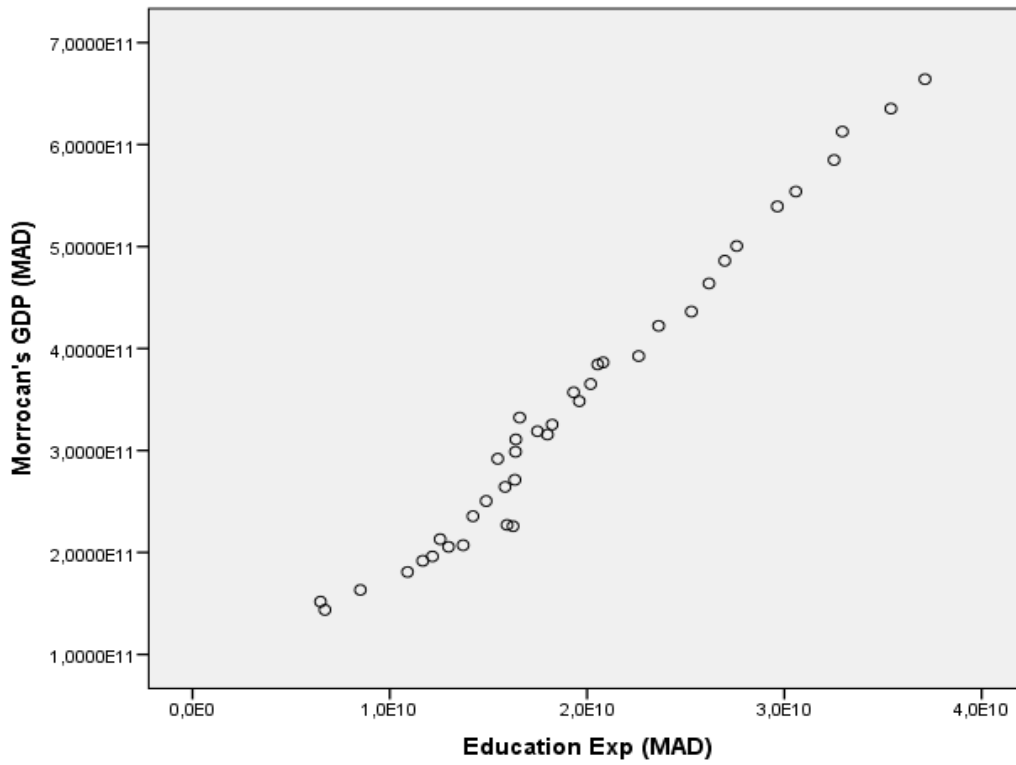
			Statistic	Std. Error
Enrolment in tertiary (Students)	Mean		232237,23	19897,737
	95% Confidence Interval for Mean	Lower Bound	191956,37	
		Upper Bound	272518,09	
	5% Trimmed Mean		232802,02	
	Median		255667,00	
	Variance		15440877564	
	Std. Deviation		124261,328	
	Minimum		22382	
	Maximum		430928	
	Range		408546	
	Interquartile Range		201338	
	Skewness		-,202	,378
	Kurtosis		-1,109	,741

Tests of Normality

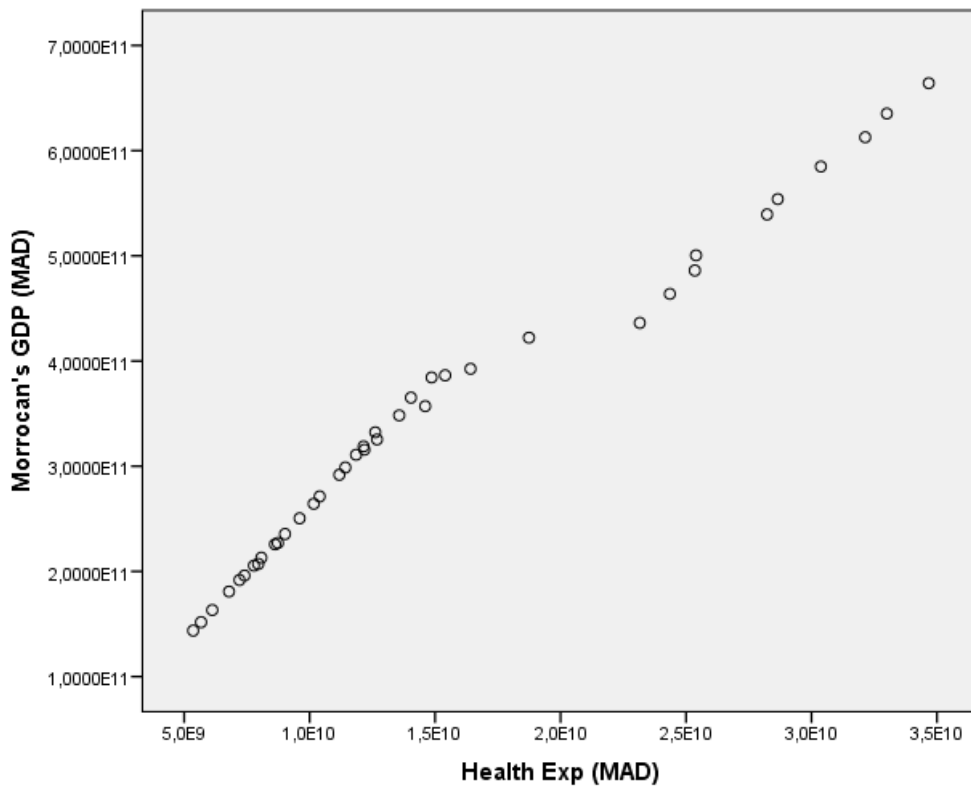
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Enrolment in tertiary (Students)	,132	39	,086	,946	39	,061

From the results we have the significant value of Kolmogrove and Shapiro is greater than 0.05. Hence, we can conclude that the sampled population for TSE is normally distributed.

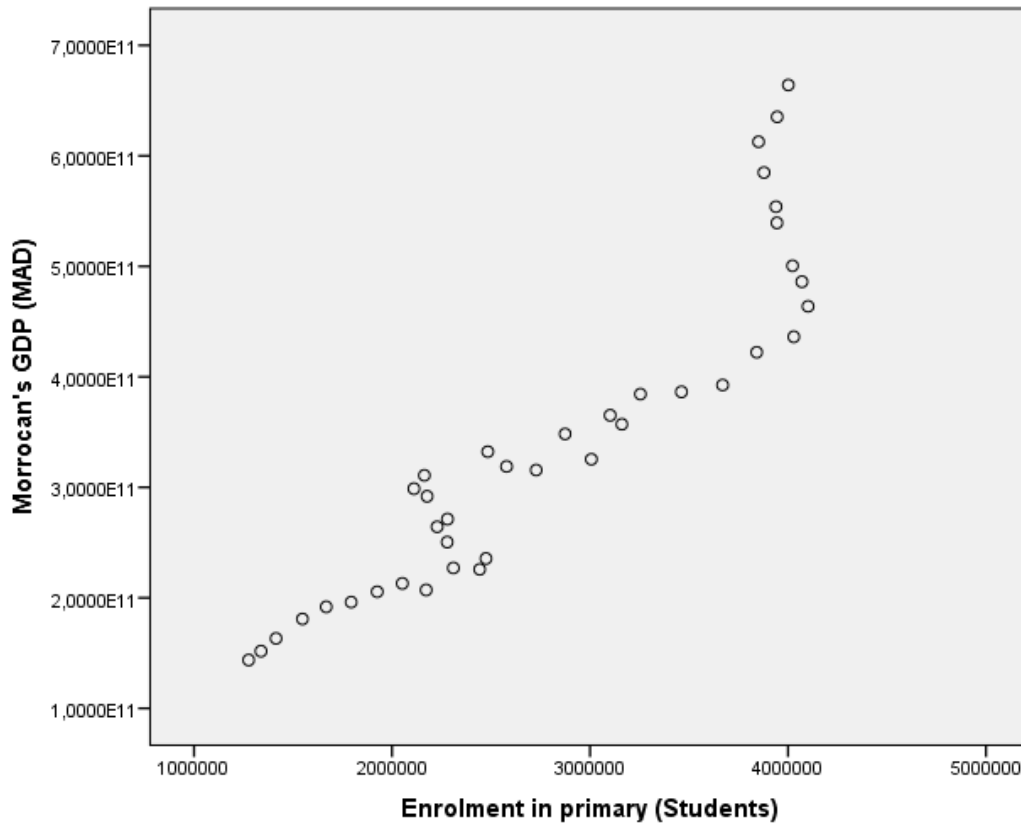
Appendix 4: Linearity Test



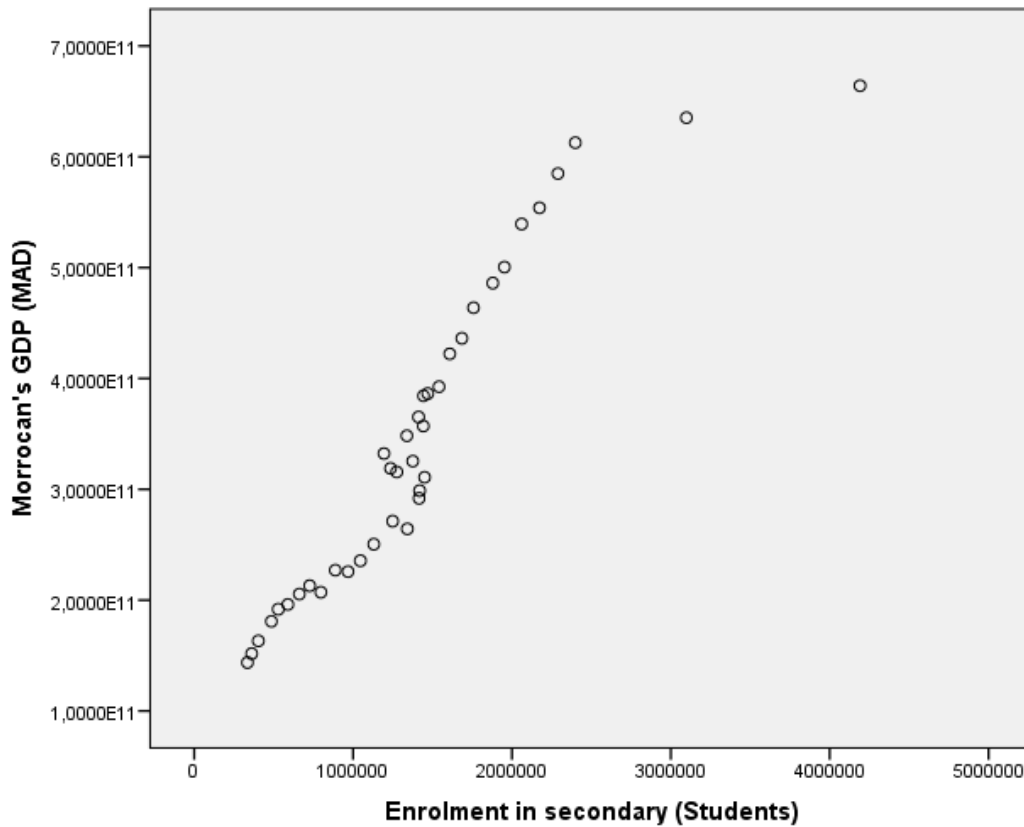
From the graph we can conclude that GDP and TGEE are linear.



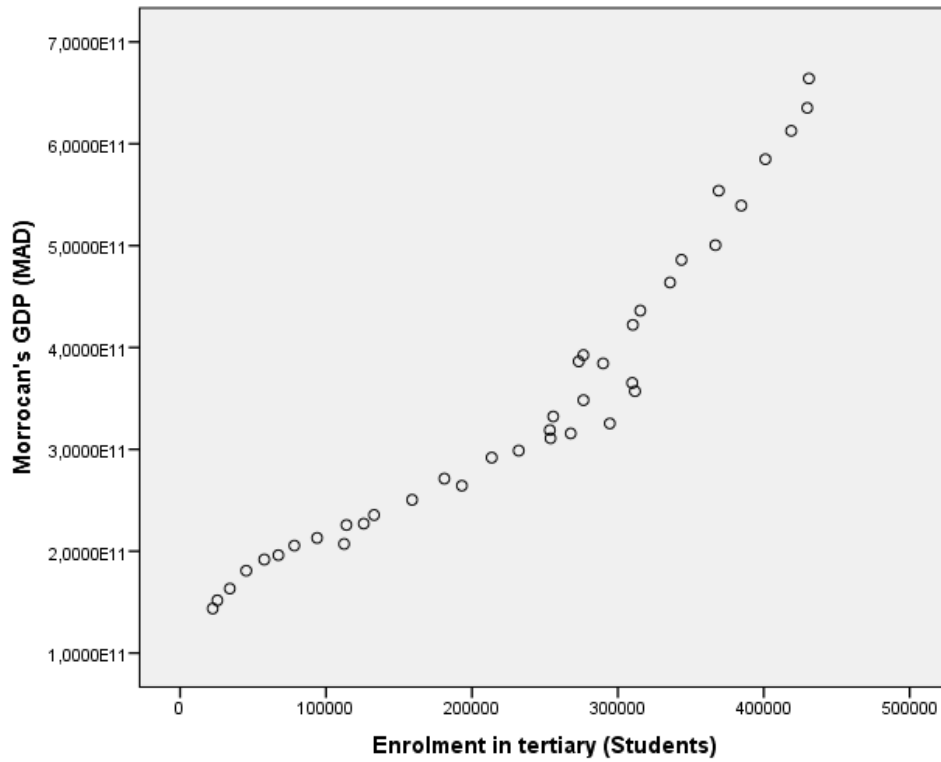
From the graph we can conclude that GDP and TGEH are linear.



From the graph we can conclude that GDP and PSE are linear.

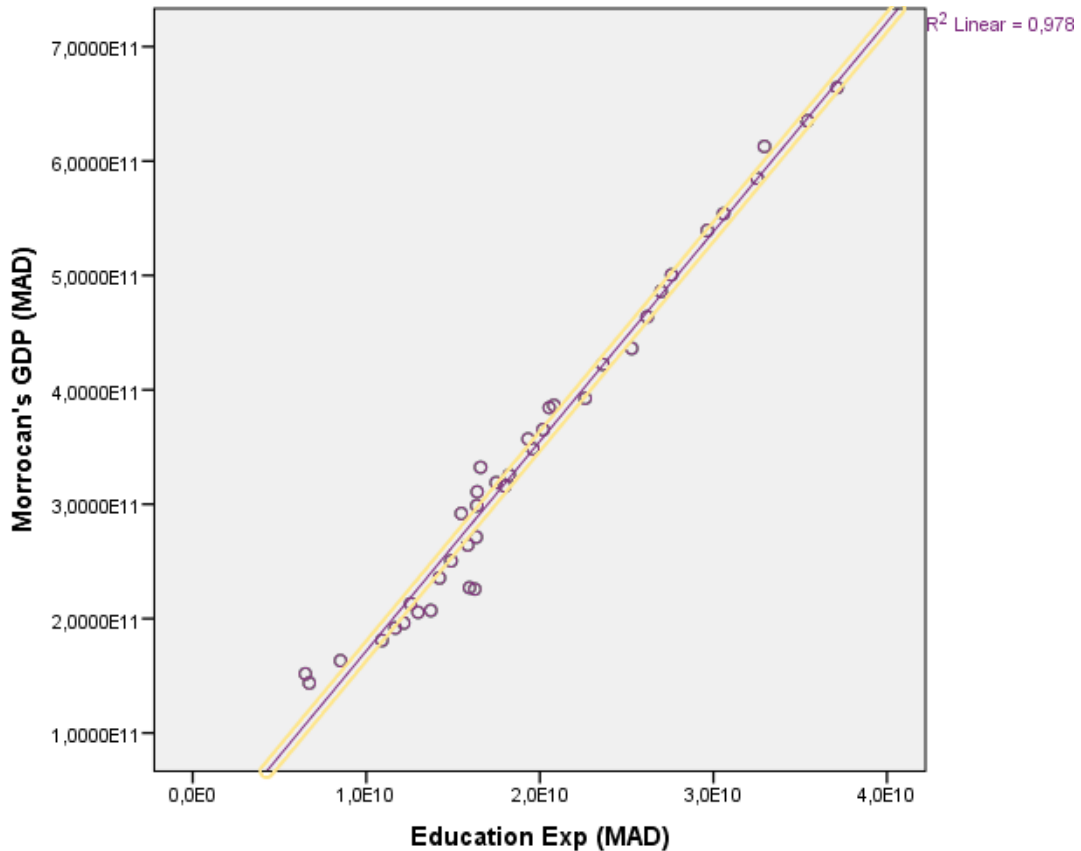


From the graph we can conclude that GDP and SSE are linear.

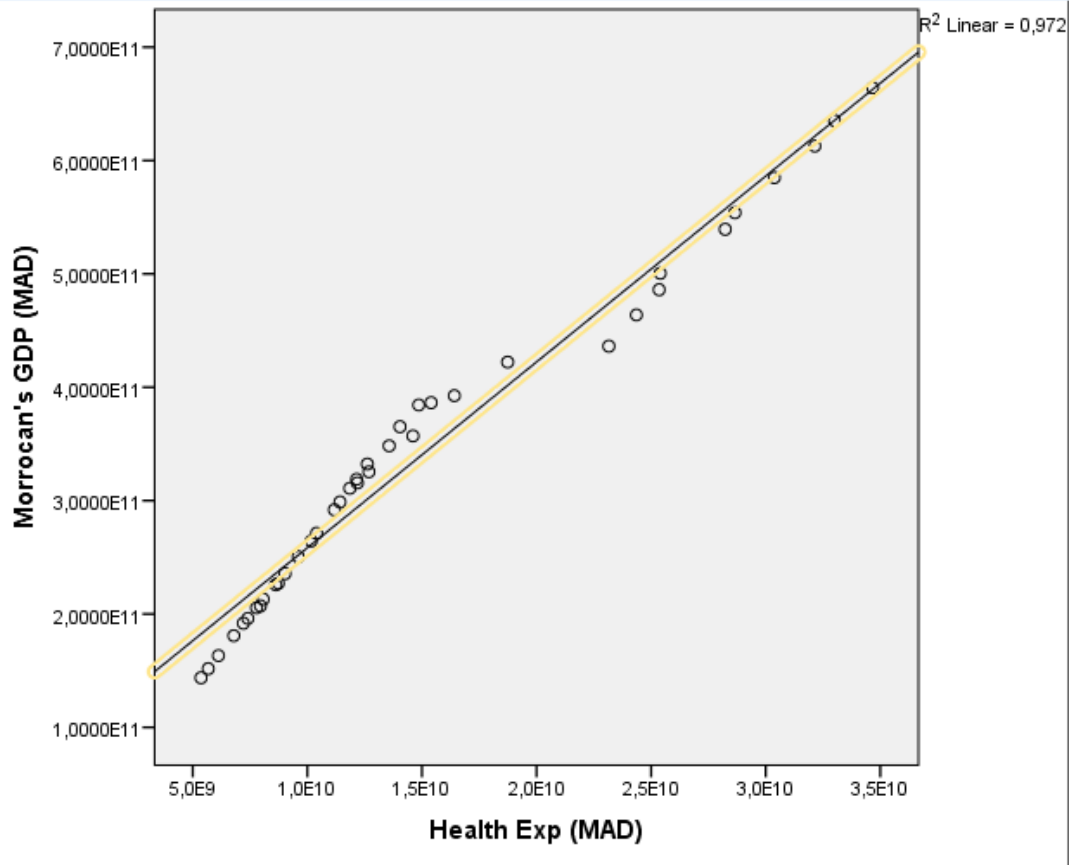


From the graph we can conclude that GDP and SSE are linear.

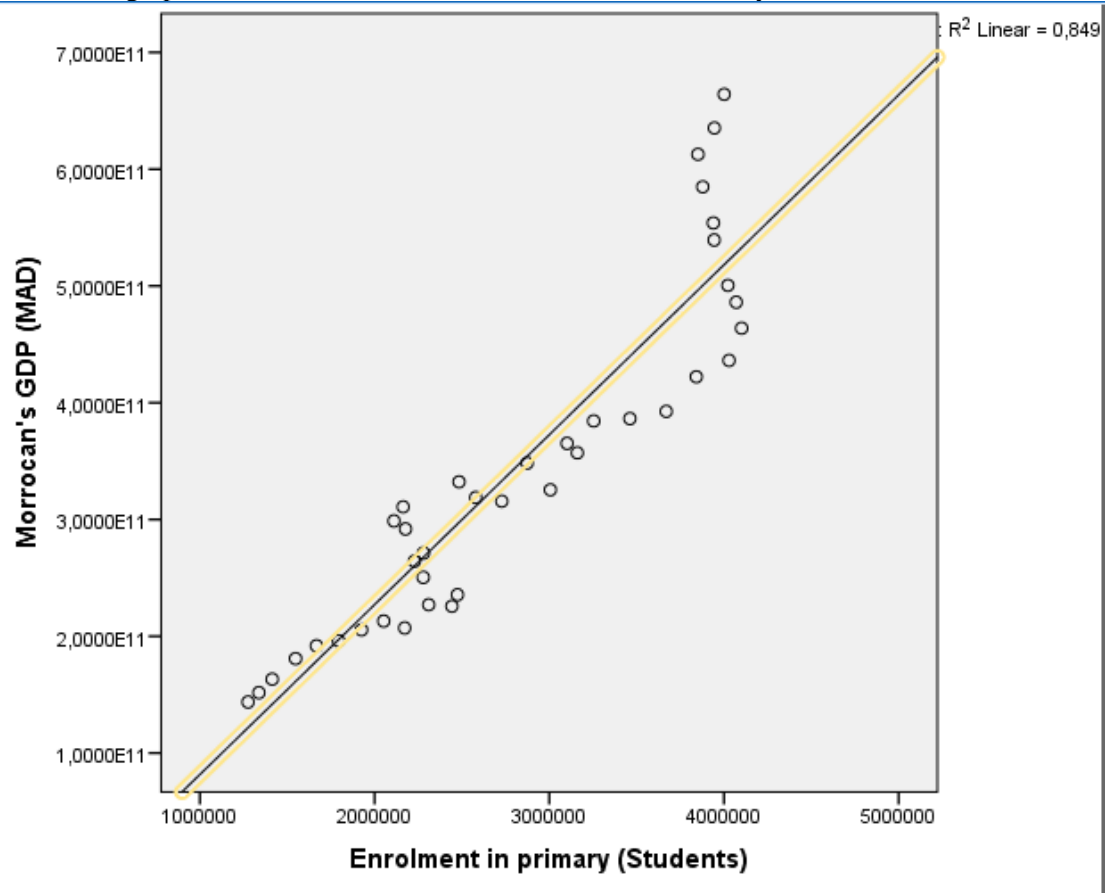
Appendix 5: Homoscedasticity Test



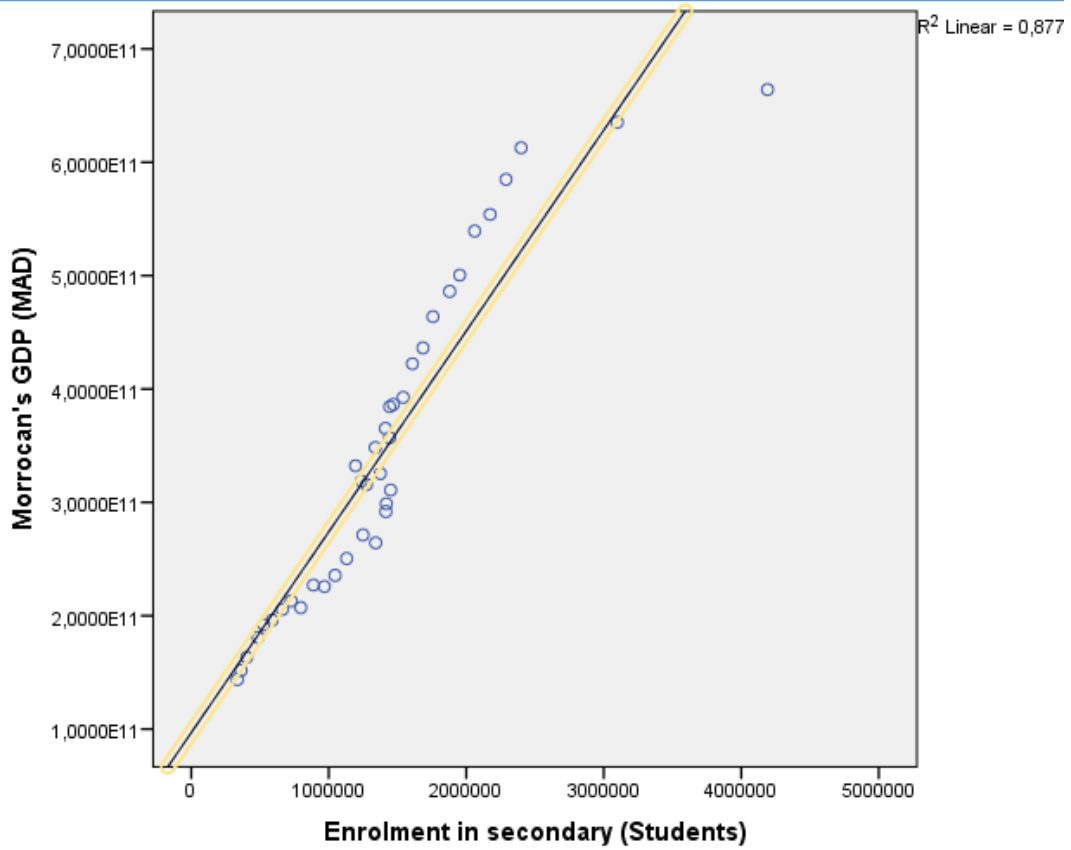
From the graph we can conclude that there is a homoscedasticity between GDP and TGEE.



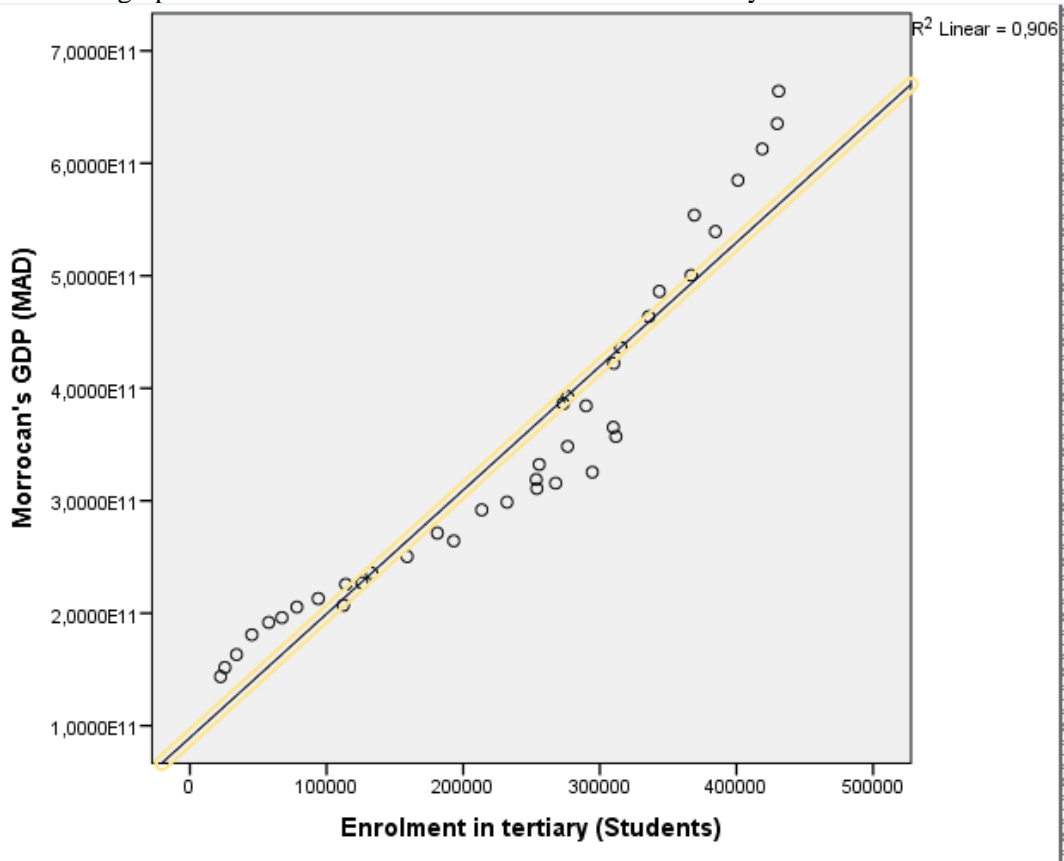
From the graph we can conclude that there is a homoscedasticity between GDP and TGEH.



From the graph we can conclude that there is a homoscedasticity between GDP and PSE.



From the graph we can conclude that there is a homoscedasticity between GDP and SSE.



From the graph we can conclude that there is a homoscedasticity between GDP and TSE.

Appendix 6: Multi-collinearity Test
VIF = the Variance Inflation Factor

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln second differences En Sec	,839	1,191
	Ln first differences En ter	,843	1,186
	Ln first differences En Pri	,834	1,199
	Ln first differences Health	,792	1,263
	Ln first differences Education	,705	1,419

a. Dependent Variable: Ln first differences GDP

Since the VIF is less than 3, around 1 and the tolerance is greater than 0.1, we do not have a problem of multi collinearity.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln first differences Health	,904	1,106
	Ln first differences En Pri	,888	1,126
	Ln second differences En Sec	,850	1,176
	Ln first differences En ter	,943	1,061

a. Dependent Variable: Ln first differences Education

Since the VIF is less than 3, around 1 and the tolerance is greater than 0.1, we do not have a problem of multicollinearity.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln first differences En Pri	,844	1,184
	Ln second differences En Sec	,897	1,115
	Ln first differences En ter	,848	1,179
	Ln first differences Education	,805	1,243

a. Dependent Variable: Ln first differences Health

Since the VIF is less than 3, around 1 and the tolerance is greater than 0.1, we do not have a problem of multicollinearity.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln second differences En Sec	,945	1,059
	Ln first differences En ter	,844	1,185
	Ln first differences Education	,750	1,333
	Ln first differences Health	,802	1,247

a. Dependent Variable: Ln first differences En Pri

Since the VIF is less than 3, around 1 and the tolerance is greater than 0.1, we do not have a problem of multicollinearity.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln first differences En ter	,845	1,184
	Ln first differences Education	,714	1,401
	Ln first differences Health	,846	1,182
	Ln first differences En Pri	,939	1,065

a. Dependent Variable: Ln second differences En Sec

Since the VIF is less than 3, around 1 and the tolerance is greater than 0.1, we do not have a problem of multicollinearity.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln first differences Education	,788	1,269
	Ln first differences Health	,797	1,255
	Ln first differences En Pri	,834	1,198
	Ln second differences En Sec	,841	1,189

a. Dependent Variable: Ln first differences En ter

Since the VIF is less than 3, around 1 and the tolerance is greater than 0.1, we do not have a problem of multicollinearity.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln first differences En Pri	,889	1,125
	Ln second differences En Sec	,898	1,114
	Ln first differences En ter	,989	1,011

a. Dependent Variable: Ln first differences Education

Since the VIF is less than 3, around 1 and the tolerance is greater than 0.1, we do not have a problem of multicollinearity.

Appendix 7: Regression Results

Descriptive Statistics

	Mean	Std. Deviation	N
First Ln (GDP)	,0401693486	,0429142222	37
First Ln (TGEE)	,0449355622	,0747677878	37
First Ln (TGEH)	,0491240530	,0515639941	37
First Ln (PSE)	,0305103189	,0417232853	37
Second Ln (SSE)	,0372298097	1,149935779	37
First Ln (TSE)	,0798687030	,0906840115	37

Correlations

		First Ln (GDP)	First Ln (TGEE)	First Ln (TGEH)	First Ln (PSE)	Second Ln (SSE)	First Ln (TSE)
Pearson Correlation	First Ln (GDP)	1,000	,447	,729	-,014	-,048	,304
	First Ln (TGEE)	,447	1,000	,375	,230	,103	,368
	First Ln (TGEH)	,729	,375	1,000	,072	-,200	,211
	First Ln (PSE)	-,014	,230	,072	1,000	-,118	,098
	Second Ln (SSE)	-,048	,103	-,200	-,118	1,000	-,061
	First Ln (TSE)	,304	,368	,211	,098	-,061	1,000
Sig. (1-tailed)	First Ln (GDP)	.	,003	,000	,468	,388	,034
	First Ln (TGEE)	,003	.	,011	,086	,273	,013
	First Ln (TGEH)	,000	,011	.	,337	,118	,105
	First Ln (PSE)	,468	,086	,337	.	,244	,282
	Second Ln (SSE)	,388	,273	,118	,244	.	,359
	First Ln (TSE)	,034	,013	,105	,282	,359	.
N	First Ln (GDP)	37	37	37	37	37	37
	First Ln (TGEE)	37	37	37	37	37	37
	First Ln (TGEH)	37	37	37	37	37	37
	First Ln (PSE)	37	37	37	37	37	37
	Second Ln (SSE)	37	37	37	37	37	37
	First Ln (TSE)	37	37	37	37	37	37

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,769 ^a	,591	,525	,0295654650	,591	8,969	5	31	,000	2,743

a. Predictors: (Constant), First Ln (TSE), Second Ln (SSE), First Ln (PSE), First Ln (TGEH), First Ln (TGEE)

b. Dependent Variable: First Ln (GDP)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,039	5	,008	8,969	,000 ^b
	Residual	,027	31	,001		
	Total	,066	36			

a. Dependent Variable: First Ln (GDP)

b. Predictors: (Constant), First Ln (TSE), Second Ln (SSE), First Ln (PSE), First Ln (TGEH), First Ln (TGEE)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics		
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF	
1	(Constant)	,008	,008		,917	,366	-,009	,025						
	First Ln (TGEE)	,101	,079	,176	1,280	,210	-,060	,262	,447	,224	,147	,697	1,434	
	First Ln (TGEH)	,548	,107	,658	5,113	,000	,329	,766	,729	,676	,587	,796	1,256	
	First Ln (PSE)	-,108	,123	-,105	-,881	,385	-,359	,142	-,014	-,156	-,101	,924	1,082	
	Second Ln (SSE)	,002	,005	,060	,491	,627	-,007	,011	-,048	,088	,056	,894	1,118	
	First Ln (TSE)	,054	,059	,114	,918	,366	-,066	,174	,304	,163	,105	,852	1,174	

a. Dependent Variable: First Ln (GDP)

Coefficient Correlations^a

Model		First Ln (TSE)	Second Ln (SSE)	First Ln (PSE)	First Ln (TGEH)	First Ln (TGEE)
1	Correlations	First Ln (TSE)	1,000	,087	-,003	-,060
		Second Ln (SSE)	,087	1,000	,155	,257
		First Ln (PSE)	-,003	,155	1,000	,057
		First Ln (TGEH)	-,060	,257	,057	1,000
		First Ln (TGEE)	-,319	-,241	-,233	-,366
		1,000				
Covariances	First Ln (TSE)	,003	2,319E-005	-1,980E-005	,000	-,001
	Second Ln (SSE)	2,319E-005	2,053E-005	8,607E-005	,000	-8,603E-005
	First Ln (PSE)	-1,980E-005	8,607E-005	,015	,001	-,002
	First Ln (TGEH)	,000	,000	,001	,011	-,003
	First Ln (TGEE)	-,001	-8,603E-005	-,002	-,003	,006

a. Dependent Variable: First Ln (GDP)

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	First Ln (TGEE)	First Ln (TGEH)	First Ln (PSE)	Second Ln (SSE)	First Ln (TSE)
1	1	3,252	1,000	,02	,03	,03	,03	,00	,03
	2	1,046	1,763	,00	,02	,01	,01	,80	,00
	3	,596	2,337	,01	,06	,08	,72	,02	,06
	4	,478	2,608	,19	,64	,01	,05	,03	,06
	5	,420	2,781	,02	,00	,40	,00	,02	,64
	6	,208	3,959	,76	,26	,48	,19	,14	,21

a. Dependent Variable: First Ln (GDP)

Casewise Diagnostics^a

Case Number	Std. Residual	First Ln (GDP)	Predicted Value	Residual	Status
1	,552	,05445078	,0381433829	,0163073971	
2	-,485	,07286211	,0872067992	-,0143446892	
3	,321	,10267194	,0931953666	,0094765734	
4	,201	,05882694	,0528715252	,0059554148	
5	-,175	,02208104	,0272626764	-,0051816364	
6	,185	,04682430	,0413487514	,0054755486	
7	,279	,03577406	,0275335019	,0082405581	
8	-1,355	-,02803268	,0120227797	-,0400554597	
9	,630	,09184040	,0732024253	,0186379747	
10	,119	-,00559102	-,0091177606	,0035267406	
11	,567	,04244973	,0256915894	,0167581406	
12	-,144	,06133145	,0655866978	-,0042552478	
13	,426	,07972859	,0671434442	,0125851458	
14	-,782	-,02577622	-,0026563299	-,0231198901	
15	1,377	,09907229	,0583712115	,0407010785	
16	-,489	,02339044	,0378476491	-,0144572091	
17	,157	,03955188	,0349146503	,0046372297	
18	1,423	,06670540	,0246210985	,0420843015	
19	-,974	-,04114430	-,0123564284	-,0287878716	
20	-,676	-,01017422	,0098239427	-,0199981627	
21	,958	,09855975	,0702296726	,0283300774	
22	-1,010	-,06805885	-,0381934966	-,0298653534	
23	1,452	,11526332	,0723269057	,0429364143	
24	-1,313	-,02252911	,0162932298	-,0388223398	
25	1,727	,07377143	,0227237492	,0510476808	

26	-,524	,00528021	,0207714596	-,0154912496	
27	-,986	,01580019	,0449637820	-,0291635920	
28	-,453	,07280382	,0861962945	-,0133924745	
29	-3,154	,03262241	,1258748650	-,0932524550	
30	,676	,06125470	,0412822730	,0199724270	
31	,457	,04690139	,0333772503	,0135241397	
32	,434	,02935016	,0165304453	,0128197147	
33	-,092	,07473497	,0774442911	-,0027093211	
34	,334	,02669816	,0168278505	,0098703095	
35	,091	,05436560	,0516689025	,0026966975	
36	-,010	,04648605	,0467691400	-,0002830900	
37	,257	,03611879	,0285223123	,0075964777	
38	.	,04448351	.	.	M ^b
39	M ^b

a. Dependent Variable: First Ln (GDP)

b. Missing Case

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-,0381934978	,1258748621	,0401693486	,0329987704	37
Residual	-,0932524577	,0510476790	0E-11	,0274355904	37
Std. Predicted Value	-2,375	2,597	,000	1,000	37
Std. Residual	-3,154	1,727	,000	,928	37

a. Dependent Variable: First Ln (GDP)