Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.6, No.16, 2015

The Impact of Human Capital on Economic Growth in Ethiopia

Dinkneh Gebre Borojo[1] Jiang Yushi[2]
School of Economics and Management, Southwest Jiaotong University, Chengdu, China
*E-mail:g10dinkneh@yahoo.com

This research is supported by NSFC (Research on the Integrated Learning Model of Web oriented Advertising Based on the Large Data Background), Chinese Sichuan Province Science and Technology Department (2015ZR0015) and Chines Sichuan Province Liqu or Industry Development Projects (SC14BJ18).

Abstract
In contemporary economics literatures human capital accumulation is considered as one of the major determinants of economic growth. To this effect, this study used empirical econometric model to analyse the impact of education and health (human capital) on economic growth from 1980-2013 in Ethiopia. Human capital stock is proxied by primary, secondary and tertiary school enrolment. Human capital investment is proxied by expenditure on education and health. Augmented Dickey Fuller test and Johansen's Co-integration technique were used to test unit root and to validate co-integration among variables, respectively. The findings of the study have shown public expenditure on health and education, primary and secondary school enrolment have positive statistically significant effect on economic growth both in long run and short run. In addition, physical capital has positive whilst inflation has negative effect on economic growth. However, tertiary school enrolment has insignificant effect on economic growth both in long run and short run. Based on these findings exceling an effort to increase primary and secondary school enrolment is recommended. In addition, substantial amount of government expenditure should be allocated towards health and education sectors to further increase contribution of the sectors to economic growth.
Keywords: Economic Growth, Health, Education, Time Series Model, Human Capital

1. Introduction

Some neoclassical economic growth models give due attention to physical capital accumulation and technology to bring economic growth. In Solow (1956) growth model technological improvement is considered as the source of economic growth in the long run. Countries with better technology will grow faster compared to countries which have no better technological advancement. In this model only change in technological progress have permanent growth effects. In addition, countries with higher saving rate will have better capital labor ratio (physical capital accumulation) hence will grow faster than others with low saving rate (Harrod 1939 and Domar 1946). However, the effect of saving on economic growth is only for short run time (Solow 1956 & Swan 1956). Overtime, different scholars affirmed that in addition to physical capital accumulation and technology improvement, increase in human capital accumulation is also important to enhance economic growth. According to extended economic growth model of Solow (1990) increase in accumulation of human capital is considered as the cause for the large increase in output of the production. In addition, growth model of Lucas (1988) revealed the significance of human capital accumulation as a complementary factor into production in parallel to physical capital accumulation. Based on his model the fundamental source of growth is human capital because as accumulation of human capital increases, the productivity of both workers and machines, equipment and other physical capital raise. Romer (1990) has also included Human capital as a measure of cumulative effect of formal education and on the-job training to his endogenous economic growth model.

Health and education are two closely related human (resource) capital components that work together to make the individual more effective in production (International Institute for Applied Systems Analysis 2008). Improvement in health of workers increases productivity. In turn increase in productivity results in economic growth either through reducing work off days or through increasing production in work place. Healthier workers are more energetic and strong. Health has wider concept than merely absence of sickness. It is the ability of people to develop to their potential during their entire lives. In that sense, health is an important asset individuals possess, which has intrinsic value (being healthy is a very important source of well-being) as well as instrumental value (Bloom,Canning &Sevilla 2004).In addition, vigorous investment on education can be considered as a platform for progress in economic growth subject to appropriate policy environment. Therefore, Accumulation of human capital consist investments on abilities, human skills, creative knowledge and health of people. So, allocating more resources to human capital will have positive effect on production (Romer 1996) and further improve economic growth by converting resources to mankind's use and value (Adelakun 2011).

In Ethiopia a few studies have been conducted on economic impact of human capital on economic growth. The studies on the impact of human capital on economic growth so far, however, are not sufficient. Mehraral and Musai (2013); Brempong , Paddison &workie (2006); Eggoh, Houeninvob & Sossoub (2015);

Grier (2005); Ndambiri et al. (2012); Brempong and Wilson (2004); Girma ,Abdulwahab &Gupta (2013) among others have conducted study on the impact of human capital on economic growth in Sub-Saharan countries and some other developing countries. They have conducted panel data models to study a cross country effect of human capital on economic growth in these countries. Some of them have included Ethiopia among their sample and some others not. The results of these studies are also mixed; some found positive effect of human capital on economic growth and some other have found negative or insignificant effect of human capital on economic growth. To examine the effect of human capital on economic growth accurately country specific study is worthwhile. Thus, the aim of this paper is to analyse the impact of human capital on economic growth in Ethiopia using time series econometric model.

The rest of this study is organized into four parts; part two is about theoretical and empirical literature, and trends of school enrollment and public spending on education and health in Ethiopia. Part three covers research methodology and data. Part four majors in results and discussions. Part five then is about the conclusion and policy recommendation.

2.Literature Review

2.1Theoretical Literature

Economic growth and functioning of a country relies on its physical capital accumulation and human capital accumulation (Adekola 2014 & Adawo 2011). Adam Smith's belief that the key to the growth of labour productivity is the division of labour which in turn depends on the extent of the market and thus upon physical capital accumulation which in turn is cause for economic growth. In addition, in Solow (1956) and Swan (1956) economic growth model technological progress is a source of economic growth in the long run. However, it is left unexplained in detail about technology. In the Solow (1956) growth model he attempted to show the relationship between production (Y) and factor of production such as physical capital (K_t), labor force (L_t) and technology (A_t) is shown as per the following Cobb- Douglas specifications of production function.

$$Y(K_t,A_t, L_t)= A_t K^{\alpha}_t L^{1-\alpha}_t \quad \text{---------- (1)}$$

Keeping perfect competition assumption prevail, α measures the sensitivity of output with respect to capital (physical capital's share of total income) and 1-α measures the responsiveness of output with respect to labour (labor's share from total income).

However, their economic growth models do not provide satisfying answer for source of economic growth. If physical capital earning in total income is modest, physical capital accumulation does not account for significant part of long run economic growth (Romer 2006). In addition to other factors of production human capital is affirmed as an important factor of production to impact economic growth. Mankiw, Romer &Weil (1992) extended Solow (1956) model of growth by adding human capital, specifying this variable has a significant impact on economic growth that is convenient to this study. Investment in human capital, innovation and knowledge are significant contributors to economic growth. This model is extended to incorporate dynamics of physical capital accumulation to human capital accumulation in Augumented Solow grow model. The extended model was estimated by Mankiw, Romer &Weil (1992) describing by a Cobb-Douglas constant return to scale production function:

$$Y(t) = K(t)^{\alpha}H(t)^{\beta} (A(t))L(t))^{1-\alpha-\beta} \quad \text{----------(2)}$$

Where, Y(t) is output in time t, A(t) is technology in time t, K(t) is physical capital in time t, H(t) is human capital in time t, and L(t) is labor in time t. The parameters α, β and 1- α - β are the output elasticities with respect to physical and human capital and effective labor (shares of physical and human capital and effective labor in total income), respectively.

In addition, For Lucas (1988) human capital accumulation is a complementary input in the production in parallel to physical capital accumulation. According to him the 'engine' of growth is human capital, as human capital accumulation raises the productivity of both labour and physical capital (Adelakun 2011).

2.2. Empirical Literature

Numerous studies have examined the impact of human capital on economic growth. They have empirically analyzed the effect of human capital in different proxies. Human capital accumulation can be included in growth model in terms of education enrollment and expenditure and health status of workers. The results of some studies show that human capital has insignificant effect and/or negative effect on economic growth in different countries, different econometric models and different data set.

Romer (1990) used adult literacy rate as a proxy for the stock of human capital for a sample of 112 countries. He found the literacy rate has significant and positive effect on economic growth. In addition, Khembo and Tchereni (2013) examined the impact of human capital on economic growth in the SADC region using health and education capital as proxy for human capital accumulation. Their findings show that education capital had a positive and significant effect on GDP per capita whilst health capital has a positive but insignificant effect on economic growth in the region. In an investigation of the impact of education and health on economic growth

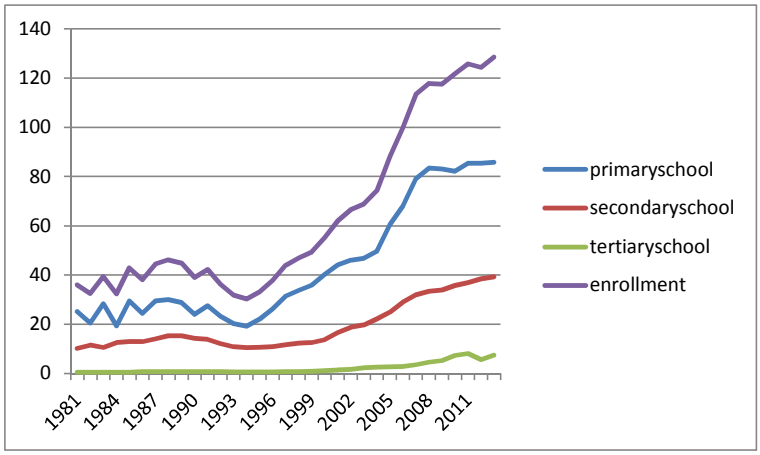
in African countries Eggoh, Houeninvob &Sossoub (2015) found human capital stock (school enrollment and life expectancy at birth) have positive effect on economic growth. However, human capital investment (public expenditures on education and health) has a negative impact on economic growth. They used school enrollments and life expectancy as proxy for human capital stock and public expenditure on education and health for human capital investment. Victoria (2015) examined the impact of human capital on economic growth in Nigeria using education and health expenditure, primary school enrollment, secondary school enrollment and tertiary school enrollment as proxy for human capital investment and accumulation; and the findings the study indicate that public expenditure on health, secondary and tertiary enrollment rate have significant positive effect on economic growth. However, government expenditure on education and primary enrolment rate has not. Furthermore, Adawo (2011) analyzed contribution of human capital to economic growth in Nigeria using school enrollments at various levels and total expenditure on health proxies for human capital. All primary school input and health were found to contribute to growth. However, Secondary school input and tertiary institutions were found to dampen growth. Alireza, Teymour & Maryam (2014) surveyed the effect of human capital on economic growth in Oil Rich Countries using health expenditure and they found that human capital has no effect on economic growth in African Countries. From these studies, therefore, we can use different variables to represent human capital stock and investment. We use school enrollment as a proxy of human capital stock and public expenditure on education and health as a proxy of human capital investment. Human capital stock and human capital investment variables together represent human capital accumulation and hence inter into macroeconomic model to see their effect on economic growth.

2.3. Trends of Schools Enrolment and Public Expenditure on Education and Health in Ethiopia

2.3.1. Trends of Schools Enrolment

School enrollment has increased significantly from 1995 after the government has given emphasis on pro-poor expenditure specially in improving access to education. As a result, it has registered 87.5 % primary school enrolment rate in 2013 from 22% enrolment rate in 1995. This indicates the efforts of stakeholders to increase primary school enrolment were considerable and hence a great deal of children has joined primary school in the country in the last two decades. In addition, having stagnated between 1981 and 1999, secondary school enrolment rate was considerably increased in between 2001 and 2013. It was reached 39.3 % in 2013 from its level of merely 13.64% in 1999. However, tertiary school enrolment is still very low having 7.4 % enrolment rate. But compared to 0.96% enrolment rate in 1999, the change on tertiary school enrolment rate is very significant (figure 1).

Fig.1. Trends of Schools Enrollment in Ethiopia



Source: Own Computation from World Development Indicator, 2014

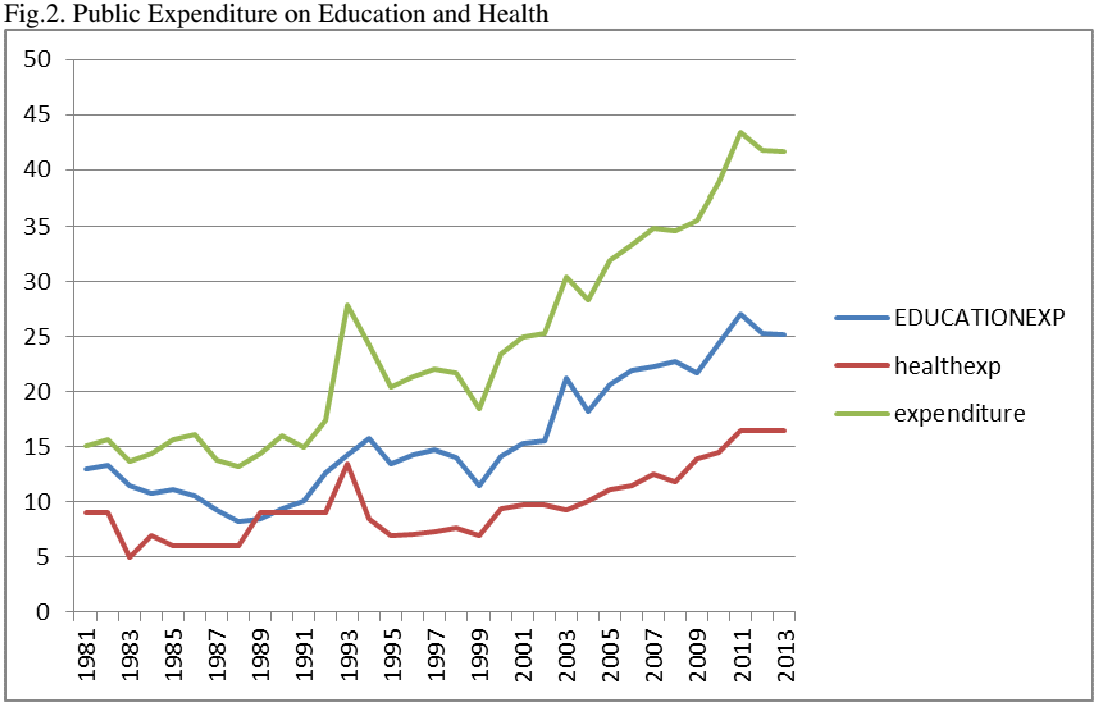
2.3.2. Trends of Public Expenditure on Education and Health

Government expenditure is categorized in to economic development, social development, general service and others. Economic development expenditure includes agricultural development, trade and tourism, construction and industry while social development expenditure consists of expenditure on education and training, health care, urban development and housing, and culture and sport. Among these social development expenditures, education and health expenditure takes the lion share. Education expenditure was 11.5 % of total government

expenditure in 1999. However, the share has increased to 25.2% in 2013 which is double of the share in 1999. This budgetary disbursement to the education sector in 2013, as shown in the figure below fulfills the minimum budget allocation requirement by UNESCO which suggests that a minimum of 25 percent of budgetary allocation should be allocated to education sector.

In addition, Ethiopia has made substantial advancement towards addressing human resources and financial problems in health sector. Improvement is made especially on health of women and children through innovative health extension programs. The progress made in the health care financing system, however, is inefficient, inequitable and a little slow (Eskinder 2014). The sector is still underfinanced and there should be mobilization of more resources to the sector to improve health service delivery and ultimately the health status of the labor force though there is slow improvement (Ministry of Health Survey 2014). Since 1981 to 2004 share of public spending of health sector was below 10% except 1993. But it has shown faster growth since 2004. As a result, Ethiopia is one of the 10 countries in the world that has achieved the largest improvements in its human development index over the last several years (United Nation Development Program 2014). However, it has still the low level of educational attainment and poor health outcomes (African Economic Outlook 2013).

Fig.2. Public Expenditure on Education and Health



Source: Own computation from World Development Indicator, 2014

3. Methodology and Data

3.1. The Data

This study covers the period from 1981 to 2013 based the data availability. The data are taken from World Development Indicators (2014), Ministry of Finance and Economic Development of Ethiopia (2014) and the Global Economy.com (2014).

3.2. Method of Data Analysis

In relation to objective of the study, this paper tried to give basic understanding on the impact of human capital on economic growth in Ethiopia using time series econometric analysis. We have extended Mankiw, Romer &Weil (1992) model including inflation and the sum of export and import per GDP to capture macroeconomic stability and the degree of openness of the economy on the top of human capital, physical capital and labor force, respectively. Time series properties like stationarity and co-integration tests are conducted. Augumented Dickey Fuller test is implemented to test the existence of unit root in the variables. Furthermore, in order to see the long run relationship between/among variables Johnson co-integration test is used.

3.3. Model Specification

LogRGDP=f[LogCAP, logLAB, nxGDP, INF, PRSECE, TRE, logEDU, logHEAL,]

\+ + + - + + + +

$$LogRGDP = \beta_0 + \beta_1 LogCAP + \beta_2 logLAB + \beta_3 nxGDP - \beta 4 INF + \beta_5 PRSECE + \beta_6 TRE + \beta_7 logEDU + \beta_8 logHEAL + U \quad \text{---------- (3)}$$

Where,
LogRGDP represents the log of Real Gross Domestic Product used as proxy for economic growth;
LogCAP is the log of gross fixed capital formation used as proxy for physical capital;
logLAB is the log of labor force;
nxGDP is the sum of export and import per GDP to capture the degree of openness of an economy;
INF is the rate of inflation used as indicators of macroeconomic stability;
PRSECE is primary and secondary school enrolment to capture education human capital stock from primary and secondary school;
TRE is tertiary school enrolment to capture education human capital stock from tertiary;
logEDU is the log of public education expenditure to include investment on education;
logHEAL is the log of public health expenditure to include investment on health and
U represents an error term.

The last four variables in the model are used to proxy human capital in terms of health and education indicators. For education human capital, both stock and investment proxies are used. School enrolments (primary, secondary and tertiary) are used to capture education human capital stock while public spending on education and health are included to proxy human capital investment.

4. Results and Discussion

4.1. Stationarity Test

In standard Dicky Fuller stationarity test it is assumed that error term is uncorrelated. Augmented Dicky Fuller adds additional lags in the regression to obtain an error term that has no autocorrelation (Verbeek 2004). Unit root of the data is tested using Augmented Dickey Fuller (ADF) test. According to the results given in the table 4.1, all the variables except inflation have a unit root in their levels. This implies that the null hypothesis that is nonstationary or existence of unit root is failed to be rejected. Inflation is stationary at level. Hence, to transform the nonstationary to stationary, first differencing is employed. After first differencing all the variables, which were non stationary have been transformed in to stationary. Therefore, all variables are integrated at order one.

Table 4.1. Augmented Dicky Fuller Unit Root Test

Variable	Test Static Z(t)	1% Critical Value	5%Critical Value	Order	Status
LogRGDP	2.61	-3.702	-2.98	I(0)	Nonstationary
DLogRGDP	-4.079***	-3.709	-2.983	I(1)	Stationary
LogCAP	2.889	-3.702	-2.98	I(0)	Nonstationary
DLogCAP	-4.025***	-3.709	-2.983	I(1)	Stationary
LogLAB	1.207	-3.702	-2.98	I(0)	Nonstationary
DLogLAB	-3.318***	-3.709	-2.983	I(1)	Stationary
nxGDP	-0.743	-3.702	-2.98	I(0)	Nonstationary
DnxGDP	-4.832***	-3.709	-2.983	I(1)	Stationary
INF	-4.605***	-3.702	-2.98	I(0)	Stationary
PRSECE	1.11	-3.702	-2.98	I(0)	Nonstationary
DPRSECE	-4.790***	-3.709	-2.983	I(1)	Stationary
TRE	0.633	-3.702	-2.98	I(0)	Nonstationary
DTRE	-6.058***	-3.709	-2.983	I(1)	Stationary
LogEDU	-0.375	-3.702	-2.98	I(0)	Nonstationary
DLogEDU	-7.735***	-3.709	-2.983	I(1)	Stationary
LogHEAL	0.261	-3.702	-2.98	I(0)	Nonstationary
DLogHEAL	-5.625***	-3.709	-2.983	I(1)	Stationary
ECM(-1)	-4.328***	-3.702	-2.98	I(0)	Stationary

*** *Stationary at 1%level of significance* ** *Stationary at 5% level of significance*

4.2. Co-integration Test

When variables are stationary at their difference, it is possible to estimate the model by their difference.

However, the difference gives only short run dynamics. Hence, in order to have both short run and long run relationship, one can appeal to co-integration. That is after testing time series for stationary, the next step of the time series analysis would be testing for co-integration. So, we tested for a co-integrating relationship among variables using Johnson co-integration test. The test results in the table 4.2 below reveal that the dependent variable is co-integrated with the independent variables. The trace statistics value is greater than the critical values at 5% level of significance for at least 2 equations. Therefore, the test indicates a rejection of the null hypothesis that says no co-integration. There are two co-integration relationships between/among the variables that show long run relationship between the variables.

Table 4.2. Johnson co-integration test

Maximum rank	Log likelihood	Eigenvalue	Trace Statistic	5% critical value
rank<=0	-8.0143	.	190.887	156
rank<=1	17.9114	0.80217	139.035	124.24
rank<=2	42.2197	0.78113	90.4187*	94.15
rank<=3	55.8388	0.5731	63.1804	68.52
rank<=4	68.6008	0.5496	37.6564	47.21
rank<=5	78.0193	0.44493	18.8195	29.68
rank<=6	83.0096	0.26794	8.8388	15.41
rank<=7	87.4289	0.24134	0.0002	3.76
rank<=8	87.429	0.00001		

*co-integration relationship

4.3. Other Long-Run Diagnostic Tests

We have used Ramsey RESET test to test variables omission or model fit. Based on the test result we have failed to reject null hypothesis. Therefore, the model we used has no variables omission problem. Therefore, it is best fit model. The existence of heteroscedasticity is checked by Breusch-Pagan test. The results mentioned in the table 4.3 below reveals that there is no heteroscedasticity problem. Finally, we have tested serial correlation by using Breusch-Godfrey LM test. Accordingly, we have accepted null hypothesis that is there is no serial correlation. This result is further confirmed by Darbin Watson d-statistics.

Table 4.3. Long run Diagnostic Tests

Test	Hypothesis	F/Chi2	p-value
Ramsey RESET test: Functional form of Model	Ho: Model has no omitted variables H1: Model has omitted variables	F(3,21)=1.18	0.3403
Breusch-Pagan test: Heteroskedasticity	Ho: Constant variance H1: Not constant variance	Chi2(1)=2.54	0.1112
Breusch-Godfrey LM test: Autocorrelation	Ho: No serial correlation H1: Serial correlation	Chi2= 1.973	0.1602

4.4. Output of the Long Run Model

In this section, we discuss the impact of different variables included in the model on economic growth using the long run regression results from the table 4.4 below. The signs of all variables are consistent with predictions.

The result of the long run model show public expenditure on health has positive statistically significant effect on economic growth. The coefficient of health expenditure shows elasticity since it is in natural logarithm form. It indicates, real Gross Domestic Product increases by 0.102% as health expenditure increases by 1% at 10% level of significance, keeping other variables constant. The result is consistent with the output of studies conducted by Abdu and Melesse (2014), Gisore et al. (2014) & Eggoh, Houeninvob & Sossoub (2015). But, it is uneven with the output of study by Khembo & Tchereni (2013).

Primary and secondary school enrolment has also positive statistically significant effect on economic growth.1% increase in combined primary and secondary school enrollment results with 0.01% increase in real Gross Domestic Product. This effect is significant at 1% level of significance. The result tells that giving emphasis on secondary education on the top of primary school is worthwhile. This result is backed by IIASA

(2008) that affirms not alone primary school enrolment, investment on secondary education in developing countries provides improvement to economic development. It is also supported by Gemmell (1996) that confirms primary and secondary education enrolments have positive impact on economic growth in poor, intermediate developing countries, respectively.

Furthermore, public expenditure on education in Ethiopia has positive and statistically significant on economic growth in the long run. 1% increase in public spending on education increases real gross domestic product by 0.143% at 10% level of significance. Nonetheless, this result is opposite to the results of Alireza, Teymour & Maryam (2014); Eggoh, Houeninvob & Sossoub (2015); Abdu and Melese (2014) and Gisore et al. (2014) who found that education expenditure and human development indicator have insignificant effect on economic growth in Africa.

However, tertiary school enrolment has statistically insignificant effect on economic growth. It may be because Ethiopia is less industrlized country. For more industrialized countries, tertiary education enrollment can play a key role in economic growth (International Institute for Applied Systems Analysis 2008). Furthermore, the fast increase in enrolment in tertiary school in Ethiopia is important but may not be sufficient to ensure that students have harvested sufficient knowledge and skills that will enable them to create productive job and employment because tertiary school in the country is claimed less quality education (Mammo 2010 & Amera 2013). Furthermore, other factors such as countries' macroeconomic structure, the given function of higher education in national poverty reduction strategies, the degree of universities independence and their responsiveness to local needs can also have influence and limit higher education benefits (Montanini 2013). Moreover, tertiary education systems are not market oriented in the country (Mehrara and Musai 2013).

The ratio of the sum of import and export to GDP is positive and insignificant suggesting that Ethiopia is unable to catch up the leading technologies of the rest of the world. This is supported by the results of (Eggoh, Houeninvob & Sossoub 2015) that the least developing countries (African countries) do not have a greater ability to use technology embodied in the import of goods and services. In addition, increasing trade openness with China which is the major destination of Ethiopian export and the source of Ethiopian import may not have significant effect on the technology transfer that increases the factor productivity. This is supported by the study of Elu and Price (2010) found that trade with china (the major trade of Ethiopia) have no significant effect on productivity in Africa. However, this result of the study conducted by Henok (2015) in Sub-Saharan Africa including Ethiopia is inconsistent with the results of this study.

Physical capital proxied by gross fixed capital formation has significant positive effect on economic growth. 1% increase in physical capital increases real Gross Domestic Product by 0.104%. The result is significant at 1% level of significance. Inflation has a negative significant effect on economic growth. This result is in line with Rao and Abate (2015). However, labor force has positive insignificant effect on economic growth in the long run.

Table 4.4. Output of the Long Run Model
Dependent Variable: Log of Real Gross Domestic Product (LogRGDP)

Independent Variables	Coefficients	Std. Err.	t-value	P>t
logCAP	0.104***	0.026	4.01	0.001
logLAB	0.004	0.289	0.02	0.988
nxGDP	0.001	0.002	0.46	0.647
INF	-0.002*	0.001	-1.99	0.058
PRSECE	0.006***	0.001	5.35	0.000
TRE	0.011	0.015	0.74	0.468
logEDU	0.143*	0.076	1.9	0.052
logHEAL	0.102*	0.058	1.75	0.092
constant	19.231***	4.902	3.92	0.001
F(8, 24) = 418.14 Prob > F = 0.0000				
R-squared = 0.9929 Adj R-squared = 0.9905				
Durbin-Watson d-statistic(9, 33) = 1.54				
*** significant at 1%level of significance * significant at10% level of significance				

4.5. Output of the Short Run Model

If dependent and independent variables are I(1) but have a long-run relationship, there must be some force which brings the equilibrium error back towards zero. The error-correction model (Short run dynamic model) does exactly this (Verbeek 2005). The coefficient of one-period lagged error-correction term (lagECM) measures the speed of adjustment to the co-integration relationship. It is negative as is expected to be negative, statistically significant, and has an absolute value smaller than one, indicating the gradual convergence of the system toward long run equilibrium values (Engle and Granger 1987). Based on the result, the magnitude of the error correction coefficient is -0. 74 implying that within one year it adjusts about 74% of the disequilibria.

The results of short term dynamics reveals that physical capital has statistically significant positive effect on economic growth in the short run in Ethiopia. That is 1% increase in capital accumulation proxied in gross fixed capital formation increases real Gross Domestic Product by 0.12%. It is consistent with the Agénor (2004) forecast.

Among the human capital development proxies health expenditure has a significant positive effect on economic growth. 1% increase in health expenditure increase the real Gross Domestic Product by 0.1% in the short run. The result is consistent with the study conducted by Gisore et al. (2014) on the effect of government expenditure on economic growth in east Africa. Education expenditure and tertiary school enrolment do not have any significant effects on Gross Domestic Product in short run. However, combined primary and secondary school enrolment has significant positive effect on real Gross Domestic Product in the short run. Labor force and the sum of export and import per Gross Domestic Product have insignificant negative effect of real Gross Domestic Product. The sign of their coefficients are inconsistent with expectation. Inflation has negative significant effect on economic growth at 10% level of significance.

Table 4.5. Output of the Short Run Model

Dependent Variable: Change in log of Real Gross Domestic Product (DLogRGDP)

Variables	Coefficients	Std. Err.	t-value	p>t
DLogCAP	0.124***	0.033	3.77	0.001
DLogLAB	-0.495	2.595	-0.19	0.851
DnxGDP	-0.002	0.003	-0.62	0.543
INF	-0.001*	0.001	-1.73	0.097
DPRSECE	0.003*	0.002	1.80	0.085
DTRE	0.016	0.012	1.26	0.221
DlogEDU	0.035	0.092	0.38	0.707
DlogHEAL	0.092*	0.048	1.91	0.070
ECM(-1)	-0.739***	0.214	-3.46	0.002
_cons	0.038	0.087	0.43	0.670
R^2=0.67		Adj R^2=0.55		
F-value(9, 22)=4.96 , p=0.001		Durbin-Watson d-statistic(10, 32) = 1.65		
*** significant at 1%level of significance * significant at10% level of significance				

5. Conclusion and Recommendation

In this study we have examined the impact of human capital on economic growth in Ethiopia using time series econometrics model from 1980 to 2013. Some econometric empirical inferences such as stationarity, co-integration and the long run diagnostic tests were done to grasp the nature of time series data. The results of the long run mode revealed that public expenditure on health (health human capital), public spending on education, combined primary and secondary school enrolment have positive statistically significant effect on real gross domestic product in the long run. In addition, physical capital has positive statistically significant effect on real gross domestic product while Inflation has negative significant effect on it. However, from human capital proxies tertiary school enrolment has insignificant effect on real gross domestic product in the long run. Based on the results of short run dynamic model, the magnitude of the error correction coefficient is -0. 74 implying that within one year it adjusts about 74% of the disequilibria. Furthermore, physical capital, public spending on health, primary and secondary school enrolment have positive statistically significant effect on real gross domestic product in the short run. This study, therefore, shows in addition to physical capital, human capital in

terms of expenditure on health, expenditure on education, primary and secondary school enrollment are determining factors for economic growth in Ethiopia. Based on this results stakeholders are recommended to excel efforts to increase secondary and primary school enrolment. Government should also allocate sizable amount of budget towards health and education sectors to enhance economic growth. Finally, for tertiary school, there should be quality education that helps students to have sufficient knowledge and skills that will enable them to create productive job and employment so that it can contribute to economic growth.

References

Abdu, M. & Melesse, A. (2014), Government Spending for Economic Growth in Ethiopia. Journal of Economics and Sustainable Development, 5(9).

Adawo, M. A. (2011), Has education (human capital) contributed to the economic growth of Nigeria?. Journal of Economics and International Finance, 3(1), pp. 46-58.

Adekola, A.I. (2014), Public Investment in Human Capital and Economic Growth in Nigeria: Analysis on Regime Shifts. Journal of Economics and Development Studies, 2 (2), pp. 213-231.

Adelakun, O. J. (2011), Human Capital Development and Economic Growth in Nigeria. European Journal of Business and Management, 3 (9).

African Economic Outlook (2013), Structural Transformation and Natural Resources, African Development Bank, Organization for Economic Co-operation and Development, United Nations Development Programme, Economic Commission for Africa. Viewed on 12 April, 2015 http://www.undp.org/content/dam/rba/docs/Reports/African%20Economic%20Outlook%202013%20En.pdf

Agénor, P.R. (2004), The Economics of Adjustment and Growth, Second edition, Harvard University Press, Boston, Massachusetts.

Alireza, D, Teymour, M and Maryam, S. (2014), The Survey of Human Capital Effect on Economic Growth in Oil Rich Countries. International Review of Management and Business Research,.3, Issue 1.

Amera S. (2013), Curriculum Materials Designing and Delivery Practices versus Quality in Higher Education Institutions of Ethiopia. Journal of Education and Practice, 4 (22).

Bloom, D.E., Canning, D. & Sevilla,J. (2004), The Effect of Health on Economic Growth: A Production Function Approach. World Development , 32(1), pp. 1–13.

Brempong ,K. G. , Paddison, O. and workie, M. (2006), Higher Education and Economic Growth in Africa. Journal of Development Studies , 42 (3) , pp. 509–529.

Brempong, K.G. & Wilson ,M. (2004), Health human capital and economic growth in Sub Saharan African and OECD countries. The Quarterly Review of Economics and Finance, north Holland 44, PP. 296–320.

Domar, E. (1946), Capital expansion, rate of growth and employment. Econometrica, 14(2), pp. 137-147.

Eggoha, J., Houeninvob, H. & Sossoub, G. (2015), Education, Health and Economic Growth in African Countries. Journal of Economic Development, 40(93).

Elu, J. U. & Price, G. N. (2010), Does China transfer productivity enhancing technology to Sub Saharan Africa? Evidence from manufacturing firms. African Development Review, 22, pp.587-598.

Engle, R. F. and Granger, C. W. (1987), Co-integration and Error Correction: Representation, Estimation and Testing. Econometrica, 55(2), pp. 251–276.

Eskinder, E. (2014), Health Care Financing in Ethiopia: Implications on Access to Essential Medicines. Value in health regional issues, pp. 37-40.

Gemmell, N. (1996), Evaluating the Impacts of Human Capital Stocks and Accumulation on Economic Growth: Some New Evidence. Oxford Bulletin of Economics and Statistics, 58(1), pp. 9-28.

Girma, Z., Abdulwahab, S. & Gupta, K. (2013), Human Capital, Productivity and Economic Growth in 31 Sub-Saharan African Countries for the Period 1975–2008. International Journal of Economics and Finance, Canadian Center of Science and Education, 5 (10).

Gisore, N., Kiprop, S., Kalio, A. & Ochieng, J. (2014), Effect of Government Expenditure on Economic Growth in East Africa: A Disaggregated Model. European Journal of Business and Social Sciences , 3(8), PP. 289 – 304.

Grier, R. (2005), The Interaction of Human and Physical Capital Accumulation: Evidence from Sub-Saharan Africa. International Review for Social Sciences, 58(2), pp. 195–211.

Henok, A. (2015), Trade Policy and Economic Growth in Sub-Saharan Africa: A Panel Data Approach. American Journal of Trade and Policy, Vol. 2(1).

International Institute for Applied Systems Analysis (2008), Economic Growth in Developing Countries: Education Proves Key, Policy Brief 03.

Khembo, F. & Tchereni, B. H. (2013), The Impact of Human Capital on Economic Growth in the SADC Region. Developing Country Studies, 3(4).

Lucas, R. E. (1990), Why Doesn't Capital Flow from Rich to Poor Countries?. AER Papers and Proceedings,

pp. 92-96.
Lucas, R.E. (1988), On the Mechanics of Economic Development', Journal of Monetary Economics, 22, pp. 3-42.
Mammo, M. (2010), Quality of Higher Education in Public Institutions. Ethiopian Electronic Journal for Research, Innovation Foresight, pp.150-156.
Mankiw, N.G., Romer, D. & Weil, D.N. (1992), A Contribution to the Empirics of Economic Growth. Quarterly Journal of Economics , 107(2), pp. 407-37.
Mehraral, M. & Musai, M. (2013), The relationship between Economic Growth and Human Capital in Developing Countries. International Letters of Social and Humanistic Sciences , 5 , pp. 55-62.
Ministry of Finance and Economic Development of Ethiopia (2014), Democratic Republic of Ethiopia**,** Addis Ababa.
Ministry of Health Federal (2014), Ethiopia's Fifth National Health Accounts Highlight of Major Findings Briefing Notes, Ethiopia, Addis Ababa.
Montanini, M. (2013), Supporting tertiary education, enhancing economic development, Strategies for effective higher education funding in Sub-Saharan Africa. ISPI Working Paper, Fondazione Edu, 49, PP. 1-37.
Ndambiri H. K., Ritho C., Nganga S. , Kubowon, P. C., Mairura F.C., Nyangweso P. M., Muiruri E. M. & Cherotwo F. H. (2012), Determinants of Economic Growth in Sub-Saharan Africa: A Panel Data Approach. International Journal of Economics and Management Sciences, 2(2), pp. 18-24.
Rao, P.N. & Abate, Y. (2015), Inflation and Economic Growth: Inflation Threshold Level Analysis for Ethiopia. International Journal of Ethics in Engineering and Management Education, 2.
Romer,D. (1996), Advanced Macroeconomics, Mcgraw Hill Advanced Series in Economics.
Romer, D. (2006), Advanced Macroeconomics, London: McGraw-Hill.
Romer, P. (1990), Endogenous technological change. Journal of Political Economy, 98(5), PP.S71- S102.
Solow, R. M. (1956), A Contribution to the Theory of Economic Growth. Quarterly Journal of Economics , 70(1), pp. 65-94.
Swan, T. (1956), Economic Growth and Capital Accumulation. Economic Record, 32(2), PP. 334-361.
TheGlobalEconomy.coma,vailable.http://www.theglobaleconomy.com/texts_new.php?page=aboutus(Feveruary.
United Nations Development Programme (2014), Human Development Report, Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience, New York.
Verbeek, M. (2004), A Guide to Modern Econometrics, 2nd edition , John Wiley & Sons Ltd.
Victoria, J.S. (2015), Human Capital Investment and Economic Growth in Nigeria. An International Multidisciplinary Journal, African Research Review, 9(1), 36, pp.30-46.
World Development Indicators (2014). World Bank, available http://data.worldbank.org/data-catalog/world-development-report-2014.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Academic conference: http://www.iiste.org/conference/upcoming-conferences-call-for-paper/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar