The impact of Education on Economic Growth in Palestine: 1990-2014

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Abstract

The objective of this paper is to measure the contribution of education to growth in per capita real GDP in Palestine over the period 1990-2014 by employing OLS estimation on the growth accounting formula. Over the period, per capita real GDP increased in a yearly average by about 3.6 percent. Of about 47 percent contributed by total employed labor and capital components to economic growth only about 11 percent was contributed by education through private-public enrollments ratio. Whilst it is expected that secondary school enrollments contribution to economic growth to be negative, markedly a more growth in graduate students in high institutions of universities and technical colleges related negatively with economic growth, due to the weakness of Palestinian economic sector under the prevailing conditions and to a lower productivity of labor. These findings have important implication for policy makers. To promote economic growth in coming years an improvement in quality of education is needed in basic, secondary education and in universities and technical colleges. Also, further spending on the economic sectors by both public and private sectors is required to employ more graduated students.

Keywords Growth Accounting, Education, Economic Growth, OLS

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1-Introduction

The focus on human capital as a driver of economic growth for countries including developing ones has been one of the concerns of the economy analysis.

The contribution of education to economic growth returns to theoretical models extensively analyzed the relationship between economic growth and education which started by Solow (1957) and followed by numerous studies; Uzawa, (1965); Lucas, (1988); Romer, (1986, 1987, 1990); Barro, (1991); Barro and Lee, (1993, 1994); Barro and Sala-i-Marten, (1995). Romer (1990) suggests that education is important because some of the educated will create new ideas, which is a direct function of human capital. These knowledge spillovers are a form of externality, which leads to technological progress and hence to long run economic growth. This investment in human capital promotes growth in physical capital and will result in economic growth.

The status of education in Palestine shows a mixed picture. The statistics show that percentage distribution of persons with 15 years and above by educational attainment over the period 1997-2014 was in average of 7.5 illiterate, 7.5 can read and write, 18.2 elementary, 34.2 preparatory,19.1 secondary, 4.8 intermediate diploma and 8.3 bachelor and above, Figure (1). Figure (1) exhibits an increasing time trend for preparatory, secondary and bachelor and above attainment coexisted with a noticeable decreasing trend in illiterate percent and who can read and write classes percents and a stable pattern for associate diploma percent.

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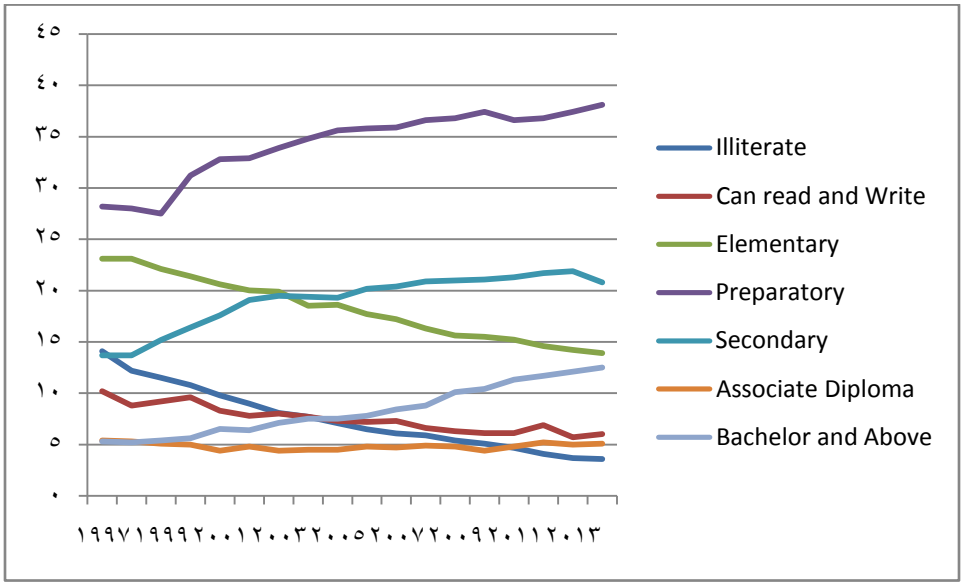

Source: Palestinian Central Bureau of Statistics(PCBS), Yearly Book, Various Issues

Figure (1): The Percentage Distribution of Persons with 15 years and above by Educational Attainment,1997-2014

Although the population is one of the most literate in the world, the education system is facing a number of difficulties due largely to effects of the Israeli occupation and including insufficient school infrastructure , lack of adequately trained teachers, access to schooling, and quality of higher education.

Recently, a number of studies highlighted problems related to both education and higher education in Palestine.

Nocolai (2007) discussed the issues seen urgent for education sector in Palestine. These include development of ministry administration, budget allocation, school construction, ensuring access and inclusion of marginalized groups, curriculum and textbooks

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development and teacher recruitment and development. El-Jafari (2010) provided evidence on the role of vocational skills and competences in the performance and functioning of Palestinian skilled labor market. It showed that success in vocational education and training could be improved if educational standards in this track of education are sufficiently high. Planning Ministry Study (2012) highlighted the weakness in the quality of graduates in universities and colleges in the Gaza Strip and recommended to pay attention to the education system in both the basic and higher education level by providing the alumni with the required skills for labor markets. Alqarout (2013) denoted challenges which face higher education in Gaza Strip. These comprise the limitation of financial resources available for students, the relatively low quality of programs offered, the gender differences in study choices, the absence of realistic governmental policies towards promoting higher education quality and the weak participation of non-governmental organizations and other civil society organizations in sitting higher education policies and promoting post secondary study. Ramahi (2015) concluded a considerable dissatisfaction with established methods of teaching and learning outcomes in Palestine. Mainly, it recommends a change in the education system generally at the technical level, being concerned with skills, academic learning and aptitudes for competing in the market.

In addition to issues mentioned in these studies, the Palestinian education & higher education has developed quantitatively and qualitatively in many aspects, including the growth in secondary school enrollment, the growth of universities and technical colleges graduates and the growth in private public enrollment ratio. Thus this study motivated by

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numerous studies in development literature that still emphasizing on investigating the impact of education on economic growth and development.

The main objective of this paper is to examine the impact of education , in terms of quantity and quality, on economic growth in Palestine over the period 1990-2014, a work not done in the Palestinian case, by employing OLS estimation on the growth accounting methodology.

This paper organized as follows. Section 2 presents an overview of selected literature. Section 3 highlights time trends for the selected macroeconomic indicators and education variables used in investigation the impact of education on economic growth. Methodology, data and descriptive statistics of the employed variables are explained in section 4. Section 5 includes empirical results. Finally, section 6 gives the main findings of the paper.

2-Selected Literature Review

Empirical estimation of the contribution of education to economic growth dates back to Solow (1957) when he estimated the contribution of labor and capital in the United States over the period 1909-1949, using the aggregate production function approach. He attributed the unexplained part of the total growth to the technological progress (i.e the residual) which is known as total factor productivity (TFP).

Other earlier studies by Jorgenson, Gollop and Fraumeni (1988), Jorgenson and Fraumeni (1992), Mankiw, Romer and Weil (1992) and Hall and Jones (1999) also estimated the contribution of education to economic growth by utilizing the growth accounting methodology.

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The contribution of education to economic growth has also been the focus of the new growth theory which emerged in the 1980s. With this work Romer (1986) argued that investing in education, training and research and other forms of human capital may help overcome the problem of diminishing returns and to achieve long run economic growth. Also, Lucas (1988) argued that the level of output is a function of the stock of human capital where human capital refers to knowledge acquired through education rather than skills.

Whilst the literature agreed upon the inclusion of human capital in models of economic growth it is less clear regarding which education measures best represent its impact on growth and differs about the impact of education on growth.

Older studies used school enrolment rates as a measure of education. Of these studies, Barro (1991) finds that both primary and secondary school enrolment rates predict higher growth. Mankiw, Romer, and weil (1992) results imply that a 10% increase in the secondary school enrollment ratio raises growth by 2.3 %. Meanwhile, Levine and Renelt (1992) find that neither primary nor secondary school enrolment rates impacts are robust to using different growth periods.

Also, of other following numerous studies related the average number of years of schooling to growth positively, like de la Fuente et. al. (2006), Cohen and Soto (2007), Glaeser et al. (2004), Mamood and Murshed (2009) and Gennaioli et al. (2013). In contrast, other studies such as Casteillio-Climent and Hidalgo-Cabrilana (2012) shows that the relationship between education quantity and growth is not as clear-cut as commonly thought. Thus, overall literature suggests that the relationship between

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education quantity measure, in most cases, basic, secondary enrolments and years of schooling and economic growth is shaky at best.

More recently, the research has shifted to investigate the impact of education quality on growth in addition to starting by introducing measures of education quantity based on the growth accounting method .

Matsushita et al. (2006) investigated the contribution of education to growth in per capita real GDP in Australia over the period 1969-2007 using regression analysis. They measured the quantity of education using the variables; number of persons who enrolled in secondary school, persons who enrolled in higher education and persons who enrolled in technical and further education institutions and measured education quality by the private-public school enrolment ratio. They concluded a negative effect of enrollment in secondary school and positive effects of enrollment in higher education and technical education and the private- public school enrolment on economic growth.

Cooray (2009) examined the effect of the quantity and quality of education in a cross section of low and medium income countries. The study found that education quantity when measured by enrolment ratios unambiguously influenced economic growth and the effect of government expenditure on economic growth was largely indirect through its impact on improved education quality via measures of trained teachers, pupil-teacher ratio, schooling life expectancy and performance levels based on test scores.

Hanushek and Woessmann (2010) show that education policy is closely associated with the long run growth potentials of OECD countries. The regression analysis, for a series of cross country over the period 1960-2000 data of 24 OECD countries, suggests that

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qualitative of education measured in terms of cognitive skills on international achievement tests, emerge as the one strong policy factor underlying growth differences across OECD countries.

Once again, Sahlgren (2014) by extending data series for OECD for the period 1960-2005 and by using 1995 TIMSS (Trend in International Mathematics and Science Study) scores, regression analysis suggests that education quality has positive effects on the long term economic growth where International Test Scores are consistently statistically and economically in models explaining countries growth rates.

In view of this background, this study distinguished, from other studies tackled main issues related to the Palestinian education, by investigating the contribution of education to growth in Palestine over the period 1990-2014.

3.Macroeconomic indicators and Education, Time Trends

Towards tracing the impact of education on economic growth, growth accounting equation connects gdp or gdp per capita to total employed labor force, gross fixed capital formation and education variable; secondary school enrollment, higher education graduate students and private public enrollment ratio.

Data on macroeconomic indicators and education variables are shown in Table (1). Table(1) exhibits an increasing time trend for all indicators; macroeconomic and education variables over the time period. Moreover, the behavior of these indicators and variables could be shown in figures (2) and (3), respectively.

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Table (1): Selected Macroeconomic Indicators and Education

year	Real GDP Millions US dollars	Real GDP Per Capita Millions US dollars	Total Employed Labor Force 1000s	Real Gross Fixed Capital Formation Millions US dollars	Secondary School Enrollment 1000s	Higher Education Graduate Students 1000s	Private-Public Enrollment Ratio
1990	2209	1260	297	665	-	983	-
1991	2118	1532	288	708	-	1252	-
1992	2708	1200	320	853.6	-	1259	-
1993	2161	969	316	862.2	-	1377	-
1994	3080.7	1172	385	937.3	45339	1495	6.523639
1995	3300	1427.1	513	1018.5	50770	2914	12.15339
1996	3340.1	1398.5	561	1092	56467	3511	17.1069
1997	3830	1460.3	602	1433	61085	4108	17.16984
1998	4379	1528.3	640	1506.3	65808	5226	6.914175
1999	4741.6	1552.9	607	1540	72550	6344	6.874998
2000	4335.9	1518.9	695	1358.9	76363	9682	6.977057
2001	3785.7	1369.4	675	1184.2	83569	10794	6.366143
2002	3284.1	1181.8	657	930.5	92309	9566	5.914412
2003	3746.6	1281.4	722	1143	109506	12192	6.230299
2004	4198.4	1358.1	752	1151.5	112673	17301	6.315255
2005	4559.5	1470.1	789	1241.3	122776	21851	6.633523
2006	4322.3	1448.8	834	1155.1	130397	25275	7.145191
2007	4554.1	1575.6	882	1204.9	140126	28699	7.145332
2008	4878.3	1835.5	908	1370.9	145135	29987	7.659098
2009	5235.3	1963.2	951	1504.8	152148	30206	7.991432
2010	5754.2	2338.7	976	1920.5	149691	31702	8.68272
2011	6882.3	2664.9	1059	1863.8	149325	32961	9.400261
2012	7314.8	2787.2	1114	2378.5	146495	35491	9.711663
2013	7477	2992.2	1155	2775.7	142063	37682	9.999876
2014	7463.4	2973.4	1255	2800.5	140452	40043	10.37756

- Not available

Sources: -Palestinian Central Bureau of Statistics (PCBS), Yearly Book, Various Issues

-Educational Statistics, Palestinian Ministry of Education &Higher Education Publications

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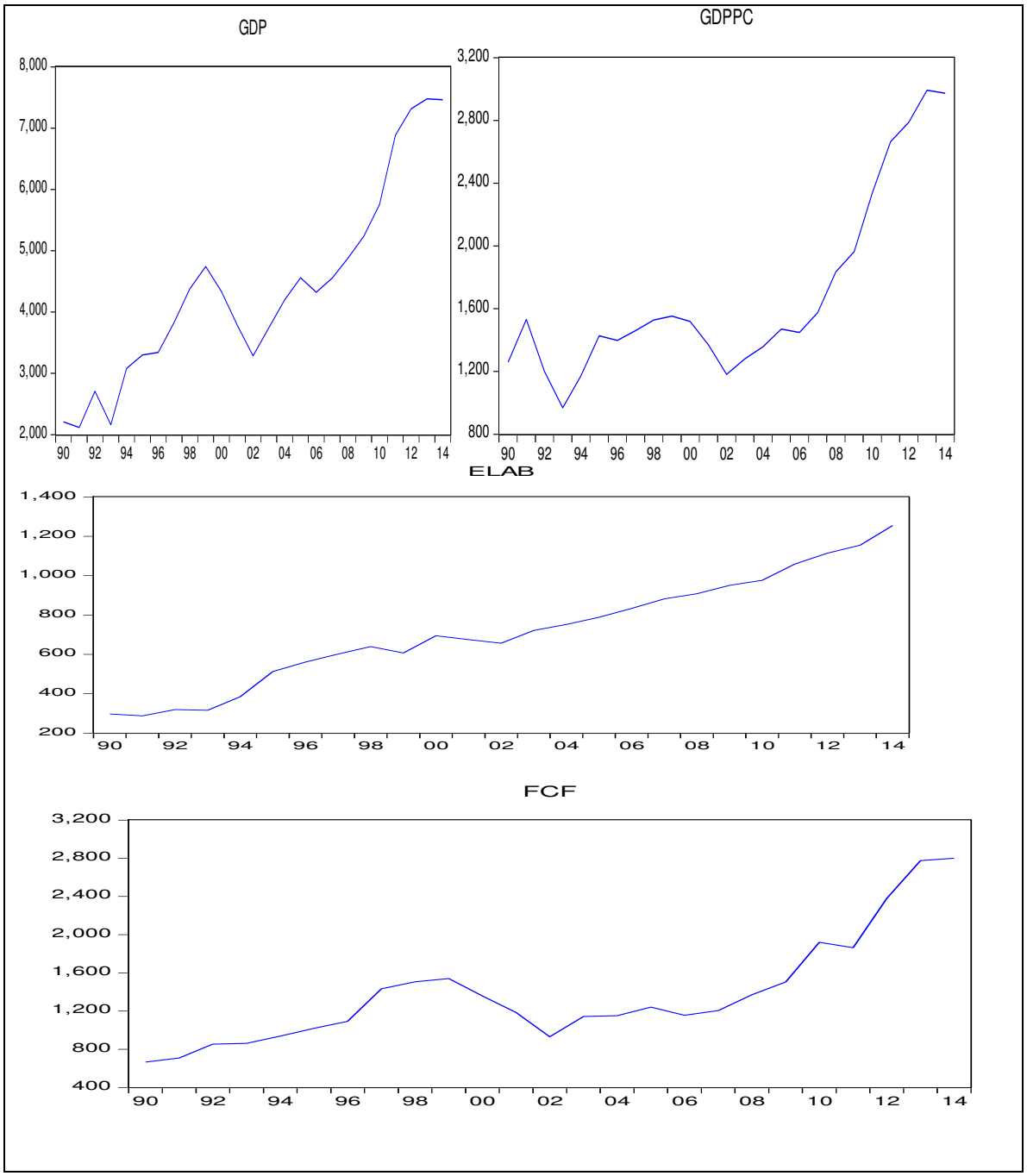

Source: table (1)

Figure (2): The Behavior of Macroeconomic Indicators; Real GDP, Real GDP Per Capita, Total Employed Labor Force and Real Gross Fixed Capital Formation over the period 1990-2014.

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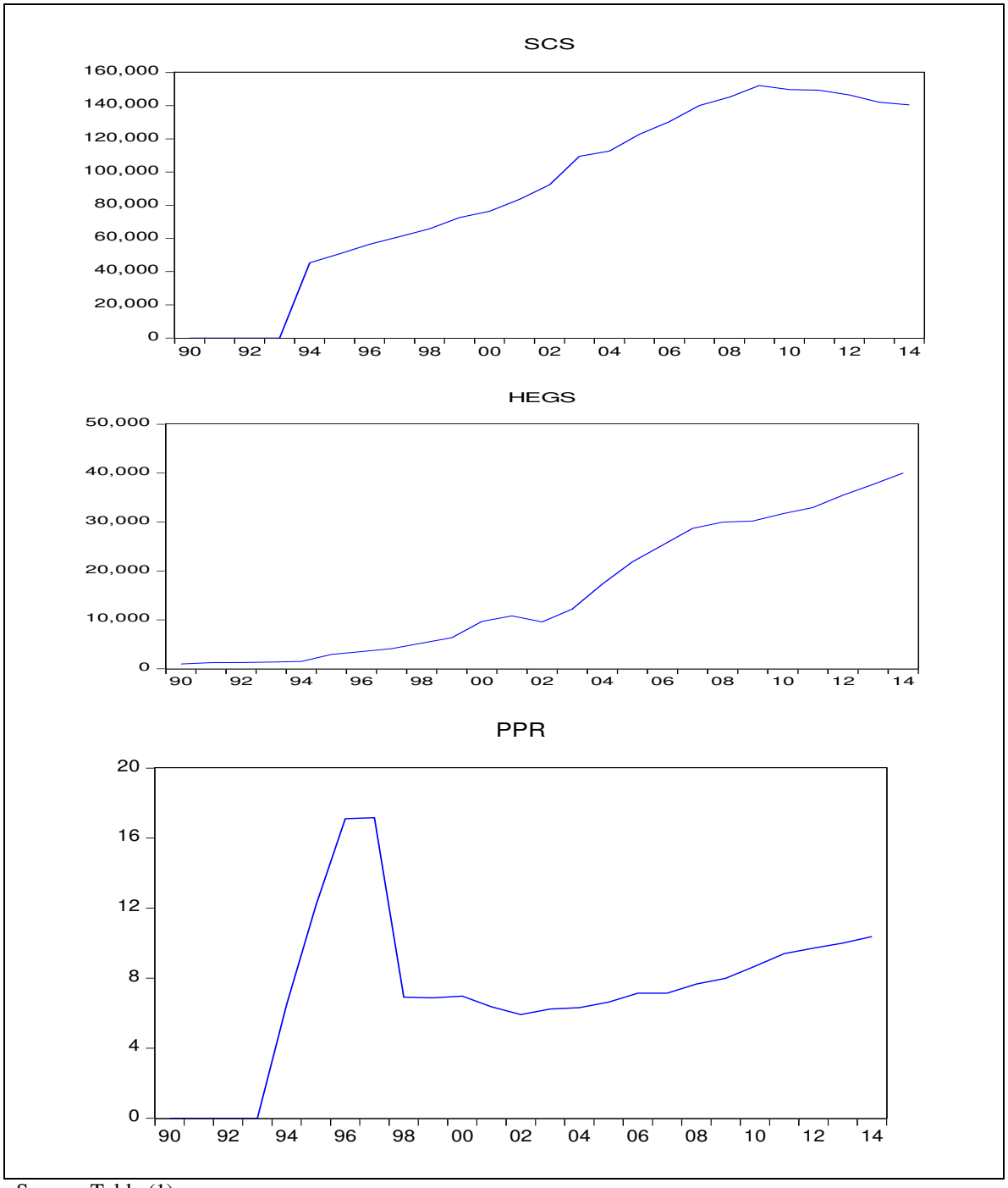

Source: Table (1)

Figure (3): The Behavior of Education Variables; Secondary Enrollment (SCS), Higher Education Graduate Students(HEGS) and Private-Public Enrollment(PPR) over the period 1990-2014

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Figure (2) gives the graph of GDP, GDP per capita, total employed labor and gross fixed capital formation. GDP per capita has an increasing time trend. It mirrors, in a large extent, the behavior of GDP. Also, both total employed labor and gross fixed capital formation have increasing time trends.

Figure (3) gives the graph of level of secondary school enrollment, higher education graduate students and private-public enrollment ratio. These variables witness increasing time trends over the time period.

The coming analysis evaluates empirically the impact of labor, capital and education on economic growth.

4.Methodology, Data and Descriptive Statistics of Variables

4.1-Methodology

This study examines the relative contribution of education to the promotion of economic growth in Palestine by employing the growth accounting methodology. This enables the decomposition of annual economic growth into components associated with the change in factor inputs and total factor productivity in a less restriction framework (Barro, 1998). We used econometric procedures of Ordinary Least Square (OLS) to estimate the partial elasticities of education components in addition to labor factor to economic growth in Palestine over the period 1990-2014. The formula of the neoclassical production function as follows;

$$Y_t = F(A_t, L_t, K_t) \qquad (1)$$

Where, Y_t = real GDP or GDP per capita, A_t = level of technology, L_t = level of labor, K_t = level of capital, in year t, for each. A_t is used to capture the general efficiency denoted

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in Solow's model (1957) and with which inputs are used reflects the effects of such things as policies and institutions (Perkins et al, 2001) or what is generally referred to as total factor productivity(TFP).

The focus of this study is to determine partial elasticities for economic growth with respect to relevant factor inputs related to labor and capital components so the log linear form is appropriate for this purpose, where we differentiate log GDP per capita with respect of log of these factor inputs. .

The general approach to estimating TFP requires converting equation (1) into a formula that enables us to isolate TFP. By following Perkins et. al (2001) and Matsushita, et al. (2006), we use this formula:

$G_Y = (W_L * G_L) + (W_K * G_K) + A \qquad (2)$

Where $G_Y = (dy/dt)$, $G_L = (dl/dt)$ and $G_K = (dK/dt)$ are the rates of growth of real GDP per capita, labor force and capital, respectively. W_L, W_K and A are the shares of capital and labor in real GDP and total factor productivity, respectively.

If these shares of capital and labor in equation (2) replaced by the partial elasticities of factors from OLS estimation of equation (1) and growth rate means proxy for growth rates thus TFP can be derived from equation (2).

Referring to equation (1), capital can be disaggregated into physical capital and human capital. The importance of human capital in the process of economic growth is recognized in the new growth theory (Mankiw, Romer and Weil, 1992; Gemmell, 1996; Foss, 1997; Barro, 1998; Agiomirgianakis, Asteriou, and Monastiriotis, 2002; and Cohen

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and Soto, 2001). Education as the major mechanism for acquiring human capital can be included in the model. Equation (1) becomes;

$Y_t = F(A_t, L_t, P_t, E_t)$ (3)

where P_t = level of physical capital and E_t = level of education in year t.

The education is then disaggregated into quantity and quality components.

By following Matsushita, et al. (2006) and Sahlgren (2014), for the Palestinian case, the quantity of education input is measured by the two variables, the number of persons who enrolled full time in secondary schools, and the number of persons graduated in higher education institutions of both universities and university and technical colleges.

For measuring educational quality some studies uses the private-public enrolment ratio. Mainly, they do that for the reasons; the ratio is considered a measure of dissatisfaction with government schools and the enrolment data for public and private schools are consistent across years and available for analysis. Other studies suggest scores on international tests, such as Programme for International Students Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) as a more promising proxy of education quality; Such test scores considered as a more fine-grained and direct measure of the average cognitive –skill level in the labor force than other measures like literacy rates which seen by researchers unlikely to capture the entire effect of education on growth (Sahlgren, 2014).

In regard with the Palestinian case, available considerable time series data for the private-public school; enrolment enable us to measure education quality whilst only three years data for the performance in TIMSS score results is infeasible for analysis.

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Also, the quantity of labor is measured by the total employed labor force working either in full or part time basis. Physical capital stock represented by total fixed capital formation is included but is not disaggregated by quantity and quality components since it is not the main concern for this study. Moreover we introduce a trend variable which acts as a proxy for a variable that affects the dependent variable and is not directly observable, but is highly correlated with time. This allows separation of components effects on GDP growth from any underlying annual trend due to unobserved forces.

Thus, equation (2) is expanded to include the disaggregated capital and time trend variable in addition to labor and to exclude the technology (TFP) variable which defined as the residual.

$Y_t = F(ELAB_t, FCF_t, SCS_t, HEGS_t, PPR_{t,}, Trend)$ (4)

Where:

$ELAB_t$ = level of total employed persons in year t, FCF_t = level of real fixed capital formation in year t, SCS_t = number of persons enrolled in secondary school in year t

$HEGS_t$ = number of persons graduated in high education institutions, universities and colleges, in year t, PPF_t = private-public school ratio in year t, Trend = 1 for t=1990

The equation can be shown in econometrics representation as the following:

$Y_t = \beta_0 + \beta_1 ELAB_t + \beta_2 FCF_t + \beta_3 SCS_t + \beta_4 HEGS_t + \beta_5 PPR_t + \beta_6 Trend + \varepsilon_t$ (5)

Where ε_t is the disturbance term.

Since the focus of this study is to determine partial elasticities for economic growth with respect to relevant factor inputs related to labor and capital components so the log linear form is appropriate for this purpose.

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Denoting the natural logarithm formula of the variables in a lower case letters, then we get;

$$gdppc_t = \beta_0 + \beta_1\, elab_t + \beta_2 fcf_t + \beta_3 scs_t + \beta_4 hegs_t + \beta_5 ppr_t + \beta_6 Trend + \varepsilon_t \qquad (6)$$

OLS estimation results of equation (6) and the estimation of TFP of equation (2) are introduced in the following section.

4.2-Data and Descriptive Statistics of Variables

4.2.1- Data

The data used for GDP per capita measured in US dollars, employed persons in thousands, real fixed capital formation in millions of US dollars, persons enrolled in secondary school in thousands and private public ratio were extracted from Palestinian Central Bureau of Statistics(PCBS) publications. The data used for persons graduated in high education institutions, universities and colleges in thousands taken from educational statistics at Palestinian ministry of education & higher education . The data for all the employed variables covered the time period 1990-2014, except for the variables persons enrolled in secondary schools and private-public school enrollment where available data covered the period 1990-2014.

4.2.2- Descriptive Statistics of Variables

Descriptive statistics shown in Table (2) gives the minimum, maximum, mean and standard deviation of the annual growth rate of the study variables. The growth rate than the values used in this analysis to be consistent with the growth accounting formula.

Real GDP per capita grew annually by an average of 3.58 percent for the period 1990-2014 with the best performance in the periods 2003-2005, 2007-2008, and 2010-2011, and the recession of the periods 1992-1993 and 2001-2002, respectively.

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The rate growth of employment averaged 6.05 over the period of study with strong growth in the years 1994-1995 with about 24 percent coincided with the establishment of Palestinian Authority institutions, and the years of 2003, 2011 and 2014 of about 8 percent for each. The poorest employment growth happened in 1999 year of -5 percent and the years 1991, and 2001-2002 with about -3 percent for each due to the closure of borders with Israel on the onset of 1990s and introducing more closure with Israel following Al-Aqsa uprising.

Table (2): Descriptive Statistics of the Variables (annual percentage change)

Variables	Symbols	Number of Observation	Minimum	maximum	Standard Deviation	mean
Real GDP Per Capita	GDPPC	24	-24.42	19.69	0.1200	3.58
Total Employed Labor Force	ELAB	24	-5.25	28.70	0.0742	6.05
Real Gross Fixed Capital Formation	FCF	24	-24.11	27.18	0.1260	5.99
Secondary School Enrollment	SCD	20	-3.07	17.08	0.0530	5.65
Higher Education Graduate Students (Universities and Technical Colleges)	HEGS	24	-12.08	66.74	0.1612	15.45
Private-Public Ratio	PPR	20	-90.95	62.22	0.2684	2.32
Time Trend	TREND	25	1	25	7.3598	13

Real gross fixed capital formation grew annually by average of about 6 percent over the period with the strongest growth in the years 1997 of 27 percent and 2010 and 2012 years with 24 percent for each. The poorest performance in the years 2002 of -24 percent and 2000-2002 of -12,-13 and -24 percents, respectively.

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Enrolment at the secondary level grew 5.65 percent over the period of study with the highest growth of 17.1 percent in 2003 and with the lowest of -3.1 in 2013, a status connected to the economic conditions in these periods to a large extent.

The number of graduated students in high education institutions of both universities and colleges grew 15.5 percent over the period with the highest growth rates during the periods 1995-2000 and 2003-2005 of growth reached 66,7 and about 34 percents for the two periods, respectively, in contrast to the lowest rate with – 12 percent recorded in 2002 year.

The ratio of private to public school has shown a growth rate of 2.3 over the period with the highest growth of 62 and 34 percents for the years 1995-1996 in contrast to the lowest growth of -91, -9 and-7 percents for the years 1998 and 2001-2002, respectively.

Overall, clearly, ups and downs in growth rates for the variables: GDPPC, ELAB and FCF , was connected with the prevailing economic conditions in Palestine.

5-Empirical Results

We proceed in this section by investigating the effect of education, in terms of quantity and quality, on economic growth using OLS estimation.

Table (3) presents four models, one without education variables and three of them include education variables. To move towards estimation of equation (6) in model (4), model (2) starts by including ssc (level of enrolments in secondary school) variable. It shows a negative effect for ssc on gdp per capita. It followed by model (3) which includes both scs and hegs (numbers of graduated students) variables. This time a noticeable change displayed in terms of coefficient estimates and effect sign. Model (3) shows that scs has a

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negative effect on gdp per capita and turned to be statistically significant. Also hegs variable has a negative effect on gdp per capita.

Model (4), which introduces three variables for education, gives the empirical results from the estimation of equation (6).

Results show that the fcf and scs variables are statistically significant at 10 or 5 percent. Whilst fcf has a positive effect on gdp per capita scs variable has a negative one. The elasticity of real GDP per capita with respect to fcf is 0.454 suggesting that if total real gross fixed capital formation goes up by one percent, on average the level of real GDP per capita goes up by 0.454 percent. The elasticity of real GDP per capita with respect to scs gives a negative sign suggesting that if the level of enrolments in secondary school increases by one percent, the level of real GDP per capita decreases by 0.051 percent.

The negative effect of scs variable is not unexpected as school enrolments act as a proxy for the labor force dependency ratio. That is, as students choose, or have their parents choose for them, to stay at school for longer, they effectively delaying the entrance to the labor market and the contribution to productivity and economic growth. However, of importance to note, though rising secondary enrolments might lessen growth in the short to medium term, they benefit economic growth in the long term via improvement in the quality of labor.

Coefficients of the variables elab and hegs are statistically insignificant but they have negative effects on economic growth. The unexpected sign of these variables reflects the reality of the Palestinian case where a more growth in the labor force and in human capital represented by numbers of graduated students accompanied with a lower

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productivity and economic growth. This is mainly due to the direct and indirect effects of the Israeli occupation which still hitting the Palestinian areas of the West Bank and Gaza Strip and to the absence of independent public policies help in pushing productive sectors ahead to absorb more labor and skill labor ones.

The coefficient of the ppr variable shows a noticeable magnitude though it is not statistically significant. If the level of private-public ratio increases by one percent then the level of real GDP per capita increases by 0.17.

Coefficients of constant and time trends are statistically close to be significant at 10 percent. Whilst the first denotes autonomous term not connected to the explanatory variables, the time trend coefficient is taken as a proxy for technical change.

The model as a whole has the highest explanatory power with adjusted R- squared and R-squared values of more than 80 percent. The F-statistics value shows the significance of the model and the Durbin-Watson statistics not show serial correlation.

Clearly, the overall significance of model (4) as whole performed better than the preceding two models in tracing the effect of education on economic growth represented by gdp per capita.

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Table(3): OLS Estimation Results

Dependent Variable gdppc

Explanatory Variables	Coefficients			
	1	2	3	4
Constant	5.6711 (1.4271) [3.9728]˙	2.9547 (2.4507) [1.2057]	2.6586 (2.4405) [1.0894]	4.6635 (2.8512) [1.6356]¨
elab	-0.05582 (0.2512) [-2.2245]˙	-0.0017 (0.4802) [-0.0035]	0.5644 (0.6766) [0.8342]	-0.0468 (0.8143) [-0.0575]
fcf	0.6787 (0.1438) [4.7213]˙	0.6208 (0.1474) [4.2115]˙	0.4044 (0.2349) [1.7220]¨	0.4540 (0.2338) [1.9413]¨
scs		-0.0229 (0.0170) [-1.3505]	-0.0284 (0.0175) [-1.6246]¨	-0.0514 (0.0246) [-2.0842]˙
hegs			-0.2177 (-0.1850) [-1.1764]	-0.0552 (-0.2206) [-0.2502]
ppr				0.1712 (0.1317) [1.2991]
trend	0.0367 (0.0141) [2.6068]˙	0.0167 (0.0202) [.8229]	0.0324 (0.0241) [1.3437]	0.0360 (0.0238) [1.510]¨
Adjusted R^2	0.812	0.819	0.8228	0.830
R^2	0.836	0.849	0.859	0.872
F Stat.	35.619	28.218	23.285	20.388
Prob. F Stat.	0.000	0.000	0.000	0.000
Durbin Watson Stat.	1.089	1.291	1.418	1.495

Figures in parenthesis and brackets are standard errors and t-statistic values, respectively.

˙ and ¨ denotes statistical significance or close to significance at 5% and 10% respectively.

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The econometric results from Tables (3) and (2) can now be used to estimate TFP from equation (2). However, equation (2) needs to be expanded to accept the disaggregation of the capital variable into physical and human capital components in addition to labor. Hence equation (2) can be written as follow:

$$A = G_Y - (W_L * G_L) - \sum_{i=1}^{4} (Wki\, Gki) \qquad (7)$$

where i represents the four components of capital, physical one and human capital (fcf, scs, hegs and ppr).

Table(4): Percent Contribution of Factor Inputs to Economic Growth: 1990-2014

	(1) Means	(2) $\hat{B}$	(3) (1)* (2)	(4) (3)/ 3.58 *100
elab	6.01	-0.0468	-0.2812	-7.860
fcf	5.99	0.4540	2.719	75.962
scs	5.65	-0.0514	-0.2904	-8.110
hegs	15.45	-0.0552	-0.8528	-23.820
ppr	2.32	0.1712	0.3971	11.095
Total	n.a	n.a	1.1161	47.267

Substituting in the mean and share values give the following:

A = 3.58 – (-0.2812) – (2.719 – 0.2904 – 0.8528 + 0.3971) = 1.8919, if divided by 3..58 and multiplied by 100, we get 52.846 percent. Thus, about 53 percent of growth in GDP per capita refers to TFP.

Moreover, Table (4) displays the following: Physical capital (fcf) alone contribute with about 76 percent of real GDP per capita growth in Palestine for the period of study. In

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contrast to the effect of physical capital total employed labor (elab) contributed negatively to economic growth by about – 8 percent. This can be justified by the case witnessed more growth in labor but a lower productivity and or growth under the prevailing conditions in the West Bank and Gaza Strip. Only, does private-public enrolment ratio (ppr) contribute positively to economic growth with about 11 percent in this study. Including the human capital variables with physical capital appear to undervalue the contribution of labor to economic growth. If all the education variables (scs, hegs and ppr) are included in addition to physical capital and total employed labor, the contribution of labor and capital to economic growth will be about 47 percent.

Also, these results show whilst the expected effect of secondary school enrollment (scd) undervalued economic growth by about 8 percent the unexpected effect of higher education graduate students (hegs) undervalued economic growth by about 24 percent.

These results invoke the importance of helpful policies needed to reverse negative effects resulted from human capital components in the short run and in the medium and long run.

6-Conclusions

This paper estimated the contribution of education to economic in Palestine over the period of 1990-2014 by employing OLS estimation on the growth accounting formula. The study suggested that, excluding private-public enrollment ratio all other components of education in terms of quantity and quality had disfavourable impacts on economic growth. The contribution of secondary school enrolments to economic growth has been

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shown to be negative. This is not surprising as upper secondary are increasingly choosing schooling instead of joining the labor market.

Noticeably, a more growth in higher education graduate students in universities and technical colleges related negatively with economic growth. This situation is attributed to the weakness of economic sectors to absorb more human capital and quality of education discussed above which resulted in a lower productivity.

The quality of education measured by the ratio of private-public school enrolments account for about 11 percent of growth in real GDP per capita. In this aspect, further efforts is required on developing this measure and isolating the true improvement in educational outcomes from increases resulting from structural change in the sector.

There was a negative relation between growth in total employed labor force and real GDP per capita. This status shows the weakness of the Palestinian economy under the prevailing conditions which involves a growth in employment mostly with a lower productivity or on part time basis accompanied with a slow growth in economic sectors.

In light of these results, and considering that the Palestinian society has moved from the need for a number of higher education institutions in the 1990s to the need afterwards for better quality of education and specializations which match the local and external labor market, the current period and the coming years need effective policies related to further spending on the economic sectors to employ more graduates, especially that the current political conditions limited the employment opportunities in the regional surrounding. There is also a need for policies to improve the quality of education at different levels; basic, secondary and higher education, in universities and colleges, and in both the public

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and private sectors to achieve matching with the needing of labor market, internal or external ones.

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