THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES

The Relationship between Physical Capital and Economic Growth in Palestine

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Abstract:
The objective of this study is to measure the extent to which the Relationship between Physical Capital and Economic Growth in Palestine (1995-2012) using Solow model and based on the utilization of Cop- Douglas production function, in order to estimate the contribution of physical to economic growth, the method used for the analysis is the time series analysis.
The results showed that the Economic variables were found to be unstable over time and then turn stable after the first differences. Later; variables were subjective to co-integration test according to Johansson method, which proved the presence of double co- integration between models variables, some of the results of the study were; the presence of correlation between physical capital and economic growth, in the sense that each affects the other.
The study recommends the emphasis on investment in Physical capital, and employees for its important and prominent role in increasing economic growth.

Keywords: *Economic growth, granger causality, physical capital*

1. Introduction

Targeting this part of the study, the statement theories that dealt with the relationship between physical capital and economic growth, which addressed the many economic theories subject of economic growth and the factors influencing the level , where interested Sales gross total .The mercantile think that the economic power could be carried out via the success of the country in increasing its wealth from the precious metals, as they consider the wealth to be the main basis for achieving the strength of any nation.

The issue of the economic growth attracted the attention of the classic economists, so they focused on the causative factors. The most important factor of them is dividing the work, the capital accumulation and the profits. So the classic analysis focused that the major motivator for the economic growth operation is forming the capital coming from the profits. As a result for the increase of the profits, the savings increase. Consequently, the average of the capital structure increases, and then the total yield volume increases.

Also Smith considered the capital accumulation as the main motive for the economic growth and its source for savings, which comes from the profits of the capitalist class. The investment average should be determined according to the savings average, and the entire savings are invested.

As Harrod, Domar published mathematical models for the economic growth for processing the issue of the growth continuity. They supposed that the economic growth is entirely dependent upon the capital increase, in compliance with the manpower increase and the developments that increased the worker's productivity, if we suppose the existence of economic relation between the capital stock (k) and the GDP

According to the old neoclassical growth theory, the growth of the output could be based on one or more of these factors increasing the capital element via "savings and investment.

The Solow model assures the significance of saving and investment, besides explaining the contributions of the different sources for the output growth, which could be clarified via the following equation:

$$\Delta y/y = (1-a)(\Delta L/L) + (a)(\left(\frac{\Delta K}{K}\right) + \left(\frac{\Delta A}{A}\right) \dots\dots (1)$$

$\Delta Y/_Y$: The growth of the total output (GDP).

$\Delta k/_k$: The rate of growth of capital.

$\Delta l/_l$: The rate of growth of labor.

(A): The share capital of the output.

$(1-\alpha)$: the shar of the work product.

ΔA / A: the rate of technological change, and is known as the change in the overall productivity (total factor productivity TFP) or (Solow residuals). This equation describes the contribution of each of the inputs (labor and capital) and the contribution of technological improvements in the growth of output. The contribution of each component is calculated as follows: Contribution to the work element = growth rate of labor x share of the work product. The contribution of capital element = growth rate of capital x share capital of product. Contribution to technical progress: It is the amount of the increase in output, which date back to the improvements in technology, and with it the survival of the other things the same. In other words, there is a technical progress when it is possible to produce more output from the same amount of inputs (including labor and capital). It can be inferred on the contribution of technological progress in growth through the remaining growth in output after excluding the contribution of both labor and capital in the growth of output, due to the difficulty of measuring technological advances directly, and called on, the changes in technology change in the coefficient of overall productivity (TFP) Total Factor productivity. But there is no way to directly measure the TFP can be inferred by rearranging the previous equation as follows:

$$\Delta A / A = \Delta y/y - \{(1-\alpha) (\Delta L / L)\} - (\alpha) (\Delta K / K) \ldots\ldots\ldots (2)$$

It is clear that the equation can access the relative contribution of technological progress in economic growth by subtracting the growth rate of output growth rate of all the inputs. It is clear from equation (2) that the rate of technological change is an external variable determined by other variables contribute to raising productivity, such as research and development and scientific progress and education and training. The method of measuring technological change in the previous equation attributed all that remains of the growth in output after deducting contributions racist labor and capital to grow, so called Solow residuals.

2. Previous Studies

I enjoyed the analysis of sources of economic growth using the Solow model several previous experimental studies. However, the studies that tests were used to examine the causal nature of the relationship between physical capital and economic growth have been rare, and these studies include:

2.1. The Study by Nabil & Mohammed (2010) Entitled, Estimating the Relationship between Economic Growth and Human Capital In Accordance with the Model Using the Methodology MRW in Algeria

Aimed to assess the relationship between human capital and economic growth through the Solwmodel, and estimated the impact of human capital, and physical capital, labor and economic growth, and through the use of time-series. The study found The presence of significant effect and a negative growth rate of human capital on the rate of economic growth in a short time, and the presence of a positive and significant effect of the rate of growth of human capital for the past year on the rate of economic growth, also having a significant effect and a negative growth rate for the current operating rate of economic growth in the short term.

2.2. The Study by Alshorbajy (2007) Entitled, "The Relationship Between Human Capital, Exports and Economic Growth in Taiwan".

Focused to identify the causal relationship between human capital, exports and economic growth in the short and long term, for the period 1986-2005, using time series, the study found a causal relationship between capital and exports to economic growth, and a causal relationship between the one-way exports and economic growth to human capital.

3. The Standard Model used to analyze the Results

Based on what has been described above, the use of many of the studies applied to the model of Sulutoestimate the contribution of physical capital to economic growth, through the production function of the CobbDouglas(Cob - Douglas), has adopted a study on the production function of the CobbDouglas, and of physical capital, and forces workforce, and the overall total factor productivity, as well as a dummy variable in order to reverse the privacy of the circumstances and the situation in the Palestinian economy. Therefore, can be represented by the standard model used to estimate the relationship between physical capital and economic growth, as follows:

$$LNGDP = \alpha LNK + \beta LN L + \varepsilon$$

Where:

GDP: Gross domestic product at constant prices.

K:Physical capital.

L: Number of employees(full employment), the participants in the production process.

ε: Residual Solow.

α, β:Production flexibility of the estimated capital and labor, respectively.

The following is a definition and explanation of the above variables to the model Standard:

3.1. Total Gross Domestic Product (at Constant Prices)

Is the sum of the monetary values of goods and services produced during the final period of time, has been the use of gross domestic product at constant prices in order to reverse the growth in real GDP.

3.2. Physical Capital

Means every kind of inputs and concrete of the territory, buildings, machines, and so on.

3.3. Labor

This element is the number of workers in the laborfully within the Palestinian economy. It is intended that the full employment worker to work35 hours or more during the week.

4. Methodology

To test for causality between economic growth and Physical capital, the Ganger causality test is used. According to Granger (1969) a variable *X* causes *Y* if the predictability of *Y* increases when *X* is taken into consideration. Therefore *X* "Granger causes" *Y* if past values of *X* can help explain Y. However, if Granger causality holds this does not guarantee that *X* causes *Y*. But it suggests that *X* might be causing *Y*.

It is crucial to test for stationary in time series data to avoid spurious regression; i.e. finding a relationship where there is none. Stationary of variables was investigated through a unit root test as well a Johansen Counteraction test to check for counteracted relationship between indicator of Physical capital and economic growth, secondary Data will be collected from official sources under consideration, study will be carried out for the period First quarter 1995 at Fourth Quarter 2012. Like Central Bureau of Statistics, Palestinian, by program (E Views 8).

4.1. Unit Root Test

The test series' first procedure at proceedings time-series analysis, and is used in the test dormancy usually test the presence of a unit root (Unit Root Test) in the time series by testing DickeyFuller (Augmented Dickey Fuller: ADF) shortest Phelps Peron (Phillips Peron, PP). The test PhelpsPeron(PP)tests are important for the detection of stillness time series, the following table shows the test for sleep study variables.

Variable	ADF		PP	
	Level	1st Difference	Level	1st Difference
logGDP	0.201773-	*9.626278-	0.262263	*9.724757-
log$\widehat{K}$	0.111365-	2.277534-	1.292949	*9.166538-
logL	2.105340	0.443494-	3.832278	*7.519191-

Table 1: Unit Root Test Results:
*Note: *Indicates stationarity at* **1***%.*

4.2. Johansen Cointegration Test

Since all variables are integrated with order one, i.e. I (1), the Johansen cointegration, test can be applied, cointegration implies existence of long-run equilibrium relationship; thus help predict stable, Granger (1986) testing for cointegration helps to avoid spurious regression. Non stationary variables can lead to spurious regression unless at least one cointegrating vector is present (Nowbutsing, Ramsohok and Ramsohok, 2010), the following table shows the results of a test of the integrity of the joint Johansson.

Hypothesized		Trace	0.05	0.01	
no. of CE(s)	Eigen value	Statistic	Critical Value	Critical Value	Prob.***
None */**	0.442476	42.69600	24.27596	29.51345	0.0001
(At Most 1*)	0.032946	2.382796	12.32090	16.36188	0.9171
(At Most 2)	0.001032	0.071257	4.129906	6.940559	0.8266

Table 2: Johansen Cointegration Test Results

Trace test indicates 5 cointegratingeqn(s) at the 1% level and 6 cointegratingeqn(s) at the 5% level */** denotes rejection of the hypothesis at the 1%/5% level

***MacKinnon-Haug-Michelis (1999) p-values

The results are shown in Table 2, below. Based on the Eigen value statics, we reject the null hypothesis of no cointegrating vectors, the test indicates one long-run relationship among the variables.

4.3. The Granger causality test:

In testing for Granger causality, the null hypothesis is rejected if the probability of the F-statistics is less than 5%. The test indicates no causal relationship between real GDP and Physical capital.

Null Hypothesis:	F-Statistic	Prob.
GDP does not Granger Cause k	4.16869	0.0198
k does not Granger Cause GDP	4.19909	0.0193
L does not Granger Cause GDP	6.35279	0.0030
GDP does not Granger Cause L	3.44975	0.0377

Table 3: Granger Causality results
*Note: * indicate rejection of null hypothesis at 5%significance levels*

Where results indicate above that the result of the test of causality was significant at the 5% level and thus reject the premise of nihilism, which states that there is no causal relationship interoperability between independent variables and the dependent variable, and conclude that changes in labor and capital has caused fundamental changes in real GDP. And changes in gross domestic product have caused fundamental changes in the labor and physical capital.

5. Conclusions

The aim of the study was to examine the causality between economic growth and Physical Capital in Palestine (for the period 1995-2012) Before analyzing the data using Granger causality test, the data was first tested for stationary using the Augmented Dickey-Fuller (ADF) and Phillips Perron-PP tests, and all variables were found to be stationary after first differencing, and Johansen test for cointegration were performed.

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Based on the above results, the study recommends the emphasis on investment in Physical capital, and employees for its important and prominent role in increasing economic growth.

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