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The Effect of Governance on Economic Growth in Palestine *

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أثر الحوكمة على النمو الاقتصادي في فلسطين

ملخص

الهدف من هذه الورقة هو دراسة العلاقة التي تربط الحوكمة بالنمو الاقتصادي للاقتصاد الفلسطيني. تكمن أهمية الموضوع بأنه تقييم لأثر الحوكمة على النمو الاقتصادي ودور السلطة في تهيئة البيئة الصالحة من أجل دفع عجلة الاقتصاد إلى الأمام. تمت البرهنة رياضياً لأثر الحوكمة على دالة النمو الاقتصادي. بالإضافة لذلك فقد تم إجراء تحليل السلاسل الزمنية لتقييم تأثير الناتج المحلي الإجمالي على كل معيار من المؤشرات الستة للحوكمة. أما بالنسبة لنتائج تحليل السلاسل الزمنية فتبين أن جميع المتغيرات كانت مستقرة، في حين وجد أن هناك تكامل مشترك بين الناتج المحلي الإجمالي وفعالية الحكومة، والسيطرة على الفساد، وحرية التعبير والمساءلة. وحسب اختبار سببية جرانجر فكان الناتج المحلي الإجمالي سبباً للمؤشرات. بناءً على اختبار نموذج تعديل انحدار المربعات الصغرى فإن الناتج المحلي الإجمالي كان له تأثيراً إيجابياً على فعالية الحكومة والسيطرة على الفساد، وتأثيراً سلبياً على حرية التعبير والمساءلة. وجاءت النتائج لتشير أن الزيادة في الناتج المحلي الإجمالي يؤدي إلى زيادة في فعالية الحكومة والسيطرة على الفساد. وبالنسبة إلى حرية التعبير والمساءلة، فإن الزيادة في الناتج المحلي الإجمالي تؤدي إلى نقصان في هذا المعيار. ووضعت بعض التوصيات ومن أهمها تحسين مستوى الخدمات للمواطنين في جميع مكاتب ومراكز السلطة.

الكلمات المفتاحية: النمو الاقتصادي، الحوكمة، الاقتصاد الفلسطيني، سببية جرانجر، نموذج تعديل انحدار المربعات الصغرى

Abstract

The purpose of this paper is to examine the relationship between governance and economic growth in Palestine. The importance of this topic is to shed light on the crucial and vital role that the governance plays in the growth of the Palestinian economy. This paper will prove mathematically that economic growth is a function of governance. An econometric model was developed to prove this relationship empirically. Moreover, a time series analysis was performed to evaluate the effect of each of the six governance indicators on economic growth in Palestine. The data was taken from the Palestinian Central Bureau of Statistics and the World Bank Group covering the period of 2000 to 2014. The regression model indicated that the governance variable is significant to the economic growth in Palestine. As for the time series analysis we found that voice accountability indicator had a negative impact on the GDP. Nonetheless, government effectiveness and control of corruption had a positive effect on the GDP. A number of recommendations were given to Palestinian National Authority (PNA), most importantly the need to improve the quality of its services.

Keywords: Economic Growth, Governance, Fully Modified Least Squares Method, Granger Causality, Palestinian Economy.

Introduction:

The purpose of this paper is to show that there is a functional relationship between governance and economic growth, and to measure this relationship in the Palestinian economy. In other words, we will prove the existence of a functional relationship between governance and economic growth, and then measure the effect of governance on economic growth in Palestine. The importance of this topic lies in the fact that it will shed light on the crucial and vital role that governance plays in achieving economic growth and development in the Palestinian economy. It is also an opportunity for the Palestinian National Authority (PNA) to assess its performance in providing a suitable environment that promotes an increase in the quality of governance in its institutions which in its turn will lead to economic growth and development. Thus, this paper will provide a conception for the policy makers on the reality and level of governance that is being implemented in the PNA institutions. Furthermore, they will be able to identify which areas to focus upon in order to increase the quality of governance in Palestine, and its impact on economic growth.

"Governance describes the overall manner in which public officials and institutions acquires and exercise their authority to shape public policy and provide public goods and services" (Farrenti, Jacinto, Ody, & Ramshaw, 2009, p. 8).

"represent[s] the overall quality of relationship between citizens and government, which includes responsiveness, efficiency, honesty, and quality" (Farrenti, Jacinto, Ody, & Ramshaw, 2009, p. 8). Meanwhile the United Nations defined governance in a similar manner , "the process of decision-making and the process by which decisions are implemented (or not implemented)" (United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2009, p. 1). In addition, the United Nations defined and introduced the notion of good governance. The notion of good governance practices was characterized by international standards and developed by the United Nations. Thus, the United Nations stated that "good governance has 8 major characteristics; it is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive, and follows the rule of law" (United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2009, p. 1).

In this paper, governance will be measured through using the Worldwide Governance Indicators (WGI). The WGI will be used to measure governance quality as it measures both the efficiency and effectiveness of the government work. The WGI uses the rule of law, regulator quality, and the government effectiveness indicators. These measures will take into consideration the extent of fighting corruption and encouraging citizens to participate in the political process. The data of the six WGI will be collected from the World Bank Group, where each of these indicators is measured by a value from -2.5 to 2.5 for each year. The data will include the values of these indicators covering the period of 2000 to 2014. **The six WGI are as follows:**

1. Control of Corruption (CC), measures the use of public power for private gains, including both petty and grand forms of corruption, as well as the capture of state by elites and private interests.
2. Government Effectiveness (GE), measures the competence of bureaucracy, the quality of the delivery of public services, the quality of civil service and the level of its independence from the political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitments to the given policies.
3. Political Stability and Absence of Violence/ Terrorism (PS), measures the likelihood of violent threats against the existing government or regime change. The threat of terrorism is included in this indicator.
4. Rule of Law (RL), measures the quality of contract reinforcement, courts, police, and finally the likelihood of crime and violence.
5. Regulatory Quality (RQ), measures the incidence of market unfriendly policies.
6. Voice and Accountability (VA), measures the political, civil, and human rights of the country. In other words, the extent to which the citizens of a country are able to participate in selecting their government officials, as well as the degree of their freedom of expression, freedom of association and freedom of the media. (World Bank Group, 2015)

The table below shows the WGI and the Gross Domestic Product (GDP) for Palestine.

Table 1:

Gross Domestic Product (GDP) and Worldwide Governance Indicators for Palestine from 2000 - 2014

Year	GDP	Control of Corruption (CC)	Government Effectiveness (GE)	Political Stability (PS)	Rule of Law (RL)	Regulatory Quality (RQ)	Voice and Accountability (VA)
2000	4335.9	-0.97	-1.26	-1.66	-0.12	-0.97	-1.15
2001	3932.2	-0.77	-0.93	-1.75	-0.41	-0.53	-0.9
2002	3441.1	-0.97	-1.07	-1.77	-0.38	-1.05	-1.15
2003	3923.4	-1.1	-1.3	-1.35	-0.13	-1.06	-1.23
2004	4329.2	-0.42	-0.82	-1.1	-0.27	-0.64	-0.82

Year	GDP	Control of Corruption (CC)	Government Effectiveness (GE)	Political Stability (PS)	Rule of Law (RL)	Regulatory Quality (RQ)	Voice and Accountability (VA)
2005	4796.7	-0.98	-1.09	-1.37	-0.36	-1.04	-0.85
2006	4609.6	-1.1	-1.11	-1.7	-0.5	-1.14	-0.54
2007	4913.4	-0.81	-1.22	-1.95	-0.77	-1.4	-0.76
2008	5212.1	-1.15	-1.32	-1.97	-0.81	-1.15	-0.78
2009	5663.6	-0.36	-0.71	-2.03	-0.35	-0.17	-0.93
2010	6122.3	-0.34	-0.42	-1.94	-0.21	0.29	-0.76
2011	6882.3	-0.8	-0.63	-1.93	-0.44	0.29	-0.96
2012	7314.8	-0.61	-0.75	-1.94	-0.46	0.11	-0.88
2013	7477.0	-0.53	-0.77	-1.76	-0.44	0.15	-0.87
2014	7463.4	-0.57	-0.53	-1.99	-0.44	0.28	-0.85

Sources: Palestinian Central Bureau of Statistics, website: https://www.pcbs.gov.ps. GDP at constant prices, base year 2004; World Bank, website: https://info.worldbank.org/governance/wgi/index.aspxt#home

Now we will take a closer look at some of the factors of production and other factors that influence the GDP in Palestine. Table 2, shows these different factors, where the GDP of Palestine is measured at constant prices with the base year of 2004.

Table 2:

Gross Domestic Product (GDP) and Factors of Production in Palestine 2000 - 2014

Year	GDP in USD	Capital (K) in USD	Labor (L) in thousands	Percentage of Palestinian Workers Aged 15 Years and Above with 13 Years of Schooling and Above (%)
2000	4335.9	1000.6	464	8.86
2001	3932.2	983.2	419	8.95
2002	3441.1	994	409	9.15
2003	3923.4	1104.9	491	9.29
2004	4329.2	1272.7	506	9.4
2005	4796.7	1730.1	547	9.5
2006	4609.6	1312.2	581	9.65
2007	4913.4	1035.7	629	9.76
2008	5212.1	877.5	598	9.89
2009	5663.6	1117.1	642	10.13
2010	6122.3	1151.5	665	10.15
2011	6882.3	1234.0	754	10.29
2012	7314.8	1138.2	774	10.46
2013	7477.0	888.5	784	10.54
2014	7463.4	1199.4	806	10.57

Sources: Palestinian Central Bureau of Statistics, website: https://www.pcbs.gov.ps

The rest of the paper is organized as follows; the next section discusses the relevant literature; mathematical prove of the functional relationship between governance and economic growth; the

econometric models that will test and measure this relationship; the results from the econometric analysis; a discussion of the results; and finally the conclusion.

Literature Review

Many research papers had tackled and confirmed the positive effect of improved quality of governance on economic growth and development. Governance was proven to have a statistically significant positive impact on economic development (Campos & Nugent, 1999). The work of (Knack & Keefer, 1997) had similar findings.

Mushtaq H. Khan discussed the liberal economist's development of a framework of good governance based on market-enhancing governance. Focusing on market capabilities which will reduce the transaction costs and enable markets to be more efficient. Meanwhile, heterodox economists have emphasized on the role of growth-enhancing governance that focuses on overcoming the market entrench failures in allocating assets, acquiring productivity-enhancing technologies and maintaining political stability in times of rapid social transformations. The two approaches are not mutually exclusive. However, current policies focus on the former to detriment the growth prospects of poor counties (Khan, 2007, p. 1).

(Al-Bassam, 2013) asserted that the economic crisis affect all aspects of life. They can result in political instability, personal financial troubles, and an increase in the number of business bankruptcies. This article examines whether the strong correlation between governance and economic growth is maintained during times of economic crisis. The results from this paper had showed that the global economic crisis had an unnoticeable influence on the relationship between governance and economic growth. Nonetheless, this study had also showed that the different levels of development of nations affect this relationship in various ways during times of economic crisis. Thus, the results highlights the instability of the relationship during times of crisis. This unsteadiness in the relationship is a sign of the essential need for long-term strategies that would promote the implementation of global and national good governance practices which are not adversely affected by the crisis (Al-Bassam, 2013, p. 1).

Corruption is a key component of governance according to the annual publications of The World Bank Group. The first edition of the WGI -published in 1996- included 186 countries. This list had later increased to 215 countries and territories by 2011. Thus, a study (Al-Sabbagh & Dahman, 2016) examined the concept of corruption and money laundering. The paper looked at the causes, growth, forms, negative effect and methods of measuring corruption in a number of successful economies. It studied the period between 2004 and 2013, where it showed a positive correlation between Corruption Perception Index (CPI) and GDP in some countries that were included in the study. Meanwhile other countries showed a constant rise in the corruption levels. The results showed that there should be a review of the corruption prevention laws. The study had also showed that money laundering prevention techniques had failed to meet the targeted levels in the countries that where studied (Al-Sabbagh & Dahman, 2016, p. 145).

We notice that the above three papers had all measured the correlation between economic growth and either governance or the components of governance. A more rigors approach was adapted by (Rivera-Batiz, 2002). The paper examined how democracy affected long-term economic growth through influencing the quality of governance. The empirical evidence demonstrated that the quality of governance was higher in democratic countries. An endogenous growth model was developed in order to show that for the general-equilibrium, a governance that improves democracy would increase economic growth. In the developed model, stronger democratic institutions influence governance by constraining the level of corruption among the public officials. Furthermore, decreasing corruption stimulates technological changes and ignites economic growth. Empirical data of the cross-section of countries from 1960 to 1990 indicates that democracy is a significant factor in determining total factor productivity (TFP) growth in case it was associated with a better quality of

governance (Rivera-Batiz, 2002, p. 225).

From the above literature, we can say that there is no doubt that improving the business environment will attract both domestic and international investments to a country. This will ultimately reflect positively on the economic growth. Nonetheless, investors are repelled by politically unstable, bureaucratic, and highly inefficient governments, that offer nontransparent governmental services (Emara & Chui, 2016, p. 127).

So is it possible for the good governance to have a positive effect on economic growth in an unstable political environment like Palestine? To answer this question, (Al-Razy & Abdul Allah, 2014) tackled this issue. A sample of 120 singles and the descriptive method analysis were utilized. The study found a set of results, most importantly is that most employees of the PNA Ministries in the Gaza Strip adapted a code of conduct and ethics. Nonetheless, they differ in the degree and proportion of its practice (Al-Razy & Abdul Allah, 2014, p. 245).

This above paper aimed at examining the level of practice of an ethical code in the Gaza Strip; in this paper we will examine the relationship between governance and economic growth in the Palestinian case. We will shed the light on the crucial and vital role that governance plays in the economic growth process in the Palestinian economy. This paper will prove mathematically that there is a functional relationship between governance and economic growth. Then the researcher will prove empirically the existence of this relationship in Palestine. The paper will also assess the PNA's performance in providing a suitable environment that promotes an increase in the quality of governance, which leads to the improvement of the economic growth and development. Afterwards, this paper will provide recommendations to policy makers on the suitable approaches to increase the quality of governance in Palestine, and its impact on economic growth.

Mathematical Theory

The Euclidean spaces are examples of metric space. This is why we are interested in working in metric space. So let us define the following metric space:

A set S, whose elements we will call points, is said to be a metric space if with any two points a and b of S there is associated a real number d(a,b), called the distance from a to b, such that

1. $d(a,b) > 0$ if $a \neq b$; $d(a,a) = 0$.
2. Symmetry, $d(a,b) = d(b,a)$.
3. Triangular inequality, $d(a,b) \leq d(a,r) + d(r,b)$ for any r belongs to S.

(Rudin, 1976, p. 30).

We will now define a function, "Consider two sets A and B, whose elements may be any objects whatsoever, and suppose that with each element x of A there is associated, in some manner, an element of B, which we denote by f(x). Then f is said to be a function from A to B (or a mapping of A into B). The set A is called the domain of f (we also say f is defined on A), and the elements f(x) are called the values of f. The set of all the values of f is called the range of f." (Rudin, 1976, p. 24). The definition of a function will now allow us to define a sequence. "By a sequence, we mean a function f defined on the set J of all positive integers. If f(n)=xn " (Rudin, 1976, p. 26), for n belong to J, we denote a sequence by xn . The elements of a sequence are called the terms of the sequence (Rudin, 1976, p. 26).

Let us now define some terms, let S be a metric space and let all the elements and sets mentioned below are elements and subsets of S.

1. A neighborhood of a is a set Nr(a) consisting of all b such that $d(a,b) < r$, for some $r > 0$. Where r is called the radius of Nr(a).
2. A point b is a limit point of the set G if every neighborhood of b contains a point $a \neq b$ such that b belongs to G.
3. A set G is said to be closed if every limit point of G is a point of G.
4. A point a is an interior point of P if there is a neighborhood N of a such that N is a subset of P.
5. P is an open set of if every point of P is an interior point of P.

(Rudin, 1976, p. 32).

The two variables in question are governance and economic growth. Governance will be denoted by G and economic growth by E.

Let S be a metric space, and let G and E be subsets of S, where G and E are both closed and bounded. This is due to the simple fact that G can have values that range from -2.5 to 2.5, i.e. restricted by the closed interval [-2.5,2.5]. Meanwhile, E is bounded –has an upper bound and a lower bound- since economic growth is dependent on scarce and limited factors of production.

Given that G is dependent on the six indicators and E is dependent on a number of other variables, such as labor, capital, etc. We want to prove that E is a function of G, given that there are common independent variables for G and E.

Prove:

Consider the two variables in question G and E, G is a function of c, f, l, p, q and v, in other words G(c,f,l,p,q.v). Express c, f, l, p, q and v each as a decimal expressions of which it ends in a finite sequence. Where each sequence has the same length. Thus,

c = c1 c2 c3 ... cn . c(n+1) c(n+2) ... f = f1 f2 f3 ... fn . f(n+1) f(n+2) ...

l = l1 l2 l3 ... ln . l(n+1) l(n+2) ...

p = p1 p2 p3 ... pn . p(n+1) p(n+2)...

q = q1 q2 q3 ... qn . q(n+1) q(n+2) ...

and

v = v1 v2 v3 ... vn . v(n+1) v(n+2) ... Now define G(c,f,l,p,q,v) to be z where

z = c1 f1 l1 p1 q1 v1 c2 f2 l2 p2 q2 v2 ... cn fn ln pn qn vn . c(n+1) f(n+1) l(n+1) p(n+1) q(n+1) v(n+1) c(n+2) f(n+2) l(n+2) p(n+2) q(n+2) v(n+2)... Now, could you obtain the same z from a different combination of (c,f,l,p,q.v)? No, because you can extract the decimal expression for c, f, l, p, q and v from z, so c, f, l, p, q and v are uniquely determined from z.

Let X = (x1,…,xn, z).

Then there exists two different n-tuples X and X' such that G(z) = G(z').

and that E(X) = E(X') implies

E(x1,…,xn, z) = E(X') implies E(x1,…,xn, G). This means that E is a function of G because its values depend on the values of G and several other variables.

Econometric Model and the Emprical Evidence

In this section we will develop a regression model that identifies the cause and effect relationship between governance and economic growth in the Palestinian economy. The analysis will utilize the following Cobb-Douglas production function:

$$Y=A\,K^{\alpha}\,L^{(1-\alpha)}$$

Where Y is the Gross Domestic Product (GDP), A is a parameter that represents the influence of factors other than capital and labor on production, K is capital stock, $0<\alpha<1$, and L is labor.

The name Cobb-Douglas is derived from Paul Douglas, who was a labor economist at the University of Chicago during the 1930s and later a US senator from Illinois and his research assistant Cobb. This function was used to study how the share of labor to the GNP had varied throughout the business cycle. In addition, its functional form was used extensively in econometric studies of the production function. In the case of the Cobb-Douglas, $\alpha + \beta = 1$. Thus, there is a constant return to scale. If $\alpha + \beta > 1$ then there is an increase returns to scale, and if $\alpha + \beta < 1$ then we have a decreasing returns to scale (Quirk, 1987, p. 151).

By definition, the parameter A represents the total factor productivity (TFP). It is through the parameter A that the governance will identify its impact on the production. Thus, improving the quality of governance will spur technological advances and thus shifts TFP upwards (Rivera-Batiz, 2002, p. 252).

We now divide our Cobb-Douglas production function by L :

$Y/L=A\ K\ ^{\alpha}\ L^{(1-\alpha)}/L$

$Y/L=A\ K\ ^{\alpha}\ L^{(-\alpha)}$

$Y/L=A(K\ /\ L)^{(\alpha)}$

We will now transform our function into a linear function by taking the logarithms of both sides. Consequently, we will have the following linear function:

$$\log (Y/L)=\log A+\alpha \log (K/L)$$

The parameter "A" represents forces that affect the GDP per worker other than the physical capital and labor, and it is equal to total factor productivity.

Economists have traditionally associated changes in technological advances with changes in A, i.e. the changes in the technological advances are closely related to changes in A. Nevertheless, this coefficient reflects changes in any other forces such as wars, ethnic conflict, occupation, natural disasters, health and epidemics, etc… (Rivera-Batiz, 2002, p. 253).

Nonetheless, there is a wide variety of variables that influence technological advances and innovations. We will include some of these variables in our econometric model to determine their effects on economic growth. Human capital is identified as a key determinant of technological changes. It is more likely that the higher the educational level, the more likely this will contribute positively to research and development and innovation (Rivera-Batiz, 2002, p. 253).

As a result, we will add the Tertiary variable to our model. This variable measures the percentage of Palestinian workers aged 15 years and above who have 13 years of schooling and above. Finally, we will add the G variable that measures the level of governance in Palestine according to the World Bank Group. G will have a value between -2.5 and 2.5, where the higher the value, the higher level of governance quality. The variable G is a function of control of corruption (CC), government effectiveness (GE), political stability (PS), rule of law (RL), regulatory quality (RQ), and voice and accountability (VA).

That is, log A is a function of G and TERTIARY:

$$\text{Log } A = f(G, \text{TERTIARY})$$

Our econometric model is then given by the following equation :

$$\log (Y/L)=\beta_0+\beta_1 \log (K/L)+\beta_2 G+\beta_3 \text{TERTIARY}+ \varepsilon$$

where βs are the parameters to be estimated and ε represents the random error term that is assumed to be normally distributed with a mean of 0 and a constant standard deviation. The dependent variable is measured in terms of the log of real GDP per worker in US dollar at constant prices with 2004 as a base year. The log(K/L) is measured by the log of the capital stock per worker in US dollar with a base year of 2004. The G and TERTIARY variables are as defined earlier.

Now we will move to the time series analysis where the regressors are stochastic and the disturbances are autocorrelated. The autocorrelation in the disturbances that will result in the following general form:

$$Y_t = \beta_1 + \beta_{2xt} + \beta_{3\ yt-1} + \ldots + \varepsilon_t$$

Where yt is the dependent variable, xt contemporaneous (and perhaps lagged) factors εt is the disturbances, and yt-1 is its own past. Thus, the path of the dependent variable yt is described by the above variables including the disturbances. Here the time series is a single occurrence of a random event (Greene, 1995, p. 413).

In a stochastic time series model the generating process is a combination of a starting value and a sequence of a purely random component, hence, a zero-mean "innovations" εt in a dynamic structure that produces the yt variable (Greene, 1995, p. 559). Thus, unlike the deterministic models, yt is not dependent on the t or the y(t), but rather it is dependent on an initial value of y0 and a purely random component of a history of innovations of ε1, ε2,. In other words, observations of the variable yt are realizations of a random variable where we assume these random variables are a part of an infinite sequence of random variables. This sequence is called a stochastic process (Greene, 1995, p. 415).

In a stochastic time series models the ε t is no longer the error terms or unexplained deviations of yt from the predetermined time path of y(t),

instead they are unexpected new changes or innovations in the level of yt which will influence the new levels of yt+n. .

Stationary, a vital concept to be examined, guarantees the absence of fundamental fluctuations in the structure of the process. This property allows the possibility of the prediction of future values, i.e. the absence of this property for a variable would make it either impossible or difficult to predict future values.

The Unit Root Test will be used to test the stationary of a variable. The roots of polynomial are a crucial factor in determining the stationary or nonstationarity of the series. We calculate the modulus of the root λ=a±bi. The modulus is equal to the (a2+b2)1/2. If λ is real, then b = 0 and the modulus is equal to the absolute value of a. The Unit Root Rule for stationarity asserts that if the modulus of any root of β(L) ≤ 1 then the series is nonsationary. Thus for the series to be stationary all the roots of β(L) must lie outside the unit root circle in the complex plane (Greene, 1995, p. 556).

To achieve stationarity (Hendry & Juselius, 2000) demonstrated that when data is non-stationary purely due to the reason of a unit root (integrated once, I(1)), the data can be brought back to stationary by taking the difference. Thus, here we are looking at the first difference of the series –the change that occurs from one period to the next, the quantity of Yt - Yt-1. Taking the average of the first difference can help us predict the next step. In this case we will have the following model:

$$Yt=Y_{(t-1)} + \alpha$$

Where α is the average or the mean of the first difference. This is the so-called "random walk" model. Here you try to forecast the next value of Yt by predicting the difference. If taking the first difference produces a stationary process we say that the series Yt is to be integrated of order one, and denoted by I(1). A series is integrated of order d, denoted by I(d), i.e. the series becomes stationary after being differenced d times (Greene, 1995, p. 559).

Consider the case if the data generating process (DGP) is a simple random walk with an independent normal (IN) error term with a mean of zero and a constant variance as follows:

$$x_t = x_{t-1} + \varepsilon_t \quad where \quad \varepsilon_t \sim IN[0.\sigma_{\varepsilon_t}^2]$$

Subtracting x_{t-1} from both sides:

$$\Delta x_t \sim IN[0.\sigma^2_{\varepsilon_t}]$$

Which is stationary, because Δxt cannot have a unit root and is I(0)? Thus integrating twice I(2) a series must become stationary. Nonetheless, we are only interested in the first difference. Thus, the growth rate of variable and not the growth rate of the growth rate given by the second difference (Greene, 1995, p. 559).

Generally, if two variables are integrated to different orders, the linear combinations of the two variables will have an order of the higher of the two orders. Thus if yt is I(1) and xt is I(0) then the linear combination given by regressing yt on xt represented by et = yt – bxt will be I(1). If two independent variables yt and xt are non-stationary but there exists a stationary linear combination of the integrated variables, then the two variables are cointegrated. In this case, a long-run relationship exists between the two variables were the two variables drift together. This relationship is distinguished from the short-term dynamics that are measured by the relationship between the deviations of yt from its long-term trend and deviations of xt from its long-term trend. Nonetheless, cointegration test does not determine the direction of the causality (Greene, 1995, p. 567). In this paper, we will use the cointegration test to determine whether the six governance indicators are cointegrated with the Palestinian GDP.

A common question that frequently manifests in time series analysis is whether one economic variable can assist in forecasting another economic variable. For example, when looking at post war data, we can see that nearly all economic recessions are proceeded by large increases in the price of petroleum. Thus, can we conclude that oil shocks cause economic recessions? The answer to this question was tackled by Granger (1969) and popularized by Sims (1972). Granger had utilized F-tests to test for causality. He tested whether lagged information on a variable Y provides any statistically significant information

regarding another variable X in the presence of lagged X. There are many methods to implement Granger causality test (SAS)..

Hence, the Granger Causality test will be used to determine the direction of the causality between the cointegrated variables.

The Fully Modified Least Squares regression method (FM-OLS) will be used to determine the sign of the relationship between the two cointegrated variables. The FMOLS regression method was developed to determine the optimal estimates of cointegrating regressions. As the name implies, the Least Squares method was modified to take in consideration the serial correlation effects and the endogenity of regressors resulting from the existence of a cointegrated relationship (Phillips, 1995, p. 1023).

Results

The data was collected from the Palestinian Central Bureau of Statistics (Palestinian Central Bureau of Statistics, 2015) and the World Bank Group for the period from 2000 to 2014. The Statistical Analysis System (SAS) and Eviews were used to perform the different statistical analysis.

The regression analysis was performed using the SAS software. After running the regression it appeared that K/L was not significant. So we re-ran the regression analysis with only the G and TERTIARY variables. Using an alpha of 0.05 and the p-value of the f-test was 0.0058, we reject the null hypothesis thus at least one of the betas does not equal to zero and at least one of the betas is significant.

Using an $\alpha = 0.05$, we have the following results:

Table 3:

Regression results

Name of Variable or Coefficient	
K/L	Not Significant
G	Significant
TERTIARY	Significant
R2	0.5755

Hence we have the following model:

$$\log(Y/L) = 1.5274 + 0.2005G + 0.0144 \text{ TERTIARY}$$

This model has an R^2 of 0.5755. Thus, 57.55 percent of the variations in the GDP per labor are explained by the model.

The Durbin-Watson had a value of 1.987 –from the SAS output, clearly this value is above 0.946 and 1.543. Thus, the test statistic value is greater than dU, we would not reject the null hypothesis of non-autocorrelation errors.

Now we will run a unit root test to determine whether the variables are stationary or non-stationary at the first difference. We will have the following results:.

Table 4:

Augmented Dickey Fuller (ADF) test results

Variable Name	Unit Root
GDP	No Unit Root at 1st difference
CC	No Unit Root at 1st difference
GE	No Unit Root at 1st difference
PS	No Unit Root at 1st difference
RQ	No Unit Root at 1st difference
RL	No Unit Root at 1st difference
VA	No Unit Root at 1st difference

Table 5:

Bivariate Johansen Cointegration test results

Variables	Cointegration
GDP and Control of Corruption	Yes
GDP and Government Effectiveness	Yes
GDP and Political Stability	No
GDP and Regulatory Quality	No
GDP and Rule of Law	No
GDP and Voice Accountability	Yes

This leads us to the Pairwise Granger Causality Test. Results are presented in the following table for the pairs of variables that demonstrated cointegrating relationship:

Table 6:
Results of Granger Causality Tests

Causality (direction)	Causality (lag)
GDP to Control of Corruption	1
GDP to Government Effectiveness	1
GDP to Voice Accountability	2

To find the sign of the relationship, we used the FMOLS. The Eviews was used to run the FMOLS on the Granger causality variables. The results are presented in table 4.

Table 7:
Results of Fully Modified OLS (FMOLS) regression

Variables	Relationship
GDP to Control of Corruption	Positive
GDP to Government Effectiveness	Positive
GDP to Voice Accountability	Negative

Discussion:

We notice that the econometric model did reflect our mathematical prove, where the economic growth given by the GDP per worker is a function of governance, thus governance is one of independent variables for the GDP per worker. However, the beta coefficient was relatively low, where a one percent increase in the governance will result in 0.2 percent increase in the GDP per worker. Nonetheless, it is not easy to increase the governance by one percent because it is dependent on the six WGI. .

Due to the use of Gross Capital Formation the capital variable did not reflect the true physical capital stock in the Palestinian economy. This caused the capital per labor variable to be not significant. Nonetheless, since our purpose in this paper is to measure and find the effect of governance this was not an issue and the capital per worker variable was ignored. In addition, this allowed measuring exclusively how much the parameter A was able to explain the fluctuations in the log(Y/L) variable. Thus, the parameter A had explained 57.55 percent of the fluctuations in the GDP per worker variable. In order to measure the effect of capital on the GDP we can refer to (Hamdan, 2014), where the elasticity of capital was 0.63 (Hamdan, 2014, p. 350).

Conclusion:

This paper had proved mathematically that there is a functional relationship between governance and economic growth. Economic growth is a multivariable function, and governance is one of the independent variables for economic growth. An empirical model was then developed in order to demonstrate the functional relationship that exists in the Palestinian economy. The quality of governance was a significant determinant for economic growth in Palestine.

A more detailed analysis was performed, where each of the variables that determine the quality of governance in Palestine was examined. We concluded that as the Palestinian GDP increases, government effectiveness and control of corruption also increase. Nonetheless, the increase in the GDP is associated with a decrease in the voice and accountability.

One of the key components of governance is the control of corruption. This is why when we look at the literature review, we find that most of the papers focus on the relationship between corruption and economic growth. For instance, Rivera-Batiz, analyzed how democracy affected economic growth through governance, where governance –in his paper- was represented by corruption. In other words, corruption was the sole determinant of the quality of governance. This is why we will concentrate on corruption and economic growth and development in our analysis. We have found that an increase in the GDP affect corruption positively. That means, as GDP increases, the level of corruption decreases. Although this is quite intuitive, most of the empirical findings demonstrate the opposite. An example on this matter is Indonesia. This provides some explanations behind our findings.

Regarding Palestine, in order to encourage and attract local and foreign investors, government officials may reduce or be less likely to take bribes as the Palestinian economy experiences economic growth. In addition, the fear of local businesses to re-locate abroad might also be a reason for the reduction in corruption.

In Palestine, corruption does not have any relationship (cointegrating) with voice and

accountability. Therefore, we can conclude that people are not concerned about corruption, although according to WGI, Palestine's ratings are quite low. However, as the economy grows and develops, government effectiveness grows and corruption decreases.

The paper has the following recommendations

1. The PNA should focus on improving its records in regard to the control of corruption and government effectiveness.
2. Improving government effectiveness can be accomplished by asking for feedbacks from citizens who receive a particular service. This can be done by completing a survey and asking for suggestions from the community for improving the process in addition to placing suggestion boxes for the different government offices that have a direct contact with citizens.
3. Since the PNA has a very limited control over the political stability, rule of law, and regulatory quality, it should try to negotiate better agreements with Israel in order to make these variables significant to the economic growth of the Palestinian economy. This will also allow the quality of governance to have a higher impact on the economic growth and the development of the economy.

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