



UNIVERSITY OF SIENA

DEPARTMENT OF ECONOMICS

Doctoral Programme in Economics

22 Cycle

Programme coordinator

Ugo Pagano

THREE

ESSAYS ON UNEMPLOYMENT AND WELFARE IN PALESTINE

by

Na'el Musa

In fulfilment of the required for the degree of doctor of philosophy in
economics

Doctoral advisor

Massimo Di Matteo

Dissertation committee

Marco Tucci

Michele Raitano

Fabrizio Patriarca

Siena – Italy

February 2020

CONTENTS

Introduction	1
1. Chapter one: Does Growth Affect the Size of Government Spending in the Occupied Palestinian Territories?	4
1.1. Introduction	5
1.2. The Objectives	8
1.3. Palestinian Public Expenditure	11
1.4. Methodology	15
1.4.1. Test of Stationary	17
1.4.2. Co-Integration	17
1.5 Data and Empirical Results	18
1.6 Conclusions	25
1.7. References	26
1.8. Annexes	31
2. Chapter Two: Impact of Government Expenditure on Unemployment Rate in Palestine: An Error Correction Analysis	41
2.1. Introduction	42
2.2. Unemployment in Macroeconomic Thought	43
1. 3. Objectives	45
2.4. Previous Empirical Results	46
2. 5. Methodology	47
2. 5.1 The Error Correction Model (ECM)	50
2.5.2 Data and Empirical Results	50
2.5.3 Stationery and Unit Root Test	56
2.5.4 Estimation of Error Correction Model Engle- Granger Approach (ECM)	59
2.5.5 Diagnostic and Stability Test	60
2.6. Conclusions	61
2.7. References	62

2.8. Annexes	67
3. Chapter three: Social Security in Palestine: Assessment and Prospects	74
3.1. Introduction	75
3.2. The Traditional Pension Models	77
3.3. Assessment of Pension Systems	82
3.3.1 Pay as You Go (PAYG) Vs. Fully Funded (FF)	82
3.3.2 Defined Benefit Schemes (DB) Vs. Defined Contribution Schemes (DC)	88
3.3.3 Private Schemes Vs. Public Schemes	89
3.4. International Experience of Pension	98
3.5. Social Security in Palestine	102
3.5.1 Features of Any Proposed Social Security Program	103
3.5.2 Encouraging Voluntary Participation by Non-Public Sector	106
3.5.3 Proposed Pension Designs in Palestine	108
3.6. Empirical Results	110
3.6.1. Employer	111
3.6.2. Employees	114
3.7 Determinants of Adherence to the Social Security System for Workers in SMs	122
3.7.1 Econometrics Models	123
3.7.1.1. Logistic Model Methods	124
3.7.1.2. Artificial Neural Networks (ANNs)	132
3.8. Conclusion	142
3.9. References	143

Introduction

In this thesis, we tackle three interrelated issues, and derive empirical evidence that adds some knowledge concerning growth in public spending, growth in output and unemployment in the Palestinian occupied territories. First, in chapter one, we examine the relationship between GDP and government expenditure over the period 1972-2015. The major objective of this study was to examine the direction of causality between government public expenditures and gross domestic product in Palestine. We test whether Palestine is consistent with the Wagner's law that emphasizes growth of GDP as the primary determinant of Government size (Wagner, 1893). In contrast, The Keynesian macroeconomic model advocates an active government intervention in the economy through an increase in government spending is conducive to growth GDP, thus stimulating the demand for goods and services during periods when there is a lack of effective demand and putting the unemployed back to work. This illustrates the importance of aggregate demand in the Keynesian macroeconomic framework to determine the level of output and income in the economy (Chipaumir.et al., 2014). In addition, we expect that international aid was an important variable significant on income and on government expenditure. The main question of this paper: whether government expenditures in Palestine cause economic growth or vice versa? The answer to the question, we used a trivariate VAR model methodology. The model finding positive and strong effect of Wagner in trivariate was due to the advent of Palestinian National Authority which increased the supply of goods and services needed by the modernization process. This was in addition to the requirements of rent seekers in the Palestinian economy. Further examination of the results presented also revealed that the PNA's management of public finance had a positive and significant effect on government expenditure. On the other hand, the reverse hypothesis had significant levels too. In particular, there was a significant effect of the size of the government on growth. This is consistent with an economy in which growth is followed by expansion in public sector activity that feeds into the growth process in short run.

To look further into the issue of weak association between government spending and economic growth, I investigated the channel effect on growth and investment through

unemployment. In particular, I looked into how public spending and private investment spending affects unemployment over the period 1972-2013. The relationship between unemployment and government expenditures and the investment is examined in Chapter two. The methodology used in the chapter is cointegration and error correction, which is hoped to account for a potential long-term relationship between unemployment and government spending as proportion in GDP. The model's findings indicate that the size of the government is significantly positively related to unemployment. However, the relationship between unemployment and investment as proportion in GDP was found to be insignificant.

The unemployment and conditions of the labor market is another interest of this thesis. Specifically, we conclude this thesis by having a closer look at the social security programs available in the Palestinian labor market. In this thesis, I investigated social security programs in the Palestinian occupied territories. The aim was to provide a description of the current situation of the social security systems in Palestine. Second, introducing some international experiences pertinent to pension fund, particularly in countries of economic hierarchy similar to Palestine's. Eastern European and South (Latin) American countries are cases in point. Third, studying the Palestinian pension fund for the sake of evaluation and identification of any existing gaps. Fourth, analyzing empirically the results of a questionnaire administered by MOWATEN to SMEs workers to join the pension fund identifying the most important causes and factors which impact employees' decisions in small enterprises to join social security system, by used Logistic Model and Artificial Neural Network Model (ANN) implemented over the sample. And fifth, establishing a Palestinian pension fund capable of serving all the West Bank and the Gaza Strip employees, and providing programs for all sectors.

We contribute in two directions: first we looked into the characteristics of that determine the chance of participation in a probable social security plan; second, we analyze raw

questionnaire data collected by MOWATEN, by used Logistic model and Artificial Neural Network Model (ANN) implemented over the sample. The results show that there is significant difference between the attitude of workers to pensions in both the West Bank and the Gaza Strip when it comes to joining the social security system.

Moreover, there is no difference between males and females in terms of the decision to join social security in small enterprises.

There is a positive effect of knowledge of pensions and education on the possibility of joining a social security program.

In the ANN model, it is found that the years of work (experience) is the most important as it obtained the highest weight, followed by the location, the number of dependents, secondary education, knowledge of social security, mutual status, graduate education and finally the age of the person.

However, in the logistic model, the location obtained the highest weight, followed by graduate education, knowledge of social security, mutual status, the years of work, secondary education, the number of dependents and finally age of person.

1. Chapter one: Does Growth Affect the Size of Government Spending in the Occupied Palestinian Territories?

1.1 Introduction

Fiscal policy plays an important role in shaping the growth of the economies of developing countries. It is considered an effective financial tool that stimulates private spending and promotes economic activities and growth. The study of the effect of government spending on economic growth is vital for understanding the sources and future paths of economic growth. Against this background, this study examines the nexus between government spending and the economy. This work focuses on the Palestinian economy. The author hopes to offer some appropriate recommendations that could be beneficial regarding the contributions that are most effective, in enhancing growth, and should be focused upon by policy makers.

The bulk of the economic literature has stressed the positive impact of expanded government spending on the growth of the Gross Domestic Product (economic growth hereinafter).¹ However, there are many studies that have argued in the opposite direction concerning the relationship between government spending and economic growth, using similar or different models such as those of Laudau (1983), Komain and Brahmasrene (2007), Folster and Henrekson (2001).

Similarly, some economists have argued that government spending should increase during recessions to motivate the economy. For instance, in the Keynesian macroeconomic theory, an increase in public spending contributes positively to economic growth through the multiplier effect on aggregated demand.

Increasing and improving the quality and quantity of public services provided constitute another channel through which governments influence the economy. By improving the quality of education and health services, productivity is enhanced and this would have a positive impact on growth. Another area that has an influence on growth is public spending on infrastructure, street lighting and state security. The quantity and quality of public infrastructure have a direct impact on the cost of private business and hence, they play an important role in investments' decisions that are needed for accelerated growth.

¹ For instance, see Feder (1983), Ram (1986), Grier and Tullock (1989), Romer (1990), Barro (1990, 1991), Levine and Renelt (1992), Devarajan et al. (1996), Sala-i-Martin (1997), and **Omoke** (2009) and references therein

Similarly, policies and regulations can have an impact on issues related to housing and social welfare.

In addition, economists maintain that a rise in government spending can be an effective stimulator of aggregate demand in a sluggish economy and it can bring about and motivate private sector activities (Chipaumur et al., 2014). The Keynesians argue that government borrowing from the private sector is conducive for growth as the money is paid back through various spending programs. The rationale is based on the argument of the additional purchasing power that is injected in the pockets of consumers as a result of increased public spending. This stimulates aggregate demand in periods when demand is low and ultimately encourages the economy.

Coupled with the boosting of economic activity, public spending also serves as a tool to achieve stability against short-term fluctuations in aggregate expenditure (Joe-Huang, 2006). The Keynesian macroeconomic model advocates an active government intervention in the economy through an increase in government spending, and money supply, thus stimulating the demand for goods and services during periods when there is a lack of effective demand and putting the unemployed back to work. This illustrates the importance of aggregate demand in the Keynesian macroeconomic framework to determine the level of output and income in the economy (Chipaumur et al., 2014).

Barro (1990) also argued for the endogenous growth theory. He believed that government expenditure directly affects the private production function. Keynes (1936) argued that market economies had no automatic capacity to generate full employment and that the economic policy was and should be inextricably linked to social policy (Connor and Simpson, 2011).

Following Keynes, economists believe that a larger government is conducive to growth. The Keynesian theory rests on the assumption of price and wage rigidity in the short run. Therefore, the economy is believed to be always operating under full employment and hence, there is always a room for public spending to improve the economy by creating inflationary pressures. Contrary to what classical economists believed, the Keynesians have always supported a causal nexus between public expenditures to economic growth. Unlike Keynesians' thoughts, the Wagner law suggests that public spending is proportional to growth. There is a long-run relationship between public expenditures

growth and growth in Gross Domestic Product (GDP). According to Wagner, higher GDP growth rates lead to higher public spending and not the other way around. Hence, the causality of the link between public expenditures and national income is inverted (Wagner, 1893).

In Wagner theory Both the nature of causality and importance of the public sector in the economy are different. According to Wagner, governments expand with economic growth. He provides three explanations for that. First, with economic growth and industrialization, the government has to increase its public sector services to keep up with the growing economy. Second, growth would be accompanied by increased public spending on cultural and welfare services. Third, growth would bring up monopolies with increased demand for regulations and offsetting actions.

Another rationale for Wagner hypothesis can be found in Meltzer and Richard (1981)'s article. According to Meltzer and Richard, the early stages of growth would be accompanied with mal distribution of income, thus providing heightened incentives for the government to increase spending in order to please voters. That would support the existence of a relationship between economic growth and government spending if the position of the decisive median voter shifted in income distribution towards the lower end. For example, with the growth of the economy, income of skilled workers may increase much more than the income of non-skilled workers, leading to an increase in inequality (Dogan, 2006). In Meltzer- Richard model, this would imply more votes for redistribution, and eventually a higher level of government spending (Oxley, 1994).

Studies on testing Wagner hypothesis are scant. Instead, most of the related empirical literature studies and explains the fundamental determinants of the size of the government. Moreover, empirical evidence differs considerably from place to place.

The empirical evidence on the influence of government spending on growth is not uniform. While some studies have found a positive impact of public budget on economic growth (Ghali, 1997, 1998; Sáez and García, 2006, Loizides and Vamvoukas, 2005) Kamasa and Ofori-Abebrese, 2015), others have concluded that government spending would slow growth (Landau, 1983; Ramayandi, 2003; Grier and Tullock, 1987; Barro, 1991).

There is a good amount of literature which indicates that governments are bad for growth. For instance, Landau (1983) analyzes a cross-sectional data of 104 countries and finds a negative and significant relationship between GDP per capita growth rates and contribution of government to GDP. His results have also shown that even the investment portion of public spending is negatively impacting growth. Similarly, Grier and Tullock (1987), using panel data, find a negative relationship between the growth rate of real GDP and the share of government spending to GDP. The same results were recorded by Ramayandi (2003) who used a time series data on Indonesia between 1969-1999 and found that government spending decreased economic growth. Additional empirical evidence comes from a study by Kormendi and Meguire (1985) who used post-war data from 47 countries and found that there was no significant relationship between GDP real growth rate and its government share. Finally, Hsieh and Lai (1994), using data from the G-7 countries, found no evidence of a relationship between the contribution of government spending to GDP and per capita GDP growth.

Barro (1991), using a sample of 98 countries covering 1970-1985, also found a negative relationship between the GDP growth rate and the share of government consumption expenditure to GDP. The public investment share was found to be positively related to growth. However, these results are insignificant at conventional levels.

The study by Soory et al. (2004) stresses the importance of controlling for the population demographics in studying the relationship between the size of the government and economic growth. They show that public spending may negatively influence economic growth particularly when demographic factors are controlled for. In another study the dependency burden and the population growth have been shown to influence the size of the government (Ghorbani and Zarea ,2009).

In marked contrast to these works was a study by Sáez and García (2006) who found a positive relationship between government spending and economic growth using data from the EU-15 countries. Similarly, Ghali (1997) found that government spending had a positive impact on Saudi Arabia's per capita growth of income. Similar evidence was provided by Chimobi (2009) who tested causality between government expenditure and national income in Nigeria using annual data covering 1970-2005. His tests indicated that government spending had a role to play in promoting economic growth in Nigeria.

A group of studies have investigated the direction of causality between government spending and growth under Wagner hypothesis. For instance, Loizides and Vamvoukas (2004) examined whether the relative size of the government could cause growth or it was the other way around. They used bivariat and trivariat analysis using data from Greece, the UK and Ireland. Their analysis revealed the following results: i) government size Granger causes economic growth in all countries of the sample in both the short run and the long run but only in Ireland and the UK; ii) The strength of government-growth Granger causality increased with the relative size of the government in Greece. It also increased when inflation was accounted for in the UK.

Kamasa and Ofori-Abebrese (2015) analyzed the causal relationship in Ghana between 1980 – 2010. Their study revealed that causality ran from GDP growth to spending growth and not vice versa. Salih (2012) tested Wagner hypothesis in Sudan covering 1970-2010. His result supported the Wagner's hypothesis and that government spending growth was influenced positively by GDP growth.²

1 .2. The Objectives

This paper aimed to provide additional empirical evidence on Wagner's hypothesis and Keynesian hypothesis from the Palestinian Territories. The major objective of this study was to examine the direction of causality between government public expenditures and gross domestic product in Palestine. The answer to the question of whether government expenditures cause economic growth or vice versa is especially important for Palestine as the public sector absorbs a relatively large share of the country's economic resources.

To the best of our knowledge, Wagner for Palestine has not been tested before. The literature on testing Wagner's law has been criticized on three counts. First, there is always a feedback effect, in macro relations, that leads to simultaneity bias. Second, in

²The methodologies used in these studies varied. For instance, Ghali (1997, 1998), Kamasa and Ofori-Abebrese (2015) have used vector autoregression and vector error correction models while Landau (1983) has classical multiple regression model. Ramayandi (2003) has time series models, and Grier and Tullock (1987) inferred from a panel data model.

the particular case where there exists co integrated variables, excluding the long -term adjustment of variables (i.e. the error correction term), from the model leads to misspecification errors that will necessarily contaminate inference. Third, a testing of the Keynesian hypothesis is sometimes absent from the empirical studies.

Hence, in this paper, we have tested a causal link between public expenditure (G_t), GDP (Y_t) and foreign aids (IA_t) and we infer from a trivariate level. This is important as it checks the robustness of Granger causality in the specification of the model.

My methodology is consistent with those of Loizides and Vamvoukas (2005), but I have introduced the foreign aid as a third variable and excluded inflation. Inflation comes into play in my model when I deflate so that I infer from real variable instead of a separate factor. In the model, the information is preserved by using the level of the variables instead of the logarithms and this is different from what many researchers have done.

In this study I have made use of public spending in absolute terms rather than in terms of its share in national income as in another research. This is important because it allows for measuring the impact of marginal dollar of public spending on GDP. In the same way I may also compute the impact of the extra dollar of GDP on government spending.

In Keynesian economics, it is often assumed that the relationship between government spending and gross domestic product is linear. Therefore, in this study, we infer from a linear model to determine and measure the impact of government spending on GDP. This is not uncommon as linear relationship between factors is suggested by many studies to investigate growth (Chipaumir.et al., (2014); Kamasa and Ofori-Abebrese (2015)).

In the empirical related literature, simple methods in the form of quadratic functions are often used to test any non-linearity in the relationship between economic growth and the government size. To account for any non-linearity in this paper, we have used a threshold time series approach to detect linear and non- linear effects of the government size in order to obtain more reliable results.

Unlike other relevant literature, my paper is limited in scope as it does consider all of the components of government expenditures taken together. The main reason of decomposing and investigating individual component is that different components may have different impact on income. However, such decomposition is not possible given the data limitations. The national accounts for Palestine from 1972 -1994 did not give to

sufficient details. The data that the Israeli occupiers are providing is composed of only one component. Not very different is the data available from Palestinian Local Authority. There is no classification of spending from 1995 – 2015 and data is sorted to varying methodology which only makes the aggregate figure the only reliable figure.

The rest of this paper is divided as follows: Section 3 is devoted to analyzing the Palestinian public expenditures. Section 4, provides a description of methodology. Section 5 is devoted to analyzing the characteristics of data set. It also includes a summary of empirical results. Finally, Section 6 includes some concluding remarks.

1.3. Palestinian Public Expenditure

The public sector in the Palestinian Occupied Territories has been managed sequentially by two distinct administrations during the last fifty years. Following the 1967 war, Israel occupied militarily the West Bank and the Gaza Strip. The two zones were annexed to the Israeli economy and the public budget of these territories was consolidated into the Israeli defense budget. Israel had designed and implemented the fiscal policy, collected the tax revenues and provided public spending as per its occupation policy. The target was to exercise a fiscal policy that would reduce the burden of occupation on the Israeli economy. This had continued for two decades. Following the Oslo agreement in 1993 between the Palestinian Liberation Organization (PLO) and the Government of Israel, the fiscal policy design and implementation was handed to the Palestinian Authority. The body which was mandated to manage it was the Palestinian Ministry of Finance, MOF hereinafter. The characteristics of these two phases can be summarized as follows:

1. The Israeli military occupation forces controlled the Palestinian economy under a set of military orders. The West Bank and the Gaza Strip were subject to the Israeli military government. All banks were closed in West Bank and Gaza Strip. Instead, Israeli banks branched into the occupied territories. The Israeli Internal Revenue Service had established departments in the territories, and the Value Added Taxes (VAT) were imposed. The revenues collected from the occupied territories were allocated to service three main purposes: A- They were used to finance the military operations of Israel in the occupied territories including Jewish settlements B- They were also used to pay for

wages of public employees and cover development expenditures in health, education and public utilities sectors C-Any surpluses were usually transferred to the Israeli government budget (Abdel-Razeq, 2004).

2. The military administration was changed to the Israeli Civil Administration in the aftermath of the Camp David Treaty between Egypt and Israel in 1979. However, the fiscal policy on the ground had fundamentally stayed unchanged. The public spending was kept to its minimal levels. The infrastructural was seriously neglected except for Israeli settlements and communities set up in the occupied territories.

3. After Oslo Accords in 1993 and the Paris Economic Protocol in 1994, the Palestinians were given, partially, the financial management and civil administration and responsibilities. Following that, real public spending (in 2004 prices) jumped from 747 million USD in 1994, to 3.01 billion in 2015. The share of public spending to GDP increased from 23% in 1995, to 58% in 2007 and 39% in 2015.

Figures 1 and 2 below show the absolute public spending and its ratio to GDP respectively. As can be seen in the figures, the level of public spending took a boost following 1995 and its share of GDP had skyrocketed.

4. Donor countries have begun to provide aid to the Palestinian National Authority following the donors' conference in October of the year 1993, which was held in Washington with the participation of 42 countries and donor institutions, where the primary goal of this conference was to mobilize aid for the Palestinian people, and support the peace process and establish a mechanism to coordinate financial and technical aid to the Palestinian National Authority, so as to enable the Palestinian territories that would be transferred to it under political agreements with the Israeli side.

Donors Conference succeeded in Washington to secure total pledges of \$ 2.4 billion in just three months from the date of the conference, and took the international aid flowing to the Palestinian people from multiple points of different channels, and to draw a variety of spending, and the conditions of many irregular.

According to the Palestinian Ministry of Finance reports, the total grants and aid obtained by the Palestinian National Authority was about \$ 17 billion from its advent until 2015.

As mentioned previously, the aim of this paper is to see whether public spending triggers economic growth in the Palestinian Occupied Territories. For that purpose, I estimate a Vector Autoregressive Regression system model that includes the government expenditure and economic growth as its main theoretical variables. The model specifies growth and government expenditure as functions of previous lags of growth and government expenditure. Hence, the nature of the specification enables testing and causality inference between growth and government expenditure. It also allows for tracing the impact of shocks in one of the variables on the others across time through deriving the impulse responses. A full account of the used model will be provided.

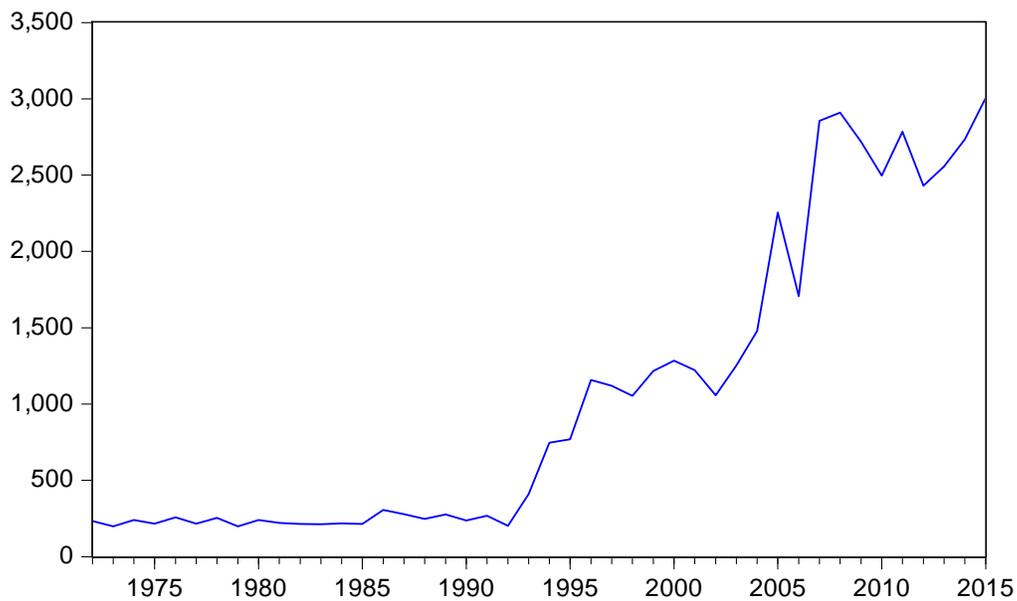


Figure 1: Public Expenditure: 1972 – 2015

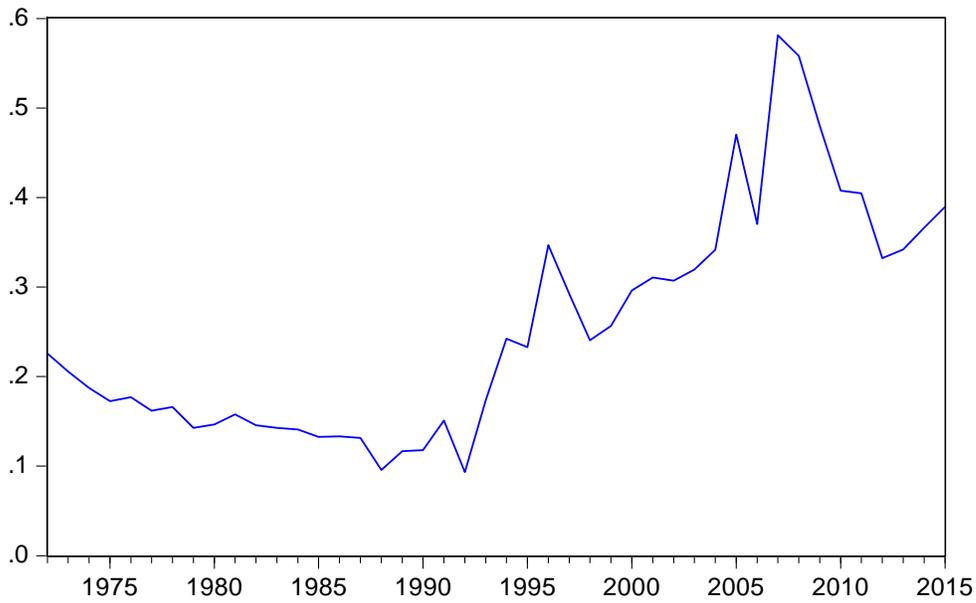


Figure 2: Public Expenditure as Ratio of GDP 1972 – 2015

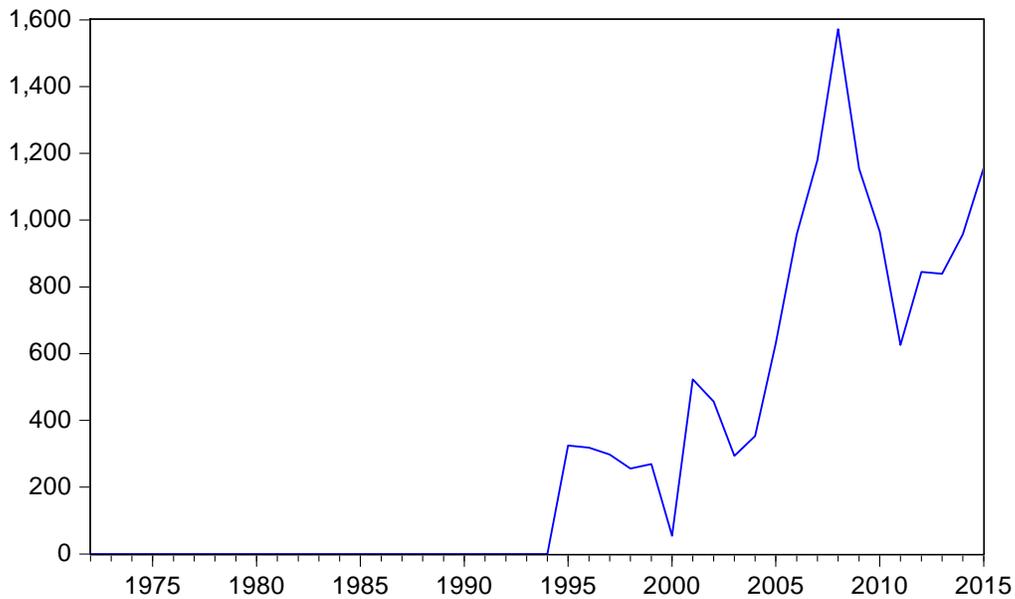


Figure 3: International Aid to the Palestinian Economy 1972 – 2015

By examining Figures 1, 2 and 3, we can observe that government spending and its share of gross domestic product and international aid remained stable at low levels up to 1995. Since the establishment of the PNA in 1995, a great qualitative change happened in the

two variables with a clear fluctuation. In 2006, both of these variables declined due to the formation of Hamas government following the election, and the consequent international boycott of the newly established Palestinian government. The curve rose to a maximum in 2008 in the wake of 2007 Annapolis meetings, and the resumption of the flow of international aid.

Pertaining to international aids it started in 1994 after Oslo agreement and establishment of PNA; its fluctuation depended on the Palestinian political status. In 2000, aid declined due to the outbreak of Al- Aqsa intifada and the Palestinian economy worked under complicated condition. After 2001 the aid curve rose to mitigate the effects of the Intifada, in 2006 a Hamas government was formed following the election, and resulted in international boycott of the newly established Palestinian government. The curve rose to a maximum in 2008 in the wake of 2007 Annapolis meetings, and the resumption of the flow of international aid. Then it declined after that because the world economic crisis.

1.4. Methodology

The general framework used to describe the dynamic relationship between stationary variables is a vector autoregressive (VAR) model. However, there is an obstacle to the application. That is, if the time series was not stationary, then VAR framework would need to be modified to allow a consistent relationship between this series appreciated. The Vector Error Correction Model (VECM) is just a special case of VAR variables, which are stationary in their differences (i.e. $I(1)$). The VECM can also take into account any co-integrating relationships among the variables.

For VECM, the variables should be cointegrated; if not, we could use VAR but in differences values

Let Y_t be the real GDP at time t . Also assume that the government spending is denoted as G_t . Here, the gross government expenditure was chosen. It included government consumption expenditure (operating expenses), and capital expenses. Such a possibility might be explored within a multivariate framework including other important variables such as the international aid to Palestinian economy IA_t .

To account for potential structural breaks, following the Oslo agreement and the change in the economic set up of the occupied territories, we included a dummy variable, dv_t , that takes a value of 1, during the Palestinian administration period and zero otherwise.

We will employ the Granger Causality methodology to determine the direction of causality between government expenditure, GDP and the international aid to Palestinian economy IA_t . Such a possibility might be explored within a multivariate framework; this econometric test is preceded by the stationary test on the variables employed in the study. Therefore, the Wagner causality relationship can be represented using a model of the form (Loizides and Vamvoukas, 2005):

$$G_t = \beta_0 + \sum \beta_{1i} G_{t-i} + \sum \beta_{2i} Y_{t-i} + \beta_{3i} IA_t + \beta_4 dv_t + u_t \quad (1)$$

The process in (1) models the government size as an autoregressive process with lagged output growth variables as leading predictors. If the lagged growth slope parameters were jointly insignificant; then we might conclude that growth does not carry information about the future size of the government.

Similarly, a suitable model for testing the Keynesian hypothesis might be written as (Dogan, 2006) and (Loizides and Vamvoukas, 2005):

$$Y_t = \alpha_0 + \sum \alpha_{1i} Y_{t-i} + \sum \alpha_{2i} G_{t-i} + \alpha_{3i} IA_t + \alpha_4 dv_t + e_t \quad (2)$$

The model in (2)³ is consistent with the views of the Keynesian theory on the likely effects of a fiscal stimulus on growth. It models growth as a function of lagged government spending. If the slope parameters associated with the lagged G were jointly insignificant, then we might conclude that the government does not Granger cause growth, and that the effect of spending on future growth is weak. This also indicates that expansion of government spending is not strongly related to future growth.

The inference on causality uses the models in (1) and (2) together. For instance, if the cross parameters of G and Y in equations (1) and (2) were significant; then there would be a causality in both directions. However, in the particular case where the cross parameters were insignificant; we would infer that growth and size were independent. Finally, if one cross set were significant, while the other set were not, we would conclude causality in one direction and deny it in the other.

³ In all specifications, we model the error term as a white noise. Also note that the specification in (1) and (2) is equivalent to a standard bivariate Vector Auto regression model.

1.4.1. Test of Stationary

The first step in a time-series analysis is to determine whether the data levels are stationary or not. In previous studies, without paying attention to variables time series characteristics and stationary hypothesis of variables, this law was investigated. Time series analysis recent progresses showed that most of macroeconomic series were integrated. In order to obviate this deficit, the present study used time series stationary test. As suggested by Engle and Granger (1987), before applying the co-integration tests, Augmented Dickey- Fuller (ADF) unit root tests were applied to each series and their first differences were to determine the stationary of each individual series (Ismet et al., 1998). (Annex 1)

1.4.2. Co-Integration

Co-integration indicates a long run relationship between economic variables. In other words, from a statistical point of view, long run relationship means variables close to themselves by passing time. As a result of this, short run residuals are removed from long run trend (Manning and Adriacanos, 1993).

Determining variables order of integration and be acquainted with all variables are integrated of order one (I (1)) – which means that they are non-stationary in levels but stationary in first differences. This is the first step of co-integration test (Noferesti, 2000). In order to determine variables, order of co-integration, Dicky-Fuller and augmented Dicky-Fuller tests were applied in step two, long run equilibrium relationship estimates by running OLS regression. This regression is called co-integration regression.

If the result indicates that the series are co-integrated: we could use VECM.

Otherwise we can't use VECM. (Annex 2)

Therefore, if the series are not co-integrated. This means that there is no co-integrating relationship among the variables; therefore, we can't use the VECM and we have to go back to VAR model by using differences in the variable. The trivariate model for Wagner's relations and the Keynesian hypotheses might be written in the following form (Green, 2012)

$$\Delta G_t = \beta_0 + \sum \beta_{1i} \Delta G_{t-i} + \beta_{2i} \Delta Y_{t-i} + \sum \beta_{3i} \Delta IA_{t-i} + \beta_4 dv_t + u_t \quad (6)$$

$$\Delta Y_t = \alpha_0 + \sum \alpha_{1i} \Delta Y_{t-i} + \sum \alpha_{2i} \Delta G_{t-i} + \sum \alpha_{3i} \Delta IA_{t-i} + \alpha_4 dv_t + e_t \quad (7)$$

1.5. Data and Empirical Results

The data set needed to estimate the models above was collected from various sources⁴. In fact, the data, from 1972 to 1994, was taken from the annual publications of the Israeli Central Bureau of Statistics (ICBS). The rest of the sample, covering 1995 to 2015, was gathered from the Palestinian Central Bureau of Statistics (PCBS). Finally, the government spending data was taken from the Palestinian public budget announcements. All data were annual at end of calendar year; all data took real value base year 2004.

Although a higher frequency data, say quarterly, is more beneficial to capture the dynamics of the variables, annual data is not inappropriate in this context. The reason is that government spending is insensitive to seasonal and **possibly** cyclical fluctuations. In addition, there were severe restrictions on the quality and availability of the Palestinian data. Fortunately, in the context of testing the Wagner hypothesis, Singh and Sahni (1984) and Hakkio and Rush (1991), have pointed out that a higher frequency data does not change inference compared to annual data, and what was crucial was the length of the period under study. This paper covered 44 years of data, a long period that extended from 1972 to 2015. We counted on that for a possible robust result.

Figure 4 plots a time series for the three variables of interest: GDP, government spending and international aid. The figure indicates that GDP and government spending were moving in tandem until late 80s. This reflects a positive contemporaneous relationship between GDP and government spending. In particular, the ups and downs of both G and Y are sequential as can be seen in the figure. The question on the direction of causality is the primary objective of this paper.

⁴ There was a regime change in the occupied territories in the aftermath of the peace agreement with Israel in 1993. The PNA took over the civil duties from Israel and so data prior to 1995 was only available from Israeli sources.

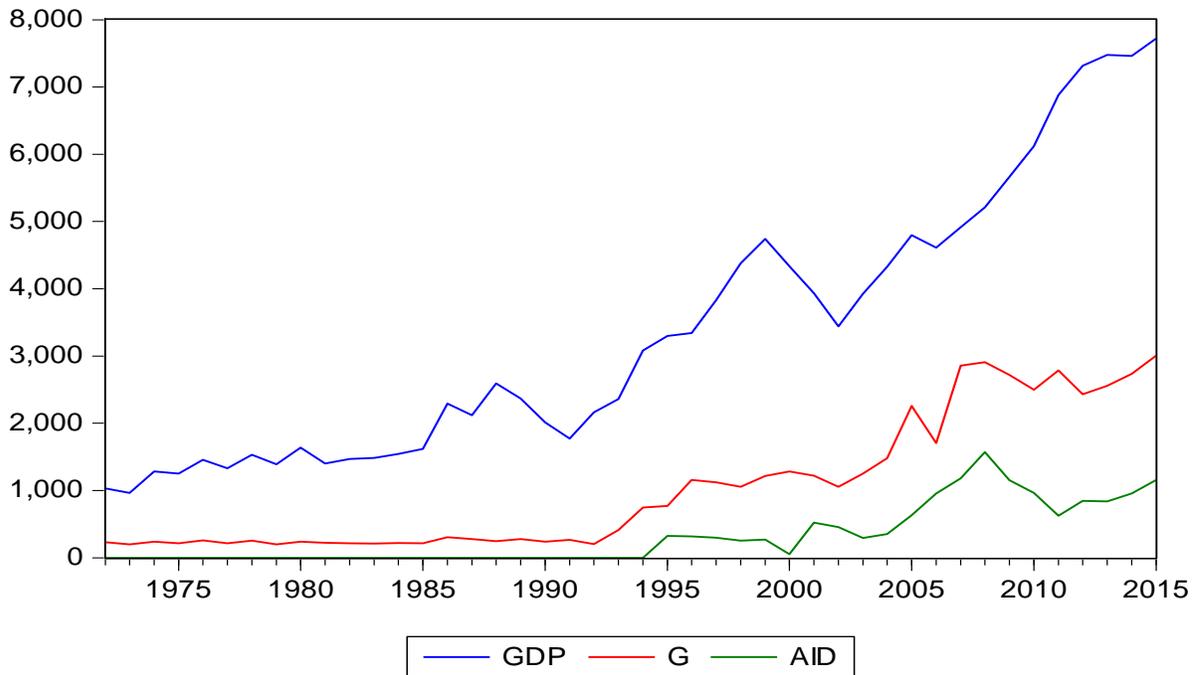


Figure 4: GDP, Government expenditure and international aid between 1972-2015

Before making inference on causality, we tested for stationarity for the level variables: G, Y and A. Table 1 presents the test statistics and the critical values of the Augmented Dickey Fuller test. As can be seen from the table, the null of unit root could not be rejected at the traditional significant levels. This indicates that the distribution of level variables is non-stationary and regression results, based on the levels of variables, are spurious.

Table 1 Augmented Dickey-Fuller Test

Variables	Calculated Value	P - Value	1% Critical Value	5% Critical Value	10% Critical Value
Y	1.19	0.99	-3.59	-2.93	-2.60
$\Delta(Y)$	-5.23	0.00	-3.59	-2.93	-2.60
G	0.67	0.99	-3.59	-2.93	-2.60
$\Delta(G)$	-9.1	0.00	-3.59	-2.93	-2.60
A	-0.62	0.85	-3.59	-2.93	-2.60
$\Delta(A)$	-6.08	0.00	-3.59	-2.93	-2.60

Notes: The Augmented Dickey-Fuller test. This test is basically a test of Hypothesis $\rho = 0$ against Hypothesis $\rho < 0$ in the equation: $\Delta X_t = \mu + \rho X_{t-1} + \alpha_i \sum \Delta X_{t-i} + \varepsilon_t$ where the lagged difference terms are included.

As the Dickey Fuller tests are not robust to the presence of autocorrelation and heteroscedasticity, we double checked the results by implementing a Phillips Perron test. Results are presented in Table 2.

Table 2: Philip – Perron Unit Root Results

Variables	Calculated Value	P - Value	1% Critical Value	5% Critical Value	10% Critical Value
Y	2.22	0.99	-3.59	-2.93	-2.60
$\Delta(\mathbf{Y})$	-5.13	0.00	-3.59	-2.93	-2.60
G	0.50	0.98	-3.59	-2.93	-2.60
$\Delta(\mathbf{G})$	-8.99	0.00	-3.59	-2.93	-2.60
A	-0.31	0.92	-3.59	-2.93	-2.60
$\Delta(\mathbf{A})$	-6.45	0.00	-3.59	-2.93	-2.60

Notes: The regression equation for the PP test is an AR (1) process and it is given by: $\Delta X_t = a_0 + a_1 X_{t-1} + \varepsilon_t$. Here, ε is the regression error, a stationary process with zero mean and constant volatility. Similar to the Dickey Fuller, the tests are carried out to reject the null of a unit root (i.e. $a_1 = 1$). In levels regressions, constant and time trend were included into unit root regression. In the regressions with first difference only, the constant was included.

Similar to the Dickey - Fuller, Phillips - Perron failed to reject the null of unit root at conventional confidence levels.

Since the variables used were non-stationary, we performed the co-integration test to check if there existed a linear combination of G and Y so that the relation would converge to in the equilibrium. The two variables were said to be co-integrated if they were each non-stationary of order 1, and if the linear combination was converging to in equilibrium (See Engle and Granger, 1987).

In order to test for co-integration, we used Johansen and Juselius (1990)'s co-integration testing procedure. We implemented the co-integration test on the levels and the causality

tests on the stationary first difference of the variables by using VAR model. Moreover, the lag of the variables for the purpose of testing were determined by several criteria: i) the final prediction error (FPE), ii) Akaike's information criterion (AIC), iii) Schwarz's Bayesian information criterion (SBIC), and iv) the Hannan and Quinn information criterion (HQIC) lag-order selection (Annex 3).

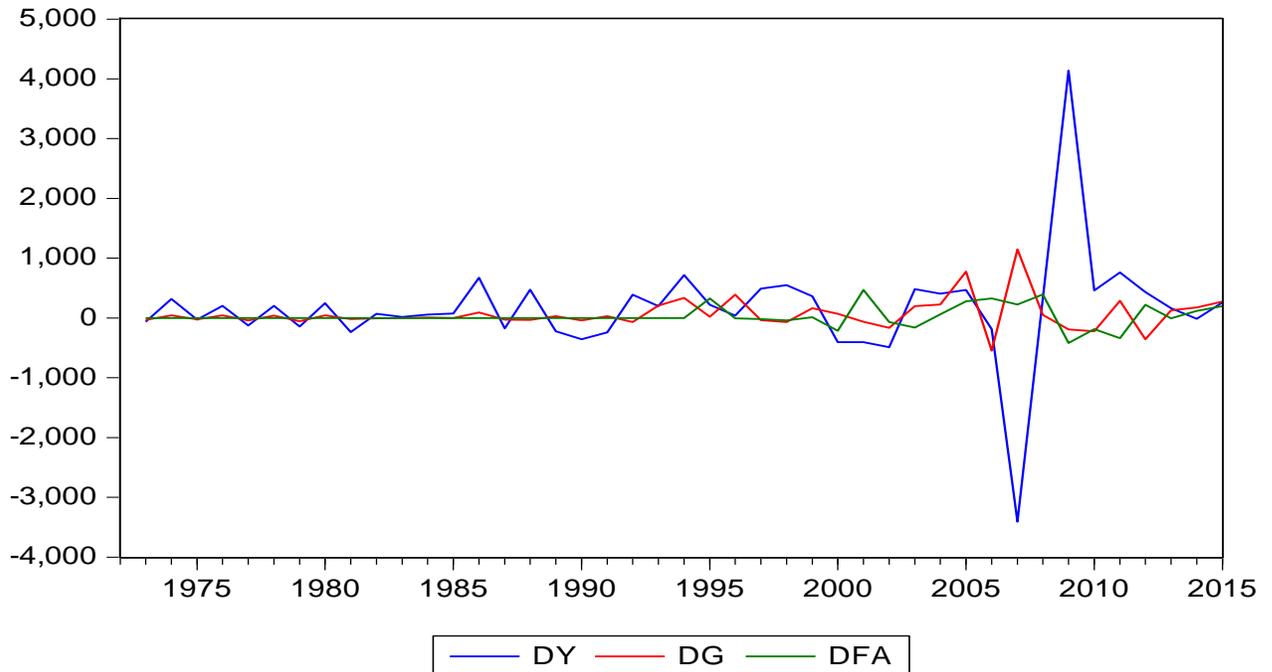


Figure 5: GDP, government expenditure and foreign aids (first differences) 1972-2015

In the co-integration analysis, we tested for an equilibrium linear combination of the data.

The likelihood ratio test statistics for co-integrating vectors might be written as

$$\text{LHR} = -T \sum_{i=r+1}^{p-r} \ln(1-g_i)$$

Where g_{r+1}, \dots, g_p are the estimated $p-r$ eigenvalues. The null is that there is at most r co-integrating vectors. The null is tested against a general alternative of $r+1$ co-integrating vector.

The co-integration test results are presented in Table 3. As the table shows, the test statistics accepted the null hypothesis of no co-integration at the 5 per cent significance level. This indicates that the chances of a long- run relationship between GDP and government expenditures over the sample period are very weak.

Table 3: Johansen and Juselius's Co -integration Test Results

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**	Max- Eigen Statistic	0.05 Critical Value	Prob.**
None	0.38	26.10	29.79	0.13	18.89	21.13	0.10
At most 1	0.16	7.13	15.49	0.55	6.86	14.26	0.51
At most 2	0.01	0.35	3.84	0.55	0.35	3.84	0.55

Trace test and Max-eigenvalue test indicates no co-integrating equation at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

As we accepted the null of no co-integration, we proceeded to estimate the specifications in Equations (6) and (7). In particular, we used the VAR models which included the differences of variable instead of its absolute values. We estimated VAR model using 1 to 4 lags (Annex 3). The parameter estimates and the t values for the models used are included in Table 4.

Table 4: VAR model

Variable	ΔY	t- student	ΔG	t- student
Constant	79.95	(0.52)	18.98	(0.38)
Dummy	-54.64	(-0.19)	182.03	(1.97)*
ΔY_1	0.36	(1.54)	-0.15	(-0.67)
ΔY_2	-0.52	(-1.71)	0.39	(4.08)***
ΔY_3	-0.51	(-2.27)**	0.10	(1.42)
ΔY_4	0.34	(1.69)	0.02	(0.26)
ΔG_1	1.56	(2.64)**	-0.81	(-4.33)***
ΔG_2	-0.77	(-0.74)	-0.67	(-2.02)**

ΔG_3	-0.56	(-0.45)	-1.51	(-3.78)***
ΔG_4	2.85	(2.77)***	-1.27	(-3.86)***
ΔA_1	-0.51	(-0.33)	1.48	(2.97)***
ΔA_2	-1.31	(-0.71)	2.17	(3.69)***
ΔA_3	-1.22	(-0.71)	1.81	(3.34)***
ΔA_4	1.44	(1.16)	1.19	(3.01)
R-squared	0.70		0.66	
Adj. R-squared	0.54		0.48	

* is significant at the 10% level.

** is significant at the 5% level.

*** is significant at the 1% level.

Results presented in Table 4 indicate that the change in government spending had a positive and significant influence on the change in GDP in the first and fourth lags. This is a clear indicator that the change in government spending had a strong effect on income on the short and long run. On the other hand, there was significant effect of the income on the public spending and positive effect in the second lag.

Further examination of the results presented in Table 4 revealed that the PNA's management of public finance had a significant positive effect on government expenditure compared to Israeli management, while it had no significant effect on changes in income.

These results can be attributed to the rise in government expenditure and to the institution building process that accompanied the establishment of the PNA. The new administration of the Occupied Palestinian Territories has started to play a stronger role in the economic and the social life of the Palestinians and to absorb a large number of employees in its newly established institutions. This has clearly constituted a structural change that implied a hike in the volume of government expenditure.

The bulk of the increase in government expenditure was not developmental and it was mainly devoted to fund current expenditures. Some of these expenditures were incurred in order to support Palestinian farmers and business following Israeli punitive actions. Therefore, the influence on sustainable economic growth of this type of spending is expected to be negligible.

These results were congruent with Wagner’s law. However, they **also** supported the Keynesians pillars on the relationship between government spending and growth. Our findings were consistent with the findings of other scholars who had tested the Wagner hypothesis. In particular, they were consistent with Dogan et al (2006), Islam (2001), Loizides et al (2005), and Wahab (2004). However, the results **were** consistent with the Keynesian thoughts and contradicted the literature that recorded insignificant causality between government expenditure and growth, namely Ghali (1998), Hsieh and Lai (1994), Kallouri et al. (2000), Ansari et al (1997), Abi Zadeh and Yousefi (1998) and Singh and Shanti (1984).

International aid was insignificant on income but had a positive and significant effect on government expenditure first three lags and insignificant in the fourth one. This reflected the effect of foreign assistance on government spending without significant effect on income growth.

Table 5: Granger Causality Test Results

Lag	1	2	3	4
Null Hypothesis	F – Statistics <i>P-value</i>	F Statistics P-value	– F Statistics P-value	– F – Statistics P-value
ΔG does not Granger Cause ΔY	3.31 (0.08)	1.49 (0.24)	3.65 (0.02)	6.94 (0.00)
ΔY does not Granger Cause ΔG	4.87 (0.03)	5.08 (0.01)	3.87 (0.02)	2.62 (0.054)

Examining Table 5, the Granger Causality test shows different levels of exogeneity between the change of government expenditure and the change of income. The results show that both lags 3 and 4 can be considered statistically significant, while lags 1 and 2 cannot be accepted (P-value above 5%). On the other hand, the Granger Causality test shows that the change in income affects the change of government expenditure in all lags at confidence level of 5%. This indicates that the exogenous relationship between the variables is high, especially between the change of income and the change of government

expenditure. This result can be explained by the fact that as the income changes, the government expenditure changes to meet the community needs. However, this expenditure does not appear to have caused a strong influence (weak ergogeneity) on the aggregate income.

1.6. Conclusions

This paper investigated causality between government spending and growth. It rested on testing Wagner's law, and the Keynesians hypothesis. The used model accounts for relationships between GDP and government expenditure, by including trivariate VAR analysis, and the Granger causality tests and the data, supported Wagner's law. On the other hand, the reverse hypothesis had significant levels too. In particular, there was a significant effect of growth on the size of the government, while the feedback effect in the reverse direction was significant too. This is consistent with an economy in which growth is followed by expansion in public sector activity that feeds into the growth process in short run.

The positive and strong effect of Wagner in trivariate was due to the advent of Palestinian National Authority which increased the supply of goods and services needed by the modernization process. This was in addition to the requirements of rent seekers in the Palestinian economy. Further examination of the results presented also revealed that the PNA's management of public finance had a positive and significant effect on government expenditure. WXPLAIN FROM WHERE

Our results are congruent to Dogan et al (2006), Islam (2001), Loizides and Vamvoukas (2005), and Wahab (2004) as we have found a significant Wagner effect. However, our results contradicted to Ghali (1999), Hsieh and Lai (1994), Kallouri et al. (2000), Ansari et al (1997), Abi Zadeh and Yousefi (1998) and Singh and Shanti (1984)'s findings as we have found that growth was **not** independent of the government size.

1.7. References

- Abdel-Razeq, O. (2005), *Palestinian Fiscal Policy 1994 -2003*, Health, Development, Information, and Policy Institute (hdip), Ramallah, Palestine.
- Abizadeh, S. and Yousefi, M. (1998) “An Empirical Analysis of South Korea's Economic Development and Public Expenditures Growth,” *Journal of Socio-Economics* 27, 687-700.
- Alkhatib, S. (2005) “Economic Growth and Credit Balances: Vector Error-Correction Modeling Approach”, *Abhath Al-Yarmouk* (Humanities and Social Sciences Series) 21(4(B)): 89-104.
- Ansari, I., Gordon, D. and Akuamoah, C. (1997) “Keynes Versus Wagner: Public Expenditure and National Income for Three African Countries,” *Applied Economics* 29, 543-550.
- Barro, R. J. (1990) “Government Spending in a Simple Model of Endogenous Growth,” *Journal of Political Economy*, 98, S103-S124.
- Barro, R. J. (1991) “Economic Growth in a Cross Section of Countries,” *Quarterly Journal of Economics*, 106, 407-44.
- Bird, R.M., (1970), *The Growth of Government Spending in Canada*. Toronto, Canadian Tax Foundation. Co-integration Analysis. *Appl. Econ.* 25: 1483-1488.
- Bird, R.M., (1971), “Wagner’s ‘Law’ of Expanding State Activity”, *Public Finance/Finances Publique*, 26, 2, 1-26.
- Brester GW. Goodwin, BK. (1993). Vertical and horizontal price linkages and market concentration in the US wheat milling industry. *Rev. Agric. Econ.* 15: 507-519.
- Chimobi, O. P. (2009). Government expenditure and National Income: A Causality Test for Nigeria. *European Journal of Economic and Political Studies*, 2 (2), 1-11.
- Chipaumire, G, et al (2014), “The Impact of Government Spending on Economic Growth: Case South Africa” *Mediterranean Journal of Social Sciences*, Vol 5 No 1, 108 -118.
- Connor, S., & Simpson. G. (2011). *Social Policy for Social Welfare Professionals*. The Policy Press.

- Devarajan, S., Swaroop, V., and Zou, H. (1996) “The Composition of Public Expenditure and Economic Growth,” *Journal of Monetary Economics*, 37, 313-344
- Dickey, D.A., and Fuller, W.A. (1979), “Distribution of the Estimators For Autorregressive Time Series With A Unit Root’,” *Journal of the American Statistical Association*, 74, 427-31.
- Dickey, D.A., and Fuller, W.A. (1981), “The Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root,” *Econometrica*, 49, 1057-72.
- Dogan, E. (2006) “Government Expenditure and National Income: Causality Tests For Five South East Asian Countries,” *International Business & Economics Research Journal*, 5, .1, 49 -57.
- Engle, R.F., and Granger, C.W.J. (1987), “Co-integration and Error Correction Representation, Estimation and Testing,” *Econometrica*, 55, 251-276.
- Feder, G. (1983) “On Exports and Economic Growth,” *Journal of Development Economics*, 12, 59- 73.
- Folster, S. and Henrekson, M. (2001). “Growth Effects of Government Expenditure and Taxation in Rich Countries”. *European Economic Review*, Vol. 45, No. 8, pp 1501-1520.
- Fuller, W.A., (1985), “Non-stationary Autoregressive Time Series”, In E.J Hannan et al (Eds), *Handbook of Statistics*, 5, Elsevier Science Publishers B.V.
- Ghali, K. H. (1997) “Government Spending and Economic Growth in Saudi Arabia,” *Journal of Economic Development*, Vol 22, No. 2, 165 -172.
- Ghali, K. H. (1998) “Government Size and Economic Growth: Evidence from a Multivariate Co-integration Analysis,” *Applied Economics*, 31, 975-987.
- Goffman, J.J. and Mahar, D.J. (1971). “The Growth of Public Expenditures in Selected Developing Nations: Six Caribbean Countries,” *Public Finance/Finances Publique*, 26, 1, 57-74.
- Ghorbani, M. and Zarea, A. (2009). “Investigating Wagner’s law in Iran's economy” *Journal of Economics and International Finance* Vol. 1(5), pp. 115-121.
- Granger, C. W. J. (1969) “Investigating Causal Relations by Econometric Models and Cross-Spectral Methods,” *Econometrica*, 37, 424–438.
- Greene, W. (2012), *Econometric Analysis*, Prentice Hall.

- Grier, K. and Tullock, G. (1989), “An Empirical Analysis of Cross-national Economic Growth 1951- 80,” *Journal of Monetary Economics*, 24, 259-276.
- Gujarati, D.N. (1995). *Basic Econometrics* 3rd ed. New York: McGraw Hill,
- Hakkio, C. S. and Rush, M. (1991). “Co-integration: How Short Is the Long Run?” *Journal of International Money and Finance*, vol. 10, issue 4, pp. 571-581.
- Henrekson, M. (1993), “Wagner’s Law: A Spurious Relationship?” *Public Finance/Finances Publique*, 48, 2, 406-415.
- Holmes, J.M. and Hutton, P.A. (1990). “On the Causal Relationship between Government Expenditures and National Income,” *The Review Of Economics and Statistics* 72, 87-95.
- Hsieh, E. and Lai, K. (1994) “Government Spending and Economic Growth,” *Applied Economics*, 26, 535-42.
- Islam, M. (2001) Wagner’s Law Revisited: Co-integration and Exogeneity Tests for the USA,” *Applied Economics Letters*, 8, 509-515.
- Ismet, M. Barkley, AP. and Llewelyn, RV. (1998). Government intervention and market integration in Indonesian rice markets. *Agric. Econ.* 19: 283-295.
- Johansen, S., and Juselius, K. (1990), “Maximum Likelihood Estimation and Influence on Co-integration- with Applications to the Demand for Money,” *Oxford Bulletin of Economics and Statistics*, 52, 169-210.
- Ju-Huang, C. (2006). Government expenditures in China and Taiwan: Do they follow Wagner’s law? *Journal of Economic Development*, 31(2)139-148.
- Kamasa, K. and Ofori-Abebrese, G. (2015) “Wagner or Keynes for Ghana? Government Expenditure and Economic Growth Dynamics. A ‘VAR’ Approach” *Journal of Reviews on Global Economics*, Vol. 4, 177-183
- Keynes, J. M. (1936) *The General Theory of Employment, Interest and Money*. New York: Harcourt, Brace and Co.
- Kolluri, B.R., Panik, M. J. and Wahab, M.S. (2000), "Government Expenditure and Economic Growth: Evidence from G7 Countries", *Applied Economics*, 32, 1059-1068.
- Komain J, Brahmasrene T. (2007): “The Relationship between Government Expenditures and Economic Growth in Thailand”. *Journal of Economics and Economic Education Research*.

- Jiranyakul, K., and Brahmairene, T. (2007): “The Relationship between Government Expenditures and Economic Growth in Thailand”. *Journal of Economics and Economic Education Research*. Vol. 8, No. 1, pp. 93 – 102.
- Kormendi, R. C., and Meguire, P. G. (1985). Macroeconomic Determinants of Growth: Cross Country Evidence. *Journal of Monetary Economics*, 16(2), 141-63. [http://dx.doi.org/10.1016/0304-3932\(85\)90027-3](http://dx.doi.org/10.1016/0304-3932(85)90027-3)
- Krzyzaniak, M. (1972). “The case of Turkey: Government expenditures, the revenue constraint, and Wagner's law”. Program of Development Studies, Houston (Texas): Rice University. p. 19.
- Kuznets, S. (1955). “Economic Growth and Income Inequality,” *American Economic Review* 45, 1-28.
- Landau, D. (1983) “Government Expenditure and Economic Growth: A Cross-country Study”, *Southern Economic Journal*, 49, 783-92.
- Levine, R. and Renelt, D. (1992) “A Sensitivity Analysis of Cross-country Growth Regressions”, *American Economic Review*, 82, 943-63.
- Loizides, J and Vamvoukas, G (2005). “Government expenditures and Economic growth: Evidence from trivariate causality testing”. *Journal of Applied Economics*, Vol. VIII, No.8, 125-152
- Manning, L.M., and Adriacanos, D. (1993). “Dollar movements and inflation: A cointegration analysis”. *Applied Economics*, 25(12), 1483 -1488.
- Meltzer, A and Richard, S. (1981). “A Rational Theory of the Size of Government, *The Journal of Political Economy*,”89, 914 -927.
- Noferesti, M. (2000). “Unit root and co-integration in macroeconomic”. Tehran. Rasa Cultural Services Press.
- Oxley, L., (1994). “Co-integration, Causality and Wagner's Law: A Test for Britain 1870-1913,” *Scottish Journal of Political Economy*, 41, 286-298.
- Peters, Amos. (2002). “An Application of Wagner’s Law of Expanding State Activity to Totally Diverse Countries,” Monetary Policy Unit, Eastern Caribbean Central Bank, West Indies.
- Phillips, P.C.B., and Perron, P. (1988), “Testing for a Unit Root in Time Series Regression,” *Biometrika*, 75, 335-46.

- Ram, R. (1986) “Government Size and Economic Growth: A New Framework and Some Evidence from Cross-section and Time series,” *American Economic Review*, 76, 191-203.
- Ramayandi, A. (2003). “Economic Growth and Government Size in Indonesia: Some Lessons for the Local Authorities”. Working Paper in Economics and Development Studies, No. 200302.
- Romer, P. M. (1990) “Endogenous Technological Change,” *Journal of Political Economy*, 98, 71- 102.
- Sáez, M. P., & García, S. A. (2006). “Government Spending and Economic Growth in the European Union Countries: An Empirical Approach”. Working Paper Series (<http://ssrn.com/abstract=914104>).
- Sala-i-Martin, X. (1997) “I Just Ran Two Million Regressions,” *American Economic Review*, 87, 178- 183.
- Salih, M. (2012), “The Relationship between Economic Growth and Government Expenditure: Evidence from Sudan,” *International Business Research*, Vol. 5. 8, 40-46.
- Singh, B. and Sahni, B. S. (1984) “Causality between Public Expenditure and National Income,” *The Review of Economics and Statistics* 66, 630-644.
- Soory, A. and Keihani Hekmat, R. (2004). “Population variables, government size and economic growth”. *Seasonal J. Econ. Res.* 9 and 10: 53-75.
- Wagner, A. (1893), “Grundlegung der Politischen Ökonomie”, 3rd ed., Leipzig, C. F. Winter.
- Wahab, M. (2004). "Economic Growth and Government Expenditure: Evidence from a New Test Specification," *Applied Economics*, 36, 2125-2135.
- Yuk, Wing, (2005), “Government Size and Economic Growth: Time – Series Evidence for the United Kingdom, 1830-1993,” Working Paper, Department of Economics, University of Victoria, Victoria, B.C., Canada.

1. 8. Annexes

Annex 1: The ADF test, (Engle and Granger, 1987):

An ADF test here consists of estimating the following regression

$$\Delta Z_t = \beta_1 + \beta_2 t + \delta Z_{t-1} + \sum \alpha_i \Delta Z_{t-i} + \varepsilon_t \dots\dots\dots (3)$$

$$\Delta \Delta Z_t = \beta_1 + \beta_2 t + \delta \Delta Z_{t-1} + \sum \alpha_i \Delta \Delta Z_{t-i} + \varepsilon_t \dots\dots\dots (4)$$

Where Z_t is the time series under consideration, ε_t is pure white noise error, t is trend, β_1 is drift and $\delta = \rho - 1$. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term is serially uncorrelated. If the null hypothesis ($\delta = 0$) is rejected, it means the series is stationary.

The minimum of the Akaike information criteria (AIC) is used to determine the appropriate lag length (value of p) in the ADF test (Brester and Goodwin, 1993). As is shown, the null hypothesis of the unit root test is that the variable under consideration has a unit root

$$H_0: \delta = 0$$

$$H_1: \delta \neq 0$$

Accepting null hypothesis indicates that the series does not have stationary.

Annex 2: Dicky-Fuller and augmented Dicky-Fuller tests for co integration:

In order to test stationary characteristic of regression's residuals terms (u_t), Dicky-Fuller and augmented Dicky-Fuller tests - following regression - were employed.

$$\Delta u_t = \beta_1 + \beta_2 u_{t-1} + \sum \alpha_i \Delta u_{t-i} + v_t \dots\dots\dots (5)$$

$$H_0: \delta = 0$$

$H_1: \delta \neq 0$

Rejected null hypothesis indicates that the series are co-integrated. Therefore, we could use VECM.

On the other hand, acceptance of the null hypothesis indicates that series were not co-integrated.

Annex 3: Selection – order criteria

VAR Lag Order Selection Criteria
 Endogenous variables: DY DG DFA
 Exogenous variables: C DV
 Sample: 1972 2015
 Included observations: 39

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-842.5227	NA	1.59e+15	43.51399	43.76992	43.60581
1	-823.6431	32.91842	9.60e+14	43.00734	43.64717	43.23690
2	-808.7430	23.68732	7.19e+14	42.70477	43.72850	43.07207
3	-794.7867	20.03980	5.74e+14	42.45060	43.85823	42.95564
4	-759.6038	45.10631*	1.58e+14*	41.10789*	42.89941*	41.75067*

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

Annex 4: VAR estimation models

Vector Autoregression Estimates
 Sample (adjusted): 1977 2015
 Included observations: 39 after adjustments
 Standard errors in () & t-statistics in []

	DY	DG	DFA
DY(-1)	0.369806 (0.23970) [1.54281]	-0.050876 (0.07627) [-0.66709]	-0.150853 (0.03130) [-4.81979]
DY(-2)	-0.520052 (0.30378) [-1.71193]	0.395011 (0.09666) [4.08678]	0.096469 (0.03967) [2.43201]

DY(-3)	-0.514247 (0.22628) [-2.27258]	0.102739 (0.07200) [1.42698]	0.061254 (0.02955) [2.07310]
DY(-4)	0.346804 (0.20537) [1.68870]	0.016691 (0.06534) [0.25544]	-0.044708 (0.02682) [-1.66724]
DG(-1)	1.563692 (0.59132) [2.64441]	-0.814886 (0.18814) [-4.33121]	0.237868 (0.07721) [3.08072]
DG(-2)	-0.767539 (1.04406) [-0.73515]	-0.672663 (0.33219) [-2.02491]	0.425506 (0.13633) [3.12118]
DG(-3)	-0.563660 (1.25084) [-0.45063]	-1.507421 (0.39799) [-3.78763]	-0.194596 (0.16333) [-1.19144]
DG(-4)	2.849274 (1.03047) [2.76502]	-1.265565 (0.32787) [-3.85995]	-0.823587 (0.13455) [-6.12085]
DFA(-1)	-0.512171 (1.56092) [-0.32812]	1.477321 (0.49665) [2.97459]	-0.442093 (0.20382) [-2.16905]
DFA(-2)	-1.309976 (1.84899) [-0.70848]	2.169138 (0.58830) [3.68712]	0.117430 (0.24143) [0.48639]
DFA(-3)	-1.216897 (1.70582) [-0.71338]	1.814324 (0.54275) [3.34284]	0.307164 (0.22274) [1.37903]
DFA(-4)	1.441031 (1.23958) [1.16251]	1.185823 (0.39440) [3.00662]	-0.040602 (0.16186) [-0.25085]
DV	-54.63729 (290.160) [-0.18830]	182.0310 (92.3217) [1.97170]	108.1244 (37.8878) [2.85380]
C	79.95061 (153.104) [0.52220]	18.98203 (48.7139) [0.38966]	3.587329 (19.9916) [0.17944]
R-squared	0.696260	0.658449	0.857551
Adj. R-squared	0.538315	0.480842	0.783478
Sum sq. resids	9928199.	1005084.	169275.3

S.E. equation	630.1809	200.5077	82.28616
F-statistic	4.408251	3.707345	11.57704
Log likelihood	-298.0615	-253.4005	-218.6651
Akaike AIC	16.00315	13.71285	11.93155
Schwarz SC	16.60033	14.31002	12.52872
Mean dependent	160.6642	70.49985	29.66667
S.D. dependent	927.4543	278.2797	176.8379

Determinant resid covariance (dof adj.)	6.30E+13
Determinant resid covariance	1.66E+13
Log likelihood	-759.6038
Akaike information criterion	41.10789
Schwarz criterion	42.89941

Annex 5: Normality tests of VAR residual

VAR Residual Normality Tests

Orthogonalization: Cholesky (Lutkepohl)

Null Hypothesis: residuals are multivariate normal

Sample: 1972 2015

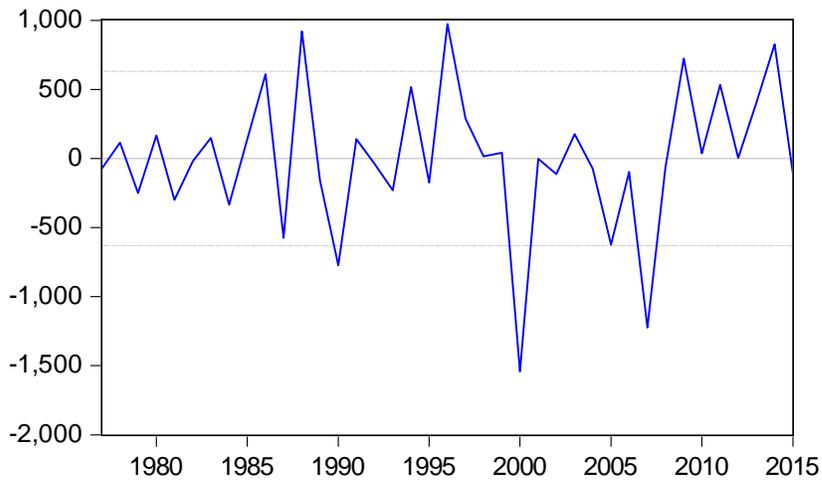
Included observations: 39

Component	Skewness	Chi-sq	df	Prob.
1	-0.643577	2.692242	1	0.1008
2	0.154769	0.155697	1	0.6931
3	-0.385772	0.967330	1	0.3253
Joint		3.815268	3	0.2821

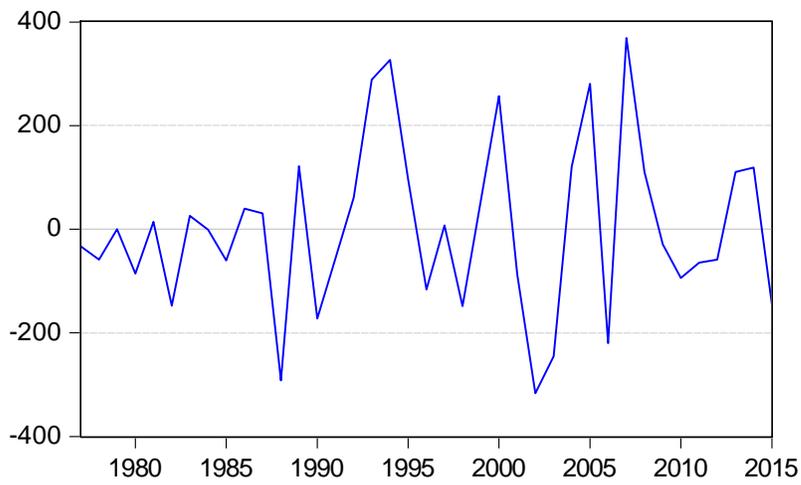
Component	Kurtosis	Chi-sq	df	Prob.
1	4.439216	3.365933	1	0.0666
2	3.039637	0.002553	1	0.9597
3	3.673108	0.736246	1	0.3909
Joint		4.104731	3	0.2504

Component	Jarque-Bera	Df	Prob.
1	6.058174	2	0.0484
2	0.158250	2	0.9239
3	1.703576	2	0.4267
Joint	7.919999	6	0.2440

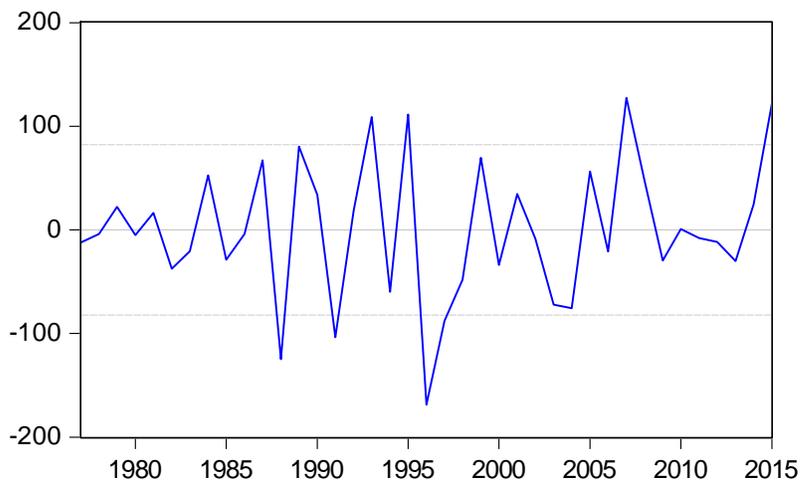
DY Residuals



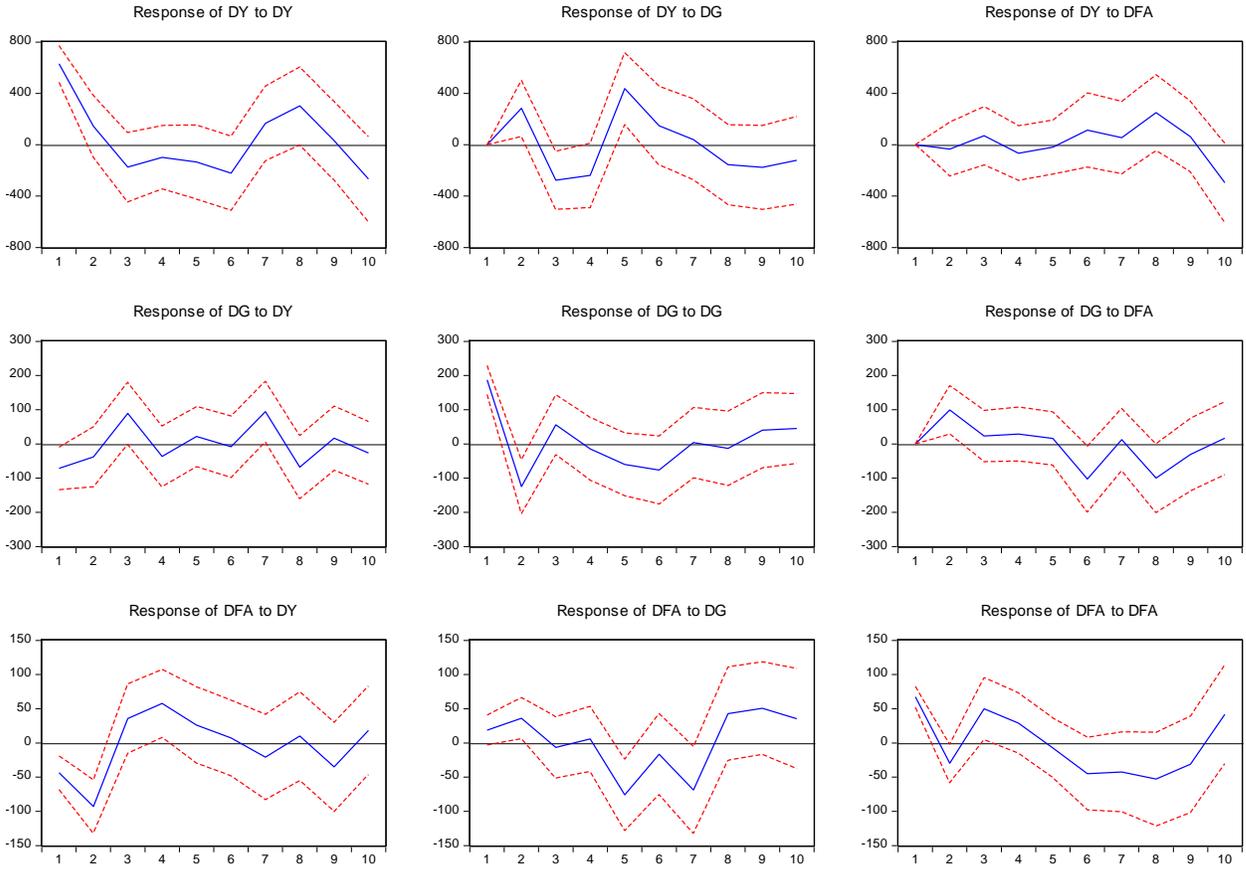
DG Residuals



DFA Residuals



Response to CholeskyOne S.D. Innovations ± 2 S.E.



- $Y = f(g,fa)$

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.563158	Prob. F(2,41)	0.0894
Obs*R-squared	4.890005	Prob. Chi-Square(2)	0.0867
Scaled explained SS	7.927644	Prob. Chi-Square(2)	0.0190

- $G = f(y,fa)$

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.257798	Prob. F(2,41)	0.2950
Obs*R-squared	2.543598	Prob. Chi-Square(2)	0.2803
Scaled explained SS	1.700794	Prob. Chi-Square(2)	0.4272

F(6, 34) = 2.14
 Prob > F = 0.0743

VAR Granger Causality/Block Exogeneity Wald
 Tests

Date: 09/02/16 Time: 00:31

Sample: 1972 2015

Included observations: 39

Dependent variable: DY

Excluded	Chi-sq	df	Prob.
DG	22.54219	4	0.0002
DIA	8.281342	4	0.0818
All	37.60303	8	0.0000

Dependent variable: DG

Excluded	Chi-sq	df	Prob.
DY	26.82129	4	0.0000
DIA	14.07526	4	0.0071
All	34.70841	8	0.0000

Annex 7: Palestinian data real values (base year 2004)

year	Y	G	IA
1972	1030.3	232.6	0.0
1973	964.9	198.3	0.0
1974	1282.3	240.3	0.0
1975	1252.7	216.2	0.0
1976	1455.8	257.8	0.0
1977	1330.0	215.2	0.0
1978	1531.4	254.2	0.0
1979	1388.2	198.0	0.0
1980	1637.1	239.9	0.0
1981	1401.1	221.2	0.0

1982	1469.0	213.9	0.0
1983	1486.2	211.9	0.0
1984	1543.3	217.6	0.0
1985	1618.5	214.6	0.0
1986	2292.8	305.7	0.0
1987	2120.2	278.4	0.0
1988	2591.4	247.5	0.0
1989	2368.0	276.6	0.0
1990	2013.9	237.3	0.0
1991	1773.4	267.9	0.0
1992	2161.2	201.6	0.0
1993	2361.7	410.4	0.0
1994	3080.7	746.8	0.0
1995	3300.0	768.9	325.0
1996	3340.1	1158.3	318.0
1997	3830.0	1119.8	298.0
1998	4379.0	1053.1	256.0
1999	4741.6	1216.3	269.0
2000	4335.9	1284.3	54.0
2001	3932.2	1221.1	523.0
2002	3441.1	1056.4	456.0
2003	3923.4	1253.2	294.0
2004	4329.2	1478.7	353.0
2005	4796.7	2255.4	631.0
2006	4609.6	1707.0	957.0
2007	4913.4	2856.1	1180.0
2008	5212.1	2909.3	1572.0
2009	5663.6	2718.3	1154.0
2010	6122.3	2496.1	965.0

2011	6882.3	2784.2	626.0
2012	7314.8	2430.2	845.0
2013	7477.0	2556.8	839.0
2014	7463.4	2734.1	957.0
2015	7721.7	3007.3	1157.0

Sources: Central Bureau of Statistics, Israel, Statistical Abstracts of Israel (several volumes).
Palestinian Central Bureau of Statistics, National Account Statistics, www.pcbs.gov.ps
Palestinian Ministry of Finance, Public Budget.

2.Chapter two: Impact of Government Expenditure on Unemployment Rate in Palestine: An Error Correction Analysis

2.1. Introduction

Unemployment rate is the most widely used indicator of the well-being of the labor market and an important measure of the state of an economy. Many macroeconomists argue that expansionary fiscal policy stimulates employment and lowers unemployment. Indeed, existing studies for the US economy (see Ravn and Simonelli 2007; and Monacelli et al. 2010) confirm this conventional wisdom. They predicted a negative response of the unemployment rate to fiscal expansionary policy because many fiscal packages in the real world are typically designed to "create jobs" in addition to the existence of many recent models which explain its time series properties. For many reasons, a large government sector is likely to increase unemployment. First, it crowds out the private sector and private investment in particular. Thus, technical progress, productivity growth and the international competitiveness of the relevant economy tend to be reduced, thus leading to high unemployment (Alesina et al., 1997). For instance, if the public spending was financed by borrowing, then this borrowing might exert upward pressure on interest rates, which, in turn, would cause a reduction in private investment. Similarly, public spending increase may bid up wages, thereby reducing the demand for labor in the private sector (Dupor and Guerrero, 2016).

John Maynard Keynes believed that the economy's resources are all put to productive use at full employment, but when the economy is depressed, government spending increases have a multiplier effect. At such times, government can compensate for the shortfall in private spending, thereby increasing the economy's total spending and output. Keynes, therefore, recommended that deficit spending be confined to periods in which unemployment is high. Thus, Keynes himself was not a "Keynesian" in the sense of someone who believes that government spending always has a positive effect on the economy" (Ranson, 2013).

Studies conducted on government spending and private spending showed an inverse relationship in the event of low unemployment, but showed that this relationship would continue even under high unemployment, but less sharply (Ranson, 2013)

Second, as the private sector is relatively small, given the presence of a large government sector, its ability to absorb people entering work force or employees made redundant in the wake of structural changes is limited as well. This may also result in higher unemployment. Finally, most of all, however, a big government is likely to increase the unemployment rate because such a government needs a higher income tax, which reduces the incentive to work and makes the cost of unemployment low (Abrams 1999; Christopoulos and Tsionas 2002; Feldmann 2006). In addition, high taxes reduce households' disposable income and thus, *ceteris paribus* aggregate demand, and reduce the profitability of private investment. (Alesina et al., 2002). Both effects tend to increase unemployment.

2.2. Unemployment in Macroeconomic Thought

The classical theory argues that the labor market consists of demand and supply of labor. Demand for labor is a derived demand, obtained from the declining portion of the marginal product of labor curve. The demand curve is a negative function of real wage in that if wages increased the quantity demand for labor would decline.

The supply of labor is derived from worker's choice to spend part of time working or not working (leisure). Supply of work hours is a positive function of the real wage because if the real wage fell, workers would supply less hours of work if the substitution effect prevails on the income effect. In equilibrium, demand and supply of labor are intersected at a clearing point that determines the equilibrium real wage rate and full employment.

Wicksell (1893) analyzed the technical unemployment as a result of technological change as well. The introduction of machines causes unemployment, thus forcing the unemployed to search for new jobs, which will push wages downward thus restoring full employment again.

For the normal (frictional) unemployment, Wicksell believed that the advertisements and recruitment agencies can reduce it. As for cyclical unemployment, and other types of unemployment, we get the result of the low effective demand, and therefore, it can be solved by raising wages, which leads to an increase of effective demand for workers. However, this procedure may result in the loss of workers to their jobs. Therefore, he

concluded that the existence of cyclical unemployment is the result of a bad choice in the investment. Capital has been invested in areas that had low rates of return. He concluded that public works are the best measure to combat cyclical unemployment.

After 1921, Wicksell turned to Malthus. He thought that the causes of the unemployment were the surplus people, shortage of capital brought about by the war, and the disorganized state of the monetary system. For the third cause, after the war prices began to fall and producers decided to produce lower amounts of production because they knew they would receive lower prices for their products. Thus, they let their money set idle in banks and workers became unemployed. These causes suggest that emigration became one of the important policies for solving the unemployment problem (Far and Saeedi, 2015). Wage reduction is not a perfect policy to increase employment. The increase in wages is most likely due to increased labor productivity and wage reduction is likely to reduce work intensity and productivity as efficiency wage theory says (Stiglitz, 1974). Wage reduction would not force some capital-intensive firms to switch to labor intensive techniques in the short run. Higher wages should stimulate the substitution effect by employing more machines for labor. And this substitution would increase labor productivity and employment in the long-run. Hayek (Nishhiyama and Leube, 1984) contends that unemployment is due “to a discrepancy between the distribution of labor...between industries...and the distribution of demand among their producers. This discrepancy is caused by a distortion of the system of relative prices and wages.” In other words, unemployment is caused by “a deviation from the equilibrium prices and wages which would establish them with a free market and stable money.” This is actually a mismatch between demand and supply of labor, which is usually caused by expansionary monetary and fiscal policies and powerful trade unions. These policies create economic dislocation and structural changes in an economy which misdirects labor and other economic resources to alternative uses. Unions are also able to set higher wages compared to market wages, which generate unemployment, particularly in industries that become less profitable. In short, for Hayek, the unemployment problem is caused by resources being in the wrong places at the wrong time and can be corrected if wages and prices are determined by the equilibrium of supply and demand (Far and Saeedi 2015).

Trehan (2001) provides an important explanation of the search theory of unemployment. Firms search for the productive workers and workers search for high paying jobs. So, both agents continue searching until matches are reached. At that point, a worker would leave the unemployment pool. But if a worker realized later on that her productivity was worth higher wages and firms were paying high wages on the average, then the worker's reservation wage would increase. Consequently, the unemployment rate would start rising gradually, indicating that a mismatch has occurred again (Far and Saeedi 2015).

Keynes criticized the classical economic theories about full employment. He rejected the theory that society would reach full employment in the equilibrium situation and he believed that the occupation level had a direct relationship with the level of production through effective demand. So, he also believed that to reduce unemployment, the government had to create occupations, even if these occupations could be non-productive (Keynes, 1936).

Keynes believed that unemployment is the result of decrease of investment; he disagreed with classical researchers who maintain that the balance between investment and saving is a natural affair and would be obtained spontaneously.

Due to the Keynes's belief, saving is also related to necessity and habit. Everyone for his/her living has his/her own behavior and recognizes it necessary to spend his/her income and saves the other depending inter alia on the interest rate. Keynes formalized the trend to consumption in what is called consumption function. Finally, what is not spent for goods purchase, is saved. Poor people should spend all their income and their saving is very low, and even nothing, but the rich people's incomes are more than their consumption. Regarding this, their saving will be more and this is confirmed by observation. The result is that if the total income or income distribution didn't change, the saving would be remained constant perforce (Rueff, 1947).

2. 3. Objectives

This paper sought to investigate the impact of the government expenditure on the unemployment rate in Palestine over the 1972-2013 periods. The central hypothesis of

this study examines the effect of government size on labor market. The issue raised is whether increasing government expenditures is the cause of unemployment, this is especially important for developing countries where the public sector absorbs a relatively large share of society's economic resources. Hence, in this paper, we derive our inference from a test that employs co-integration analysis and includes the error correction term.

Section 3 of this paper is devoted to description of the methodology; section 4 provides a description of the data set and a summary of empirical results. Finally, section 5 includes some concluding remarks.

This paper endeavored in particular to answer one question: What is the impact of government size (measured by the proportion of government expenditure to GDP) on unemployment rate? A great number of studies have tried to estimate, with various controls, whether the effect of government size on unemployment rate was positive or negative. Current literature, from different groups of countries and different types of control variables confirm that the relationship between government size and unemployment rate is not clear. The primary objective of this study was to estimate empirically the impact of government size on unemployment rate in the Palestinian economy from 1972 to 2013. Before tackling the question let us report on previous studies.

2.4. Previous Empirical Results

Most of empirical studies suggest that an increase in government expenditure adversely affects the labor market performance. For example, Karras (1993) observed negative employment effects of government expenditure in eight out of 18 countries in his sample. Abrams (1999) found that the government expenditure ratio was positively related to the unemployment rate in his study which covered 15 major industrial countries. Yuan and Li (2000), on the contrary, found a negative effect of government expenditure on unemployment in the USA. Christopoulos and Tsionas (2002) examined the relationship between the government expenditure ratio and the unemployment rate in 10 European countries from 1961 to 1999. They find that the reduction in unemployment due to the increase in public spending is not uniform across all countries investigated.

According to several other empirical studies, an increase in government employment worsens the overall employment situation. For example, empirical evidence from a sample of 17 OECD countries suggests that, on average, the creation of 100 public sector jobs might eliminate about 150 private sector jobs, would slightly decrease labor force participation, and increase the number of unemployed workers by about 33 (Algan et al., (2002); Malley and Moutos (1996); Demekas and Kontolemis (2000). Malley and Moutos (1998)) have obtained similar results for Sweden, Demekas and Kontolemis (2000) from Greece, and Malley and Moutos (1998) for Germany, Japan and the US.

A large number of studies on the unemployment effects of labor taxes were carried out recently covering OECD countries. Almost all of them concluded that a larger tax burden would increase the unemployment rate (Nickell and Layard (1999), Daveri and Tabellini (2000); Volkerink, Sturm, and Haan, (2001); Nickell et al. (2005)). For example, Nickell et al. (2005) found that a 10-percentage point increase in the labor tax rate would lead to around a one percentage point rise in the unemployment rate in the long-term.

According to Daveri and Tabellini (2000), the rise in labor tax rates in Europe from the mid-60s to the mid-90s, had accounted for half of the rise in the unemployment rate during that period. Although Scarpetta (1996) did not find statistically significant effects of labor taxes on the overall unemployment rate (nor on the youth unemployment rate), he did find such effects on the long-term unemployment rate.

Some studies have used the hours of work, weekly or annual, as a measure of labor supply. Although there is a clear difference in wage elasticity, there is a general consensus that the supply of working hours does not respond to income tax for full-time male workers (Ashenfelter and Heckman, (1974); Magnac and Bourguignon, (1990)). At the same time, labour supply by part-time workers shows negative responsiveness to an income tax; female participation as well has the same response, and the degree of this response is stable in general. Meghir and Phillips (2010) have provided a good overview.

In the literature, the nature of the management of public spending is an additional important factor which influences unemployment. The public spending in the Occupied Palestinian Territories before 1995 was managed by the Civil Administration that belongs to the Israeli Government. This has changed post 1995 and now public spending is

managed by tens of institutions that belong to the PA. Hence, another aim of this paper is to see if this transformation in the management of public spending has any influence on Unemployment. There are several reasons to suspect that the size of government size is related to unemployment. First, big governments may have intensive regulations which may impede labor market functioning. Second, big governments impose high tax rates and even income taxes or/and other indirect taxes such that sales tax or value added tax. Large tax rates presumably affect work leisure decisions and could lengthen search time between bouts of unemployment. Third, big governments are more likely to finance, for example, public health insurance and lucrative unemployment insurance schemes, thereby lowering the cost of unemployment to the individual. Fourth, big governments, other things equal, reduce the size of the private sector; Unemployment arising from a decline in one part of the private sector may take longer to be reabsorbed into another part of the private sector, the smaller and, likely, the less diversified is the private sector. This list is not exhaustive but it merely shows that a bigger government is likely to introduce a complicated system of incentives and regulations that may have a negative impact on the unemployment rate.

Large outlays for job training and placement would certainly affect unemployment differently than large outlays on unemployment insurance. Other factors, such as culture and degree of unionization, could also obfuscate the unemployment-government-size linkage unless properly controlled for. Further, the unemployment rate is the reported rate. Government programs which encourage individuals to drop out of the labor force or which shuffle idle workers into welfare programs, where they are not counted as unemployed, would reduce the reported unemployment rate. Thus, a simple, *pari passu*, linkage between the size of government and the unemployment rate is likely to experience considerable slippage. The question remains an empirical one to which we not turn.

2. 5. Methodology

Following Abrams (1999), this study identified the impact of gross government expenditures as a percent of GDP, on unemployment rate. In our regression We have

included one more variable that we think is important as Keynesian theory. Investment is an important variable and we take the proportion of total investment as a percent of GDP. On the other hand, the population size is also included as a supply instrument for labor market. In addition, we would explore the effect of Palestinian management government expenditure on unemployment by using a dummy variable. It identified the Palestinian NA era which heavily increased government size. Thus, the model will be the following linear form:

$$U_t = \beta_0 + \beta_1 G_t + \beta_2 I_t + \beta_3 GD_t + \beta_4 Pop + e_t \quad (1)$$

Where: U_t denoted the unemployment, rate measured at time t . G_t means the government spending size (government expenditure as percentage of GDP). Here, the government expenditure included government consumption expenditure (operating expenses), capital expenses and transfer payments. I_t denoted the gross private investment and it was used as percentage of GDP. A dummy variable (GD_t) was added for presenting structural change through the change in the public finance management in Palestine. This is to accommodate the Palestinian situation throughout the period from 1972-2013, which will take the value of 0 during 1972-1994, and 1 from 1995-2013. This dummy variable was multiplied by the size of the government expenditures and it is included in order to measure the influence on unemployment which can be attributed to the Palestinian management and size of public spending.

The model in (1)⁵ is consistent with the views of the likely effects of a fiscal stimulus on unemployment. It models unemployment as a function of government spending and gross private investment. If the slope parameters associated with the G_t were jointly insignificant, then we would conclude that government did not change unemployment, and that the effect of spending on future unemployment was weak. This also indicates that expansion of government spending was not strongly related to future unemployment rate. And if the slope parameters associated with the GD_t were jointly insignificant, then we would conclude that there were no differences in government expenditure on unemployment rate between the Palestinian and Israeli eras. Finally, if the slope parameters associated with the I_t were insignificant, then we would conclude that the private investment in the Palestinian economy wasn't creating jobs.

⁵ In all specifications, we model the error term as a white noise.

2.5.1 The Error Correction Model (ECM)

The most important finding of cointegration analysis is “*The Granger Representation Theorem*”. This theorem states that if a set of variables is cointegrated of order 1,1 [CI (1,1)], then there exists a valid error-correction representation of the data. Engle and Granger (1987) provided a principal feature of the cointegrated variables in that their time paths are influenced by the deviation from the long-run relationship, given that cointegration implies error correction representation.

As mentioned previously, the model in (1) runs the risk of potential cointegration between five variables U, G, GD, Pop and I. This is a serious problem, as it may invalidate inference and results. Hence, in the particular case of cointegration evidence, we derive our inference from an error correction model representation that accounts for the long- term adjustment of variables; we used a model that reads as (Mortazavi and Saeedi, 2015):

$$\Delta U_t = \alpha_0 + \alpha_1 \Delta G_t + \alpha_2 \Delta GD_t + \alpha_3 \Delta I_t + \alpha_4 \Delta \text{Pop}_t - \alpha_5 EC_{t-1} + e_t \quad (2)$$

In (2), EC_{t-1} is computed as the lagged residuals of the OLS regression of U_t on G_t , I_t , Pop_t and GD_t . The parameter (α_5) describes the short -run adjustment and indicates the speed of adjustment towards the long-run equilibrium state. An ECM is very appealing because it includes the short -run and the long-run effects.

2.5.2 Data and Empirical Results

The data set needed to estimate the models above was collected from various sources⁶. In The data collected from 1972 to 1994 were taken from the publications of the Israeli Central Bureau of Statistics (ICBS). The rest of the sample that covered the years 1995 to 2013 was gathered from the Palestinian Central Bureau of Statistics (PCBS). Finally, the

⁶ There was a regime change in the occupied territories in the aftermath of the peace agreement with Israel in 1993. The PNA took over the civil duties from Israel and so data prior to 1995 was only available from Israeli sources. This posed risks related to the computation methods followed by the two regulators. However, we conducted a subsample analysis and found that our results were robust.

government spending data were collected from the Palestinian public budget announcements. All data were annual at end of calendar year and constant prices.

Although a higher frequency data, say quarterly, is more beneficial to capture the dynamics of the variables, annual data were appropriate in this context. The reason was that government spending was insensitive to seasonal and possibly cyclical fluctuations. In addition, there were severe limitations on the quality and availability of the Palestinian data. Fortunately, Singh and Sahni (1984) and Hakkio and Rush (1991) have pointed out that a higher frequency data would not change inference compared to annual data, and what was crucial was the length of the period under study. Our paper covered 41 years of data and a long period that extended from 1972 to 2013. We counted on that for a possible robust result.

The basic assumption underlying the standard estimation procedures is that the time series are stationary, in the sense that the mean and variance are independent of time. However, many economic time-series are not stationary and change over time (Nelson and Plosser, 1982). This means that as time goes on, the mean and variance tend to move away from any given values. Non-stationarity is usually removed by taking first differences (Box and Jenkins, 1970). However, this also results in removing out the long-run characteristics of the data, thereby making the model capable of explaining only short-run effects.

Although many time series may tend to trend up or down over time in a non-stationary behavior, a group of them might drift together. If there is a tendency for some variables to hold a linear relationship over long periods of time, then cointegration analysis can be used to find out this long-run equilibrium relationship.

Figures (1-4) plots a time series for the four variables of interest: U_t , G_t , GD_t , Pop_t and I_t . The figures show that despite the increase in public spending, investment and despite the Palestinian management of their own resources, unemployment has increased. This may indicate that the size of the government may harm the unemployment rate.

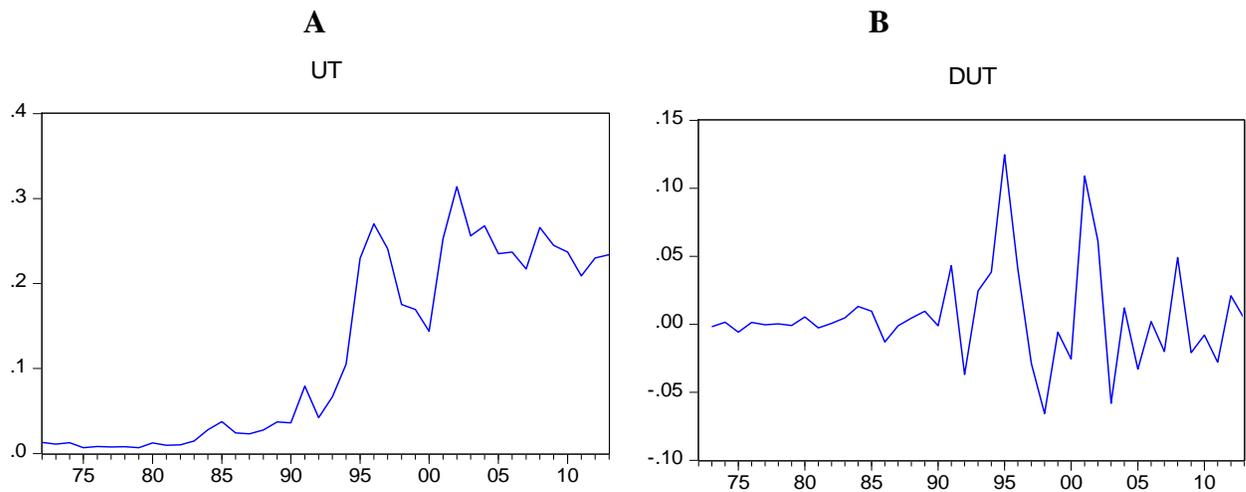


Figure 1: Unemployment Rate: 1972-2013 (Absolute Value and Differences)

As Figure 1 (A) shows, there was a tendency for an increase in the unemployment rate over time. This is attributed to the general stability of the data over time, while this situation in Figure 1 (B) changed when taking the differences. The vertical axis in figures 1A and 1B refers to the unemployment rate and the change in unemployment rate respectively.

Unemployment rates recorded low levels until the early 1990s. Since then, it had started rising mainly due to Israeli procedures of denying Palestinian workers entry into Israel. The Israeli labor market was able to absorb 40% of the Gaza Strip workers, and 30% of the West Bank workers between 1975-1992. This participation dropped to 16.2% in 1995, and 14.1% in 1998, and continued to decline to 10% in 2002. (Farsakh, 2005).

The table also shows the maximum points in the unemployment rate in 1996 and 2002, reaching respectively 27% and 31.4%. This was due to the establishment of the PNA, and the spontaneous return of a relatively large numbers of Palestinians returnees which Israel allowed in 1995. This, together with the provision of Israeli closure, had led to high unemployment rates in an unprecedented way.

In 2002, the Palestinian territories witnessed the heights of Israeli military actions to counter al-Aqsa Intifada, which was accompanied by strict measures like storming the Palestinian cities of the West Bank and Gaza Strip, and the accompanying dismemberment of cities, and imposing security cordon preventing many workers from reaching their workplaces in both Israel, and even within the West Bank. This can be observed as global maxima in Figure 1 (A).

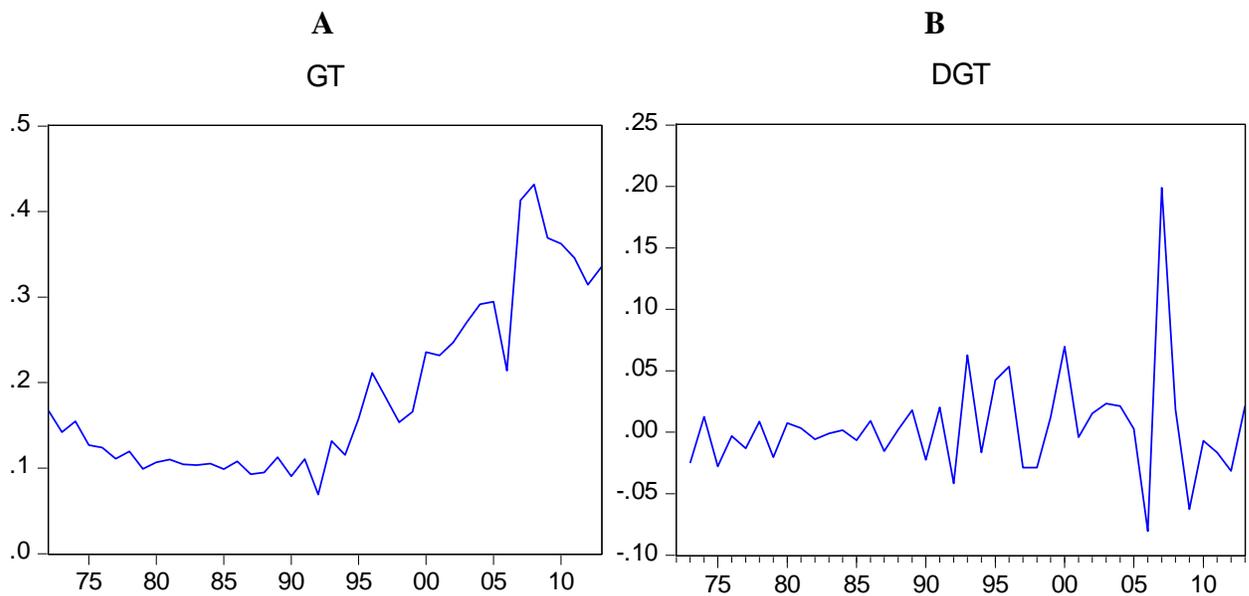


Figure 2: Government Size: 1972-2013 (Absolute Value and Differences)

The vertical axis of figure 2 (A) and 2B refers to the ratio of government expenditure to GDP and the change in this ratio respectively.

Figure 2 (A) and (B) illustrate the obvious change in the size of government spending that accompanied the advent of PNA in 1995. It also shows a clear decline in 2006 due to the following reasons:

- 1- The formation of the Hamas government, and consequent international rejection and suspension of international aid.
- 2- The suspension of Israeli refunds reserve of the PNA clearance revenue (taxes and customs collected by Israel on behalf of the PNA at border control crossings)

Following the 2007 Annapolis conference which followed the Hamas control of Gaza Strip, and the return of international aid, and release of Palestinian clearance revenue held by Israel, a maximum value of government size was observed, which surpassed any value throughout the period 1975-2013.

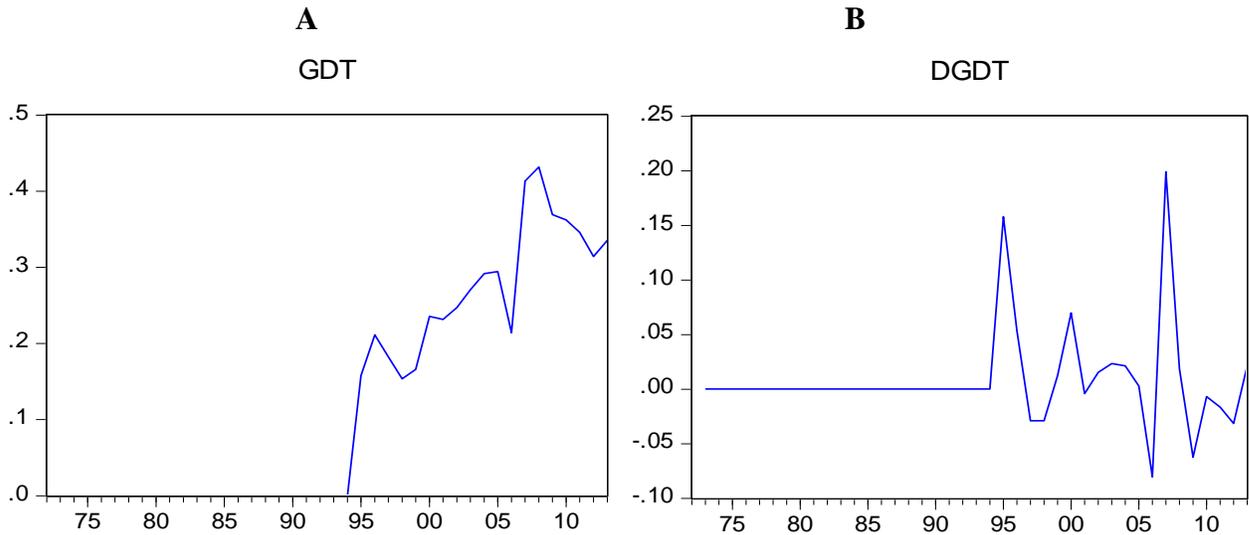


Figure 3: Government Size: 1972-2013 (Absolute Value and Differences)

Figure 3(A) and (B) shows that stability and values equaled zero in the period between 1972-1994, when the Israeli administration was running the public finance in Palestine. The dummy assumes a value of one during the period that extends from 1995 to 2013 and zero otherwise. This period is characterized by the Palestinian management of public spending in the Occupied Palestinian Territories.

The period from 1995 to 2013 indicates the government expenses. This assumption was put to answer the hypothesis: “Is there a structural change in the effect of Palestinian management of public expenses on unemployment rate?”.

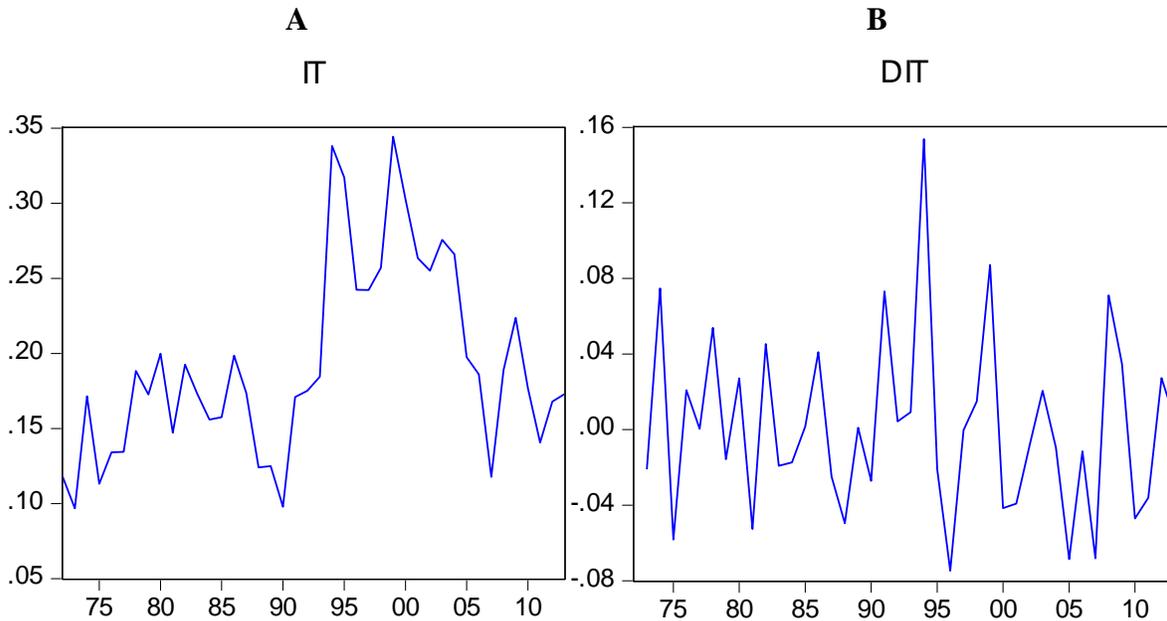


Figure 4: The Ratio of Gross Private Investment to GDP and Its Difference: 1972-2013

Figure 4 illustrates the investment behavior of the Palestinian private sector. It shows a sharp rise in the private investment in both 1994 and 1999. In both years, the gross private investment was around 34% of the GDP, worth an estimated 1, 042 and 1, 632 million dollars respectively. The sharp peak in 1994 was due to the optimistic investment atmosphere after the signing of the Oslo peace agreement, which included a 5- year transition period to reach a final settlement, and the corresponding expectancy of the establishment of the Palestinian state in 1999. Following 1999, a declining trend can be observed which could be attributed to the deteriorating political situation, in the wake of Al-Aqsa Intifada. It reached a global minimum in 2007 during the political division between Gaza, and the West Bank, where private investment amounted to 11% of the GDP or 579 million dollars.

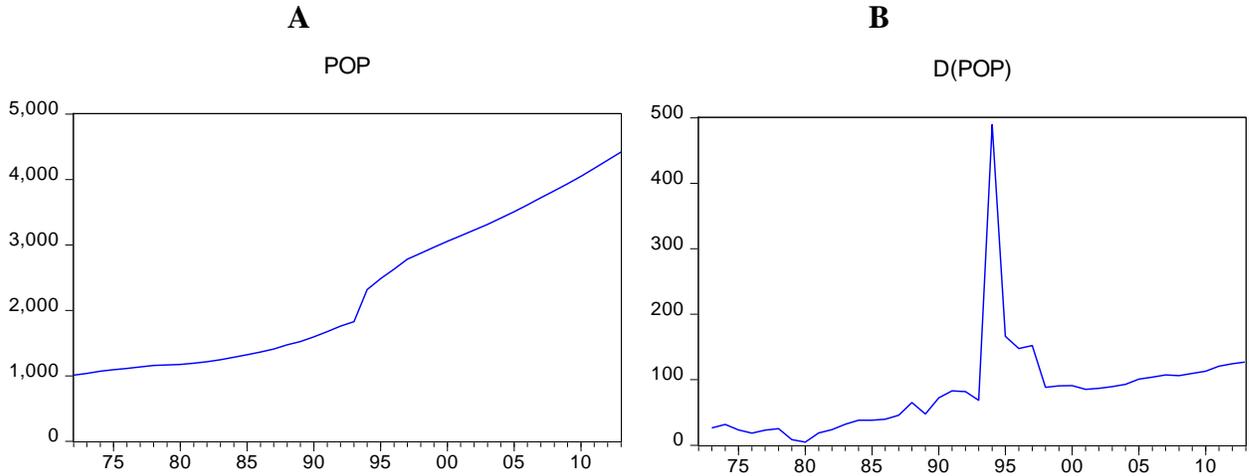


Figure 5: Population: 1972-2013 (Absolute Value and Differences)

Figure A shows that the population in the Palestinian Occupied Territories grows at a constant rate. There is a big increase in population in 1995 due to the return of a large number of Palestinians from abroad following the establishment of the PNA.

2.5.3 Stationery and Unit Root Test

Before making inference on causality, we tested stationary for the level variables: G, GD, U and I. Table 1 presents the test statistics and the critical values of the Augmented Dickey Fuller test. As can be seen from the table, the null of unit root could not be rejected at the traditional significant levels. This indicates that the distribution of level variables was non stationary and that regression results based on the levels of variables were spurious.

The Augmented Dickey-Fuller (ADF) unit root test was applied to the five-time series employed in the study (U, G, GD, Pop and I) with and without time trend. Table 1 reports the empirical results of the ADF unit root tests. The results indicate that none of the reported t - statistics for U, G, GD, Pop and I were close to the 5% critical value for the “t-statistic.” This means that the null hypothesis of a unit root cannot be rejected for the levels of each variable. Therefore, it can be concluded that the U, G, GD, Pop and I were non-stationary series. The same results were obtained when the equations included a time

trend term. These results present evidence that each time series was integrated of order more than zero; that is each series is I (1) with trend and integrates of order one. This supports out earlier conjecture that they were non-stationary time series.

Table 1: ADF Tests for Stationarity of the Time Series

Variable	Level		First Difference	
	Without trend (-2.941) *	With trend (-3.524)	Without trend (-2.939)	With trend (-3.530)
U	-1.030	-2.440	-5.570	-5.487
G	-0.954	-2.85	-8.02	-8.04
GD	-0.637	-2.521	-6.70	-6.657
I	-1.478	-3.030	-6.194	-6.102
Pop	2.634	-1.892	-4.068	-4.789

Notes: The Augmented Dickey-Fuller test is basically a test of Hypothesis $\rho = 0$ against Hypothesis $\rho < 0$ in the equation: $\Delta X_t = \mu + \rho X_{t-1} + \alpha_i \sum \Delta X_{t-i} + \epsilon_t$ where the lagged difference terms were included.
 *The 5% critical values were obtained from Mackinnon (1991) and were put between parentheses.
 $\Delta(X)$: The first difference of Variable X.
 $\Delta(X, 2)$: The second difference of Variable X.

As Dickey Fuller tests are not robust to the presence of autocorrelation and heteroscedasticity, we double checked the results by implementing a Phillips Perron test. Results are presented in Table 2

Table 2: Philip – Perron Unit Root Results

Variable	Level		First Difference	
	Without trend (-2.935) *	With trend (-3.524)	Without trend (-2.937)	With trend (-3.527)
U	-0.845	-2.412	-8.383	-8.16
G	-.0582	-2.766	-8.825	-9.886
GD	-0.364	-2.391	-7.120	-7.443
I	-0.939	-2.962	-10.131	-9.854
Pop	1.764	-1.849	-4.133	-4.885

Notes: The regression equation for the PP test is an AR (1) process and it is given by: $\Delta X_t = a_0 + a_1 X_{t-1} + \epsilon_t$. Here, ϵ is the regression error, a stationary process with zero mean and constant volatility. Similar to the Dickey Fuller, the tests were carried out to reject the null of a unit root (i.e. $a_1 = 1$). In levels, regressions

constant and time trend were included into unit root regression. In the regressions with first difference only the constant was included.

Following the Box-Jenkins approach, the first stage was data pre-testing, consisting of unit root analysis by the means of Augmented-Dickey Fuller and Phillips-Perron tests. The results of these tests indicated that all series were integrated of order one – I (1). The results of both tests showed that the three variables were integrated at same order, which also indicates that there existed a long-run stationary relationship between the five variables.

The estimated Robust LSE Eq. of unemployment rate on the Palestinian economy is given by:

$$U_t = \beta_0 + \beta_1 G_t + \beta_2 GD_t + \beta_3 I_t + \beta_4 Pop_t + e_t \quad (3)$$

$$U_t = -0.005 - 0.499 * G_t + 0.722 * GD_t + 0.20 * I_t + 0.00034 * Pop_t \quad (3')$$

Prob. (0.93) (0.06) (0.005) (0.03) (0.04)

Adjusted R-squared: 0.73 F-statistic: 90.2 Prob(F-statistic): 0.000

Examining the results of equation 3', three coefficients had significant values at 5% level of confidence. The parameters refer to a set of conclusions, some of which were expected while others unexpected

- The government spending during the Israeli administration era was inversely proportional with unemployment. This was because the government spending was at its lowest levels and less than the optimal size. This corresponded with the Israeli policy which had put spending at the lower level (Abdel - Razeq, 2005).
- The results suggest that the impact of government spending in the era of PNA had a positive effect on unemployment rate as $0.722 - 0.499 = 0.223$. This means that there was a positive proportional relationship between government size and unemployment rate. This means that the growth of government expenditure was

higher than the growth of income which consequently led to an increase in unemployment rate.

- While investment coefficient refers to the direct correlation relationship with the unemployment rate, this means that investment in Palestine doesn't create jobs. On the contrary, there is a shrinking of jobs. This is consistent with what has been put by the classical view of the cause of unemployment: investment in the wrong place.

2.5.4 Estimation of Error Correction Model Engle- Granger Approach (ECM)

Having obtained the values of the long-run parameters, we can proceed to the second step of the Engle-Granger ECM by feeding those values into the disequilibrium error of Equation (4). The equation to be estimated is:

$$\Delta U_t = \alpha_0 + \alpha_1 \Delta G_t + \alpha_2 \Delta GD_t + \alpha_3 \Delta I_t + \alpha_4 \Delta Pop_t - \alpha_6 EC_{t-1} + e_t \quad (4)$$

$$\Delta U_t = -0.005 - 0.43 \Delta G_t + 0.61 \Delta GD_t + 0.128 \Delta I_t + 0.001 \Delta Pop_t - 0.54 EC_{t-1} \quad (4')$$

Prob. (0.53)	(0.07)	(0.01)	(0.23)	(0.17)	(0.002)
--------------	--------	--------	--------	--------	---------

Adjusted R-squared: 0.26 F-statistic: 3.86 Prob(F-statistic): 0.006

Durbin-Watson stat: 1.93

Examining the results of equation 4', two coefficients had significant values. The parameters refer to a set of conclusions, some of which were expected while others were not

- A negative relationship was observed between the change in the government spending and the change of unemployment rate in the Israeli era.
- A positive and significant relationship at 10% significant level was observed between the change in the government spending and the change of unemployment rate in the PNA era. The significant parameters of Dummy variables mean that there was a switching effect between the Palestinians management and the Israeli management.

- A positive and insignificant relationship was found between the change in the gross private investments ratio of GDP and the change of unemployment rate.
- The estimated value of the adjustment parameter α_5 [the coefficient of error correction term lagged one period] was -0.54 . This means that if unemployment rate were 1% out of equilibrium, a 54% adjustment towards equilibrium would take place within the first year.
- A positive relationship and insignificant was found between the change in the population and the change of unemployment rate.
- For regression testing, the output indicates that no serial correlation depends on Durbin-Watson test.

2.5.5 Diagnostic and Stability Test

We applied a number of diagnostic tests to the error correction model such as serial correlation, heteroscedasticity, normality and structural stability of the model (See Annex 4). To make sure that the errors from error correction model (ECM) are serially independent, the Breusch-Godfrey LM test is applied to test the null hypothesis, H_0 : The errors are serially independent; against the alternative that H_0 is not true. Since the corresponding probability values of the Q-statistics are greater than 5%, we cannot reject the null hypothesis and conclude that we don't have a problem with serial correlation. The White test suggests that the errors are homoscedastic and independent of the regressors. The model passes the Jarque-Bera Normality test, suggesting that the errors are normally distributed. Then, to check whether our model is stable or not, a CUSUM and CUSUMSQ tests are applied. The plots are given in Annex 4. The red lines represent critical bounds at 5% significance level. The null hypothesis, H_0 : the coefficient vector is the same in every period, against the alternative that H_0 is not true. The results show that the parameters of the ECM are relatively stable over time given that neither CUSUM nor the CUSUMQ test statistics exceed the bounds of the 5% level of significance.

2.6. Conclusions

This paper investigated causality between government size, private investment, population and unemployment rate. In particular, the researcher was interested in testing the relationship between government size and unemployment in the Palestinian economy. The above (used) model accounted for long -term relationships between unemployment rate and the size of government by including an error correction term that was computed from a separate co integration analysis. It was found in the long run and in the short run that there was a strong and positive relationship. It was also found that the investment did not have a strong effect on creation of jobs in the Palestinian market in the short terms and has a positive and significant effect on unemployment in the long terms. On the other hand, it was found that the population did not have an effect on creation of jobs in the Palestinian market in the short and long terms

2.7. References

- Abdel-Razeq, Omar. (2005) *Palestinian Fiscal Policy: 1994-2003*, Health Development, Information, and Policy Institute (hdip), Ramallah, Palestine.
- Abrams, Burton A. (1999). “The Effect of Government Size on the Unemployment Rate.” *Public Choice*, 99, 3-4; 395-401.
- Alesina, Alberto; Ardagna, Silvia; Perotti, Roberto; Schiantarelli, Fabio (2002), Fiscal Policy, Profits, and Investment. *American Economic Review*, 92, 3; 571-589.
- Alesina, Alberto; Perotti, Roberto (1997) “The Welfare State and Competitiveness,” *American Economic Review*, 87, 5; 921-939.
- Algan, Yann; Cahuc, Pierre; Zylberberg, André (2002). “Public Employment and Labour Market Performance,” *Economic Policy*, 34; 7-65.
- Ashenfelter, O. and J. Heckman (1974), "The Estimation of Income and Substitution Effects in a Model of Family Labor Supply", *Econometrica*, 42.
- Box, G.E.P., and Jenkins, G., (1970). *Time Series Analysis, Forecasting and Control*. San Francisco: Holden Day.
- Charemza, W. and Deadman, D. (1997). “New Direction in Econometric Practice” general to specific modeling, cointegration and vector autoregression. UK: Edward Elgar.
- Christopoulos, Dimitris K.; Tsionas, Efthymios G. (2002) “Unemployment and Government Size: Is There Any Credible Causality?” *Applied Economics Letters* 9, 12; 797-800.
- Daveri, Francesco; Tabellini, Guido (2000). “Unemployment, Growth and Taxation in Industrial Countries,” *Economic Policy*, 30; 47-104.
- Demekas, Dimitri G.; Kontolemis, Zenon G. (2000). “Government Employment and Wages and Labour Market Performance” *Oxford Bulletin of Economics and Statistics*, 62, 3, pp. 391- 415.

- Dickey, D. and Fuller, W. (1979), “Distribution of the Estimators for Autoregressive Time Series with Unit Root” *Journal of the American Statistical Association*, 74; 457-431.
- Dickey, D. and Fuller, W. (1981). “Likelihood Ratio Statistics for Autoregressive Time Series with Unit Root”, *Econometrica*, 49; 1057-1072.
- Dupor, B. and Guerrero, R. (2016). “Government Spending Might Not Create Jobs, Even during Recessions” *The Regional Economist*. www.stlouisfed.org
- Engle, R. and Granger, C. (1987). “Cointegration and Error Correction Representation, Estimation and Testing”, *Econometrica* 55; 251- 276.
- Engle, R. and Granger, C. (1991). *Long-Run Economic Relationships: Reading in Cointegration*. Oxford: Oxford University Press.
- Farsakh, Leila, (2005). “Palestinian Labour Migration to Israel: Labour, Land, and Occupation,” *International Journal of Middle East Studies* 39 (3): 475.
- Far, S., & Saeedi, K. (2015). “The Effect of Government Expenditure on Unemployment Rate for Iran”. *Int. J. Rev. Life. Sci.*, 5(7), 109-116.
- Feldmann, Horst. (2006). Government Size and Unemployment: Evidence from Industrial Countries. *Public Choice* 127: 451–467.
- Fuller, W.A. (1985). “Nonstationary Autoregressive Time Series”, In E.J Hannan et al (Eds), *Handbook of Statistics*, 5, Elsevier Science Publishers B.V.
- Granger, C. (1986). “Development in the Study of Cointegrated Economic Variables,” *Oxford Bulletin of Economic and Statistics*, 48; 213-228.
- Granger, C. W. J. (1969). “Investigating Causal Relations by Econometric Models and Cross-Spectral Methods,” *Econometrica*, 37; 424–438.
- Gujarati, D.N. (1995). *Basic Econometrics* 3rd ed New York: McGraw-Hill Inc., New York.
- Hakkio, C. S. and Rush, M. (1991). “Cointegration: How short is the Long Run?” *Journal of International Money and Finance*, vol. 10, issue 4, 571-581.
- Johansen, S. (1988). “Statistical Analysis of Cointegration Vectors”, *Journal of Economics Dynamics and Control*, 12; 231-54.

- Johansen, S. (1991). “Statistical Analysis of Cointegration Vectors”, in Engle, R. and Granger, C. (1991). *Long-Run Economic Relationships: Readings in Cointegration*. Oxford:Oxford University Press.
- Johansen, S. (1996). *Likelihood-Based Inference in Cointegrated Vector Auto-Regressive Models*. Oxford: Oxford University Press.
- Johansen, S. and Juselius, K. (1992), “Testing Structural Hypothesis in a Multivariate Cointegration Analysis of the PPP and the UIP for UK,” *Journal of Econometrics*. 53; 211-44.
- Johansen, S., and K. Juselius, (1990). “Maximum Likelihood Estimation and Influence on Cointegration- with Applications to the Demand for Money,” *Oxford Bulletin of Economics and Statistics*, 52; 169-210.
- Karras, Georgios (1993). “Employment and Output Effects of Government Spending: Is Government Size Important?” *Economic Inquiry*, 31.3, 354-369.
- Magnac, T. & Bourguignon, F. (1990). “Labor Supply and Taxation in France”. *Journal of Human Resources*. 25. 358-389.
- Malley, Jim and Moutos, Thomas (1996). “Does Government Employment “Crowd-Out” Private Employment? Evidence from Sweden,” *Scandinavian Journal of Economics*, 98. 2; 289-302.
- Malley, Jim and Moutos, Thomas (1998). *Government Employment and Unemployment: With One Hand Giveth, The Other Taketh*, Working Papers, Business School - Economics, University of Glasgow.
- Meghir, C. and Phillips, D. (2010). “Labour supply and taxes”. In: *Dimensions of Tax Design: the Mirrlees Review*. Ed. by James Mirrlees, S Adam, Timothy Besley, Richard Blundell, S Bond, R Chote, M Gammie, P Johnson, G Myles, and James Poterba. Oxford University Press.
- Monacelli, T., Perotti, R. and A. Trigari (2010) "Unemployment Fiscal Multipliers," *Journal of Monetary Economics*, 57; 531-554.
- Mortazavi, S. and Saeedi, (2015) “The Effect of Government Expenditure on Unemployment Rate for Iran,” *International Journal of Review in Life Sciences*, 5(7), 109-116.

- Nelson, C. and Plosser, C. (1982). “Trends and Random Walks in Macroeconomics Time Series,” *Monetary Economic*, 10; 139-162.
- Nickell, S. and Layard, R. (1999). ‘Labour market institutions and economic performance’, in (O. Ashenfelter and D. Card, eds.) *Handbook of Labor Economics* 3, Amsterdam: North Holland.
- Nickell, S., Nunziata, L., and Ochel, W., (2005), Unemployment in the OECD since the 1960s. What Do We Know? *Economic Journal*, 115.500; 1-27.
- Nishiyama, C. and Leube, K. (1984). *The Essence of Hayek*. Hoover Institution: Stanford University, Stanford, CA.
- Perman, R. (1991), “Cointegration: An Introduction to the Literature,” *Journal of Economic Studies*, 18; 3-30.
- Phillips, P.C.B., and P. Perron, (1988). “Testing for a Unit Root in Time Series Regression,” *Biometrika*, 75;335-46.
- Pigou, A.C., (1933), *The Theory of Unemployment*, London: Macmillan.
- Ravn, M. and S. Simonelli, (2007). "Labor Market Dynamics and the Business Cycle: Structural Evidence for the United States," *The Scandinavian Journal of Economics*, 109; 743-777.
- Ranson, R. David, (2013). “Government Spending Crowds the Private Sector Out and in”, National Center for Policy Analysis, Brief Analysis No. 784, Washington DC.
- Rueff, J., 1947. "The Fallacies of Lord Keynes General Theory". *The Quarterly Journal of Economics*, Oxford: Oxford University Press, Volume 61, Issue 3, 343 – 367.
- Ruxanda, G and Botezatu, A. (2008). “Spurious Regression and Cointegration. Numerical Example Romania’s M2 Money Demand,” *Romanian Journal of Economic Forecasting*, 3-2008.
- Scarpetta, Stefano (1996). “Assessing the Role of Labor Market Policies and Institutional Settings on Unemployment: A Cross-Country Study,” *OECD Economic Studies*, 26; 43-98.
- Singh, B. and Sahni, B. S. (1984). “Causality between Public Expenditure and National Income,” *The Review of Economics and Statistics*, 66; 630-644.

- Stiglitz, J. (1974), “Alternative Theories of Wage Determination and Unemployment in LDC’S: The Labor Turnover Model”, *The Quarterly Journal of Economics* 88(2) 194-227,
- Sweezy, P. (1934), “Professor Pigou’s Theory of Unemployment,” *The Journal of Political Economy*, 42, 6, (December), 800-811.
- Trehan, B. 2001. Unemployment and Productivity, *Economic Letter*, Federal Reserve Bank of San Francisco, Number 28, October 12, 1-3.
- Volkerink, B., Sturm, J. and Haan, J. 2001. “Tax ratios in macroeconomics: Do taxes really matter?” Working paper 7/2001, European Economy Group, Madrid.
- Wicksell, Knut[1893](1954)"Value, Capital and Rent" London: Allen and Unwin. Reprint 1970. NewYork: Kelly.
- Yuan, Mingwei; Li, Wenli (2000). “Dynamic Employment and Hours Effects of Government Spending Shocks,” *Journal of Economic Dynamics and Control*, 24. 8; 1233-1263.
- Yuk, Wing, (2005). “Government Size and economic Growth: Time – Series Evidence for the United Kingdom, 1830-1993,” Working Paper, Department of Economics, University of Victoria, Victoria, B.C., Canada.

2.8. Annexes

Annex 1: Testing for Non-Stationarity and Order of Integration

A time series is stationary if its mean, variance, and auto-covariance are independent of time. Assume that M_t is a time series that is generated by a process that follows a first order autoregressive model:

$$M_t = \rho M_{t-1} + \varepsilon_t \quad (5)$$

Where ε_t is a white noise that represents a sequence of independent error terms. To test for non-stationarity of the M_t series, we test the null hypothesis of a unit root that is ($\rho = 1$) versus the alternative hypothesis of ($|\rho| < 1$)⁷. Rejecting the null hypothesis means the series M_t is stationary and integrated of order zero. The most commonly used test in the literature is Dickey Fuller (DF) test which testing the null hypothesis of a unit root. Later, and as a result of some major criticisms, Dickey and Fuller (1981) presented another powerful test known as Augmented Dickey- Fuller test (ADF). This test accounts for the fact that the residuals are estimates of the true disturbances, and there is a possibility of having autocorrelation in the error process term. The ADF test is presented by adding lagged independent variable values when the disturbance term (ε_t) is not a white noise⁸.

The next step was to find the order of integration of the time series M_t . In other words, to find the number of times the series needs to be differenced to achieve stationarity. Most economic series are known to be integrated of order one. Therefore, it is usually appropriate to start testing the hypothesis that the order of integration is one. That is,

$\Delta M_t \sim I(0)$. In this case, the new DF regression equation is written as:

$$\Delta M_t = \delta \Delta M_{t-1} + \varepsilon_t \quad (6)$$

Again, the acceptance of the null hypothesis $\delta=0$, implies that the time series ΔM_t is stationary and integrated of degree one, whereas the rejection of the null hypothesis implies that the time series ΔM_t is non-stationary, and could be integrated of order higher than one. Theoretically, this process should continue until an order of integration is established.

⁷ In most economic series, it is conventional to assume that ($\rho \leq 1$); for more details see (Perman, 1991).

⁸ Some other alternative tests for unit roots are explained in Charemza and Deadman (1997).

Annex 2: Cointegration Analysis

Cointegration analysis refers to the process of getting equilibrium or long-run relationships among non-stationary variables. The cointegration equation shows the evolution and the long-run relationship between the variables, and any shifts in the data, due to various shocks, are considered to be temporary and the data are to be reverted to their long-run path (Ruxanda and Botezatu, 2008).

The idea is that although the variables are non-stationary, a linear combination of them may be stationary, given that all variables are integrated in the same order (Engel and Granger, 1987). The vector that links the variables in the long-run relationship is called the co-integrating vector.

The most common procedure to test for cointegration is the Engle-Granger two-step estimation technique (EG). The first step in this method implies fitting the long-run relationship in levels by OLS and using the resulted residuals to test the hypothesis of cointegration by applying the DF test. If the hypothesis of co-integration is accepted, then there exists an error correction representation (Engle and Granger, 1987). The second step is to construct the Error Correction Model which represents the short-run dynamics. Another procedure to test for co-integration was developed by Johansen and Juselius (1988, 1992), and it is known as the Maximum likelihood (ML) approach. This method estimates and tests for multiple co-integrating vectors (multivariate co-integration). It applies the analysis of the vector auto-regressive (VAR) model where all variables are treated as endogenous.

Annex 3: Robust LSE Regression Results

Dependent Variable: UT

Method: Robust Least Squares

Date: 01/24/18 Time: 08:40

Sample: 1972 2013

Included observations: 42

Method: M-estimation

M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)

Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.004909	0.057330	-0.085630	0.9318
GT	-0.499255	0.273899	-1.822772	0.0683
GDT	0.721846	0.254699	2.834117	0.0046
IT	0.204245	0.095093	2.147852	0.0317
POP	3.49E-05	1.73E-05	2.020548	0.0433
Robust Statistics				
R-squared	0.757466	Adjusted R-squared	0.731246	
Rw-squared	0.926861	Adjust Rw-squared	0.926861	
Akaike info criterion	43.76993	Schwarz criterion	55.21849	
Deviance	0.037683	Scale	0.032118	
Rn-squared statistic	362.5561	Prob(Rn-squared stat.)	0.000000	
Non-robust Statistics				
Mean dependent var	0.120469	S.D. dependent var	0.108532	
S.E. of regression	0.035009	Sum squared resid	0.045348	

Annex 4: Hypothesis Testing of Residual by Applying DF Test

Null Hypothesis: RESID has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.960900	0.0038
Test critical values: 1% level	-3.600987	
5% level	-2.935001	
10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RESID)

Method: Least Squares

Date: 11/17/16 Time: 00:35

Sample (adjusted): 1973 2013

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID (-1)	-0.561694	0.141810	-3.960900	0.0003
C	-0.001095	0.004676	-0.234108	0.8161
R-squared	0.286873	Mean dependent var	-0.001345	
Adjusted R-squared	0.268588	S.D. dependent var	0.035010	
S.E. of regression	0.029941	Akaike info criterion	-4.131606	
Sum squared resid	0.034963	Schwarz criterion	-4.048017	
Log likelihood	86.69792	Hannan-Quinn criter.	-4.101168	
F-statistic	15.68873	Durbin-Watson stat	1.872610	
Prob(F-statistic)	0.000308			

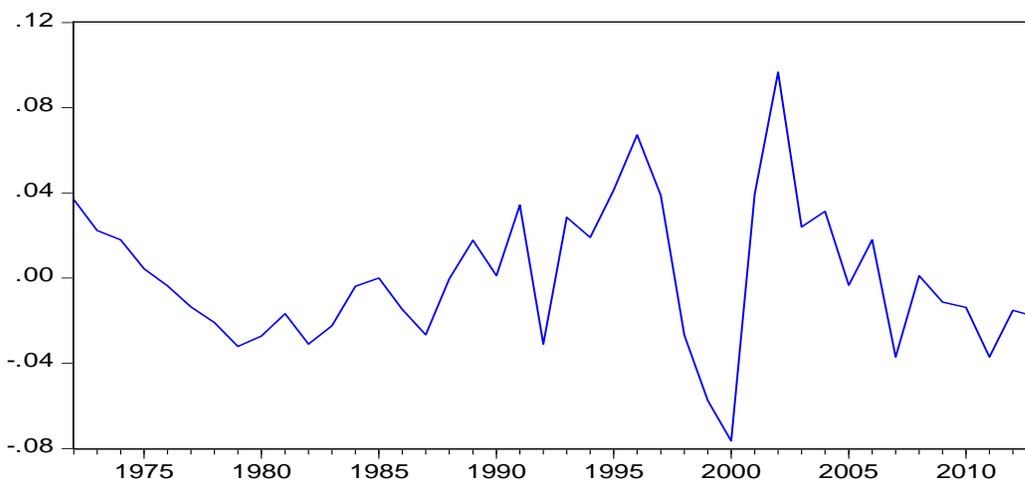


Figure 6: Residuals of Augmented Dickey-Fuller Test Equation

Annex 5: Error Correction Model Estimations

Dependent Variable: D(UT)

Method: Least Squares

Date: 01/24/18 Time: 08:41

Sample (adjusted): 1973 2013

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GT)	-0.426187	0.232057	-1.836564	0.0748
D(GDT)	0.609231	0.226513	2.689608	0.0109
D(IT)	0.128961	0.106967	1.205616	0.2361
D(POP)	9.66E-05	6.82E-05	1.418021	0.1650
RESIDUALEQ3(-1)	-0.537595	0.157232	-3.419108	0.0016
C	-0.004573	0.007326	-0.624180	0.5366
R-squared	0.355458	Mean dependent var		0.005388
Adjusted R-squared	0.263380	S.D. dependent var		0.036244
S.E. of regression	0.031107	Akaike info criterion		-3.968315
Sum squared resid	0.033867	Schwarz criterion		-3.717548
Log likelihood	87.35046	Hannan-Quinn criter.		-3.877000
F-statistic	3.860419	Durbin-Watson stat		1.930913
Prob(F-statistic)	0.006853			

Annex 6: Residual analysis

Residuals are not affected by autocorrelation as the Breusch-Godfrey Serial Correlation LM test shows.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.288988	Prob. F(2,33)	0.7509
Obs*R-squared	0.705732	Prob. Chi-Square(2)	0.7027

We accept null hypotheses which means no serial correlation

Residuals are homoskedastic

Heteroskedasticity Test: White

F-statistic	0.599067	Prob. F(20,20)	0.8698
Obs*R-squared	15.36006	Prob. Chi-Square(20)	0.7554
Scaled explained SS	14.96336	Prob. Chi-Square(20)	0.7785

We accept null hypotheses which means the residuals are homoskedastic

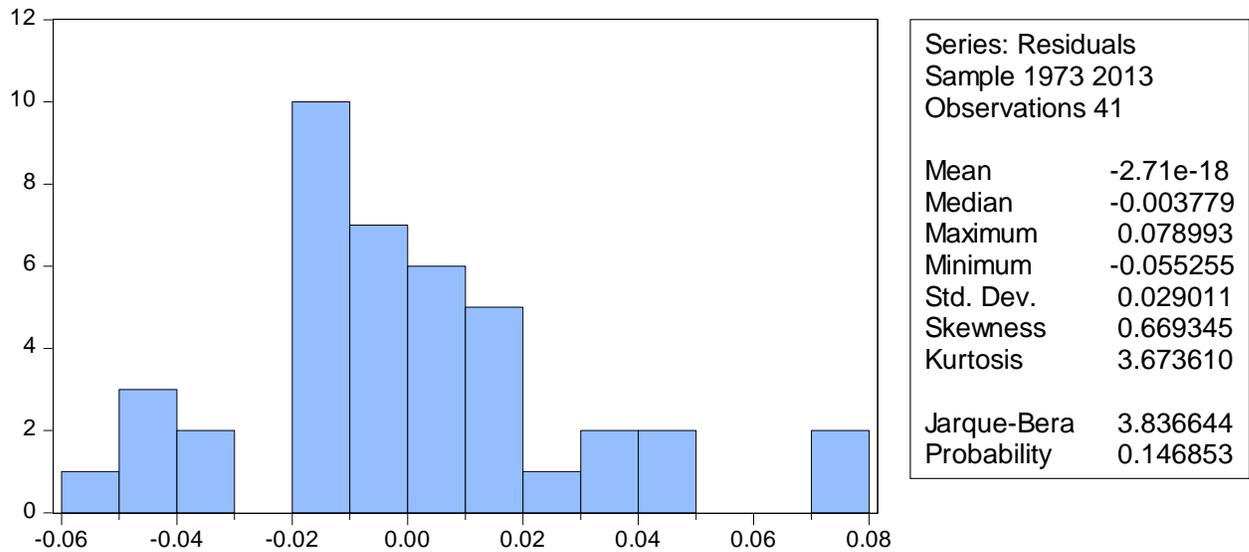


Figure 7: Normal distribution of residual

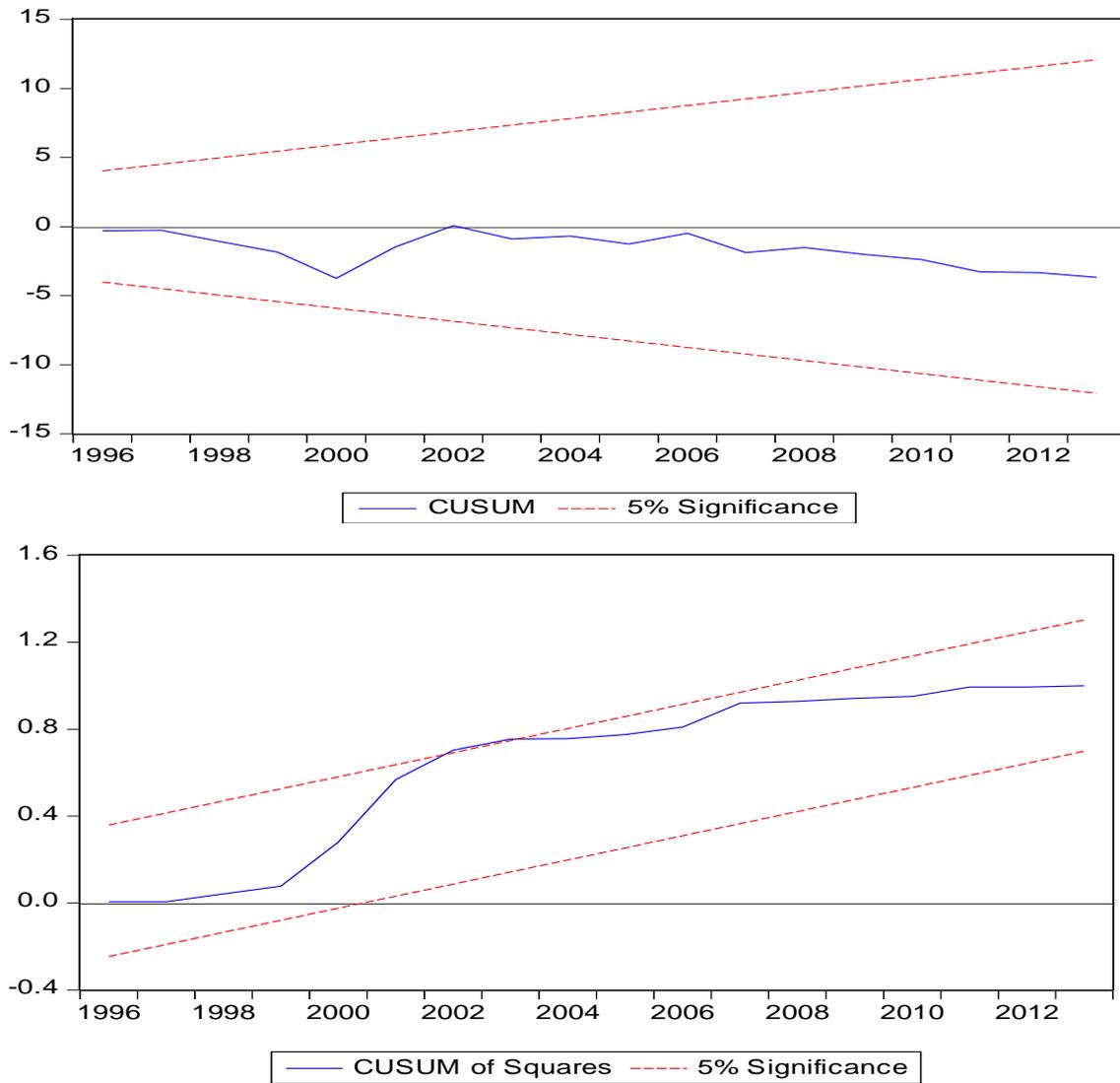


Figure 8: Cumulative Sum of Recursive Residuals and Squares of Recursive Residuals for the ECM

The CUSUM tests show a stable ECM equation. CUSUM test calculates the W statistic. Under the hypothesis of the parameter's stability, the W statistic is situated inside the confidence interval.

3. Chapter three: Social Security in Palestine: Assessment and Prospects

3.1 Introduction

Social Security programs have become the most important, the most expensive, and often the most controversial aspect of government domestic policy (Feldstein, 2008). Social security is considered one of the essential modern society institutions in both developed and developing countries. It leads to social and political security as well as economic outcomes. As for Palestine, there has never been a comprehensive social security. There have been only some programs as alternatives to social security. In the West Bank and the Gaza Strip, there are a few social security pension funds; however, these funds differ substantially in their procedures. In a nutshell, these funds are the government social security and professional union funds (engineers, doctors, dentists and lawyers' syndicates... etc). This system primarily covers part of pension salary; it uses a mixture of models. The PAYG model, in terms of finance and salary, defines the retirement benefits. Most public sector employees receive, upon full retirement or early retirement, 50- 80% of last salary they had received. The professional unions' pension system depends primarily on full funding and membership dues collected annually from members. This system is called defined contribution.

Most non-government firms and private institutions depend on what is called provision fund. This fund comes from all employees' saving and contributions made by the company or institution he/she worked in. This is addition to interest made by the fund managed for the benefit of the employees. This is fully paid upon retirement without any future commitment from the company or institution towards the worker or employee.

However, the total number of previous beneficiaries amounted to only 25% of all employee in 2009, 17% of the labor force, 8% of laborers (15-64), thus increasing the challenges of building a pension fund system in the Palestinian territories. The public pension meets all international standards and this made the World Bank describe it as "generous pension system" thanks to option of early retirement, compensations (not related to retirement) and high dues (World Bank, 2010).

The pension general expenditure amounted to 4% of GDP in 2008, higher than it was in the Middle East and North Africa (MENA region countries) where it varied between

0.1% -2%, and exceeded the GDP contribution in these countries which had the same per capita. It's worth noting that the majority of Palestinians are young, only 3% are 65 years old and more. This means it is a financial burden on any government to provide a pension with its current copy, given the increase of life expectancy. The annual current debt, due to social insurance, reached US \$ 1.5-2 billion, twice the annual public employees' salaries (World Bank 2010). The aforementioned privileges were behind the graduates' pursuit of public occupations which in return decreased the demand for private sector jobs especially among females. Improving and enacting comprehensive social security legislation is essential to provide a decent living for people, as a civil right, by means of:

1. Providing a monthly income for the vulnerable and disabled sections of the society.
2. Providing financial and psychological stability for those covered by insurance which may enhance their productivity.
3. Taking part in the social and economic development processes by investing extra capital in various fields.
4. Strengthening spirit of solidarity and social bonds between the community members.

This study aims to achieve the following objectives:

- Introducing some international experiences pertinent to pension fund, particularly in countries of economic hierarchy similar to Palestine's. Eastern European and South (Latin) American countries are cases in point.
- Studying the Palestinian pension fund for the sake of evaluation and identification of any existing gaps.
- Analyzing the results of a questionnaire administered by MOWATEN to Sms workers to join the pension fund
- Identifying the most important causes and factors which impact employees' decisions in small enterprises to join social security system
- Establishing a Palestinian pension fund capable of serving all the West Bank and the Gaza Strip employees, and providing programs for all sectors.

This study will be limited to the pension system due to the lack of research in other compensation unemployment and social security systems, insurance and health disability and child labor.

To achieve the aforementioned objectives, the researcher has made economic literature review pertinent to social security systems, and some practical experiences of some countries. In addition, he conducted personal interviews and held meetings with key officials in the Palestinian Authority, insurance companies' managers, private employees and NGOs. He also made use of the collected data from MOWATEN's questionnaires administered to employees and employers.

The rest of the study is organized as follows: Section 1 distinguishes between the various pensions schemes that are available. Also, in this section I talk about the main aims, needs and the economic benefits of having a pension scheme. In Section 2, I compare and contrast the advantages and disadvantages of these pension schemes. The distribution and international adoption of these various schemes is discussed in Section 3. In this section I draw on the experience of Chile and Argentina. Section 4 analyzes the main features of the Palestinian social security system and finally in Section 5, I focus on some of the factors that influence the decision to participate in a pension scheme.

3.2. The Traditional Pension Models

Before delving into the detail of various pension schemes I will first talk about the economic and social benefits that are produced by pensions.

Social security benefits protect the aged from poverty and, more generally, from a sharp decline in the standard of living that could occur when regular earning ceases. From an individual viewpoint, income security in old age requires two types of instruments: a mechanism for consumption smoothing, and a means of insurance (Barr and Diamond, 2006).

In terms of consumption smoothing people try to maximize their life time consumption, for example, by giving up extra consumption at a particular stage and transferring it to future retirement. They don't do that because there may be no value for recent additional

consumption today, but because they value extra consumption in the future more highly than extra consumption today (Shimasawa, 2004). This is exactly what is done by pension fund.

Moreover, the social security system provides protection for individuals as they get older and as they lose the ability to work. The person's savings over years of work secure a reasonable income that would cover his/her costs of living when getting old, thus protecting him/her from old age risks and inability to work.

An additional benefit of a social security system is insurance. Individuals are usually uncertain on whether their savings would cover his/her expenses after retirement, an employee is in need to share the risk with others. A social security system distributes risks among all participants, and provides income for the family in case of early retirement due to disability or death (Barr and Diamond, 2006).

Furthermore, social security tends to distribute income among generations, on one hand, and within the same generation's members, on the other hand. Differences of income portions can be decreased by means of security contributions which should suit income. Therefore, payments should take into account the beneficiaries' conditions. That is, married beneficiaries are paid more than single beneficiaries (Barr & Diamond, 2006). However, despite the importance of this objective, it clearly depends on the form of the followed-up system. The non-funded system may achieve this objective while the funded system may not contribute to the achievement of such an objective.

In terms of the pension schemes that are available a useful six - way classification of pension programs is divided into three criteria: defined contribution vs. defined benefit; funded (i.e., based on accumulated assets) vs. unfunded (i.e., PAYG) and public vs. private. All six possibilities exist in practice, with some countries having more than one type of plan for the same individuals at the same time. Several countries switch from one type to another or use a mixture of them (Feldstein and Liebman, 2001).

According to the fully funded scheme (the FF system hereinafter), one can share a social security fund which invests the contributions in private accounts for each participant, and pays them with profits at retirement either in monthly salaries or as one payment (what he or she desires). This means that the security fund contains the participants' contributions in addition to profits or interest.

The Pay-as-you-go (PAYG) program does not own any capital. Instead, a PAYG system relies on the contributions of the young men and women of each generation to provide the pensions of the old of the previous generation. Such a program, therefore, achieves equality:

Total benefits received by generation $t-1$ = contribution of generation t .

The PAYG system can be only sponsored by governments. This is due to its ability to raise the required contributions from one generation to pay for the previous generation through its regulation of public pensions. The core is the commitment to repay these contributions (participants pay during work time) at retirement. This means redistribution not investment. That is, the young generation provides pensions for the old one, while the coming generation will provide for the current one...etc.

The relation between contributions and benefits is whether they are funded or PAYG. A separate question is how closely pension benefits are related to an employee's previous contributions. Three approaches are common (Barr and Diamond, 2006): Defined Contribution (DC), Defined-Benefit schemes (DB) and Notional defined-contribution (NDC) schemes

In a defined contribution scheme, the pension benefits are determined by the amount of assets accumulated in the pensioner's account. The expected benefits depend on contributions and on the returns on these contributions. Thus, in a pure DC plan the sponsor's obligation is limited to his contribution and nothing more. The responsibility to invest the funds lies with the pensioner, although some guidance and education from the sponsor is usually provided. The sponsor also provides some investment alternatives for the pensioner to choose from. However, the risk of losses is always absorbed by the pensioner (Barr and Diamond, 2008).

Assets are bought through investment of the contributions whose profits are added to the contributors' accounts. When the participant retires, both assets and profits are used to cover future consumption either by means of annual or monthly salary or by any other way agreed upon.

In a defined benefit scheme, the promised benefits are well defined and they depend on the scheme characteristics. Usually they are based on the participant's wage pre-retirement, not on the amount of total contributions. It can be adopted by the government or participants themselves. In case of any shortage, a government may cover it from taxes and donations, whereas participants may do this from their own assets.

A recent innovation internationally, is the pure NDC systems which are conceptually similar to pure DC pensions in the way one aspect of risk is shared, with all adjustment taking place on the benefits side, but different, in that they are not fully funded and may be entirely PAYG.

Thus, NDC pensions mimic funded DC schemes by paying an income stream whose present value over the person's expected remaining lifetime equals his/her accumulation at retirement, but with an interest rate set by government rules rather than by market returns (Palmer, 2006).

In some of its features, the NDC system meets the PAYG DB models, on one hand, and includes the traits of the Funded DC schemes, on the other hand. It is a mixture of the two systems. One can say that the NDC system is a reflection of the PAYGO DC model (Williamson and William, 2013). In that context, it could be called the alternative to the PAYG DB model but coupled with some modifications which include a greater link of the contributions and benefits on the pension payments (Cichon, 1999).

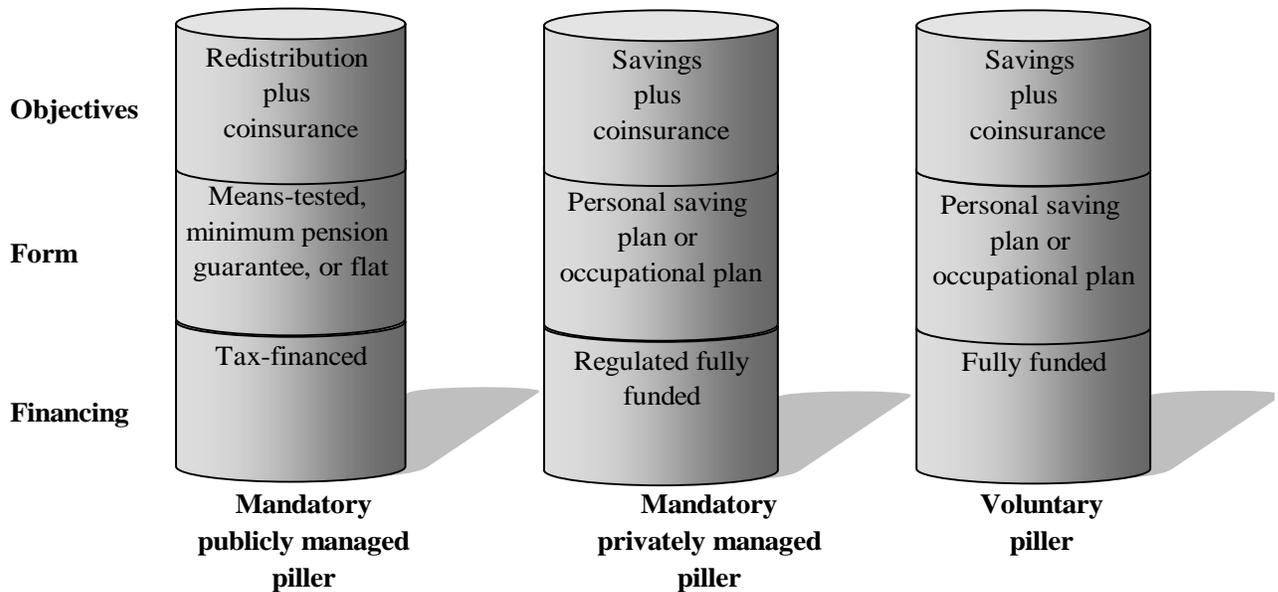
This NDC model rests on PAYG finance means. The funds obtained through imposed taxes on salaries are used to fund the dues of pension payments of present pensioners. It is different from PAYG DB model in that a phony account is created for every employee. Taxes on salaries are usually added to this phony account. This includes all contributions of the employee and employers. The money would be paid as pension upon completion of years of employment. The NDC benefits are linked to early retirement and drop out from the job market because that is reflected on the contributor's compensation.

If the pension plan is sponsored by the government, then the scheme is public. This is a social security system run by the state regardless of being funded or not, using defined

benefits of contributions mechanism. But it is dominated by PAYG with defined benefits or contributions.

But the scheme maybe sponsored by a private company or a bank. In this case it is a social security system run by the private sector or corporations regardless of funding form and benefits. It is connected to funding system and shared benefits formula.

Finally, a number of countries started to follow a multi pillar pension scheme system that consists of three types of coverage: two are mandatory and one is elective. The first mandatory cover is a general program that is donated by taxation, and it covers the underprivileged who lack access to any social security, so it helps to lessen poverty and aid those jobless and needy. The second mandatory cover is composed of savings which works in a DC way, as opposed to DB. In other words, it relies on participants' contributions during their work time. The elective cover is composed of an account that is opened for each participant; in case he/she wants to increase his/her contributions to cover any extra spending at retirement.



Source: World Bank: Averting the Old Age Crisis (Oxford University Press 1994)

Figure 1: Pillars of income security for the old

Figure above summarizes the multi-pillar system and as can be seen from the figure 1 the objective of the first two pillars to provide create minimum amount of saving and resources that help support the elderly and alleviate poverty while the third pillar is for those who want to maintain or enjoy a higher style at retirement .by saving more

Next, I turn to compare and contrast these various systems in terms of their characteristics.

3.3. Assessment of Pension Systems

In this section, I discuss the advantages & disadvantages (pros and cons) of these pension schemes. I also evaluate the experience of countries that adopted these schemes. Specifically, I compare the pay as you go with funded, the defined benefit with the defined contribution and finally public versus private schemes.

3.3.1 Pay as You Go (PAYG) Vs. Fully Funded (FF)

Each system applied has its own advantages and drawbacks. However, one can say that there are several factors that distinguish the PAYG model from FF model. And this has motivated many countries in the world to adopt and favor the former model over the latter.

The FF model needs a longer period of time to be applied. This period is necessary for saving and investment, after which compensation is given. The PAYG model could be applied immediately without the need for a period of time particularly in the context of an appropriate growth in labor force size as it had happened after the Second World War. This has made many countries in the world to embrace this model (Kune, 2001). This model application results in winners (first generation) and there are no losers.

Due to payment of pension benefits from workers' contributions, it is possible to increase it so easily, thus reflecting changes in prices, level of wages, without imposing an increase in the rates of contribution from the workers' incomes.

Therefore, the first model (FF) would be clearly desired in the economies which are characterized by lack of economic stability and high degree of uncertainty. It protects from decrease of actual return rates on investment and drop of prices of investment assets and increase of inflation rates.

This PAYG model redistributes income among individuals and in this case, it fosters solidarity between community members. In contrast, FF model plays a role in distributing individual income over his lifetime but it fails to redistribute income among the individuals. The rich person who saved at the beginning of his/her life by participating in joining this model and paying high dues would collect high returns, while the poor whose contributions were small would receive low income and would remain in the poor category.

However, this PAYG model has a number of cons.

1. High employment rates are usually reported, thus leading to drop of contributions, on one hand. On the other hand, it could lead to application of a social contract (though this option is ruled out) in commitment of older generations due to lack of contributions that could lead to covering paid commitments from security. The model also allows the opportunity to cover the employees in case of moving within the country. However, it deprives employees abroad from this advantage.
2. The increase of dependency (ratio of pensioners to employees) would be due to high rates of pensioners' numbers and life expectancy.

This worker-to- retiree ratio is falling dramatically around the world. For example, in USA, in 1950, there were 16 people working and paying taxes into the system for every person who was retired and taking benefits out of it. In 1998, there are just 3.3 workers per retiree. By 2025, there would be only two workers per retiree. After 2025, the ratio would decline to less than 2: 1.18 (Ferrara and Tanner, 1998). Few economists believe that the proportion of workers- to - retirees is not important. Instead they stress the "dependency ratio." the number of workers to non- workers in society, including children. While the dependency ratio is also declining (it fell from 5.8 to 1 in 1960 to 4.7 to 1 in 1995 and would decline to 2.7 to 1 by 2040), it is not doing so anywhere near as fast as the worker-to-retiree ratio. These economists' point is that while society may have

to spend more on the elderly, it would not have to spend as much on, say, education for children, health...etc. However, while this may or may not be true in a macroeconomic sense, within the closed system of Social Security, only the worker-to-retiree ratio drives solvency. Moreover, there have been relatively few proposals in recent years to reduce spending on children.

The real rate of return in a mature PAYG system can be estimated by adding the growth rate of the labor force and productivity (Samuelson,1958). In the future global population growth rate is expected to slow down from a current 1.3 percent per year to 0.8 percent in 2050 due to low fertility rates. Hence, global labor force growth is expected to slow down significantly. If labor productivity grows by 2% annually, then the future rate of return on the PAYG system can be estimated to be around 3% annually (Orzag and Stiglits,1999).

Both the study of Samuelson (1958) and the research of Aaron (1966) have shown that the contributions will grow at the same rate as the growth in covered wages if we fix the life expectancy. In reality, life expectancy is rigid and wages are constant proportion of income. Thus, the Samuelson-Aaron analysis implies that labor contributions into a PAYG scheme will growth at the same rate as GDP.

The early participants of the PAYG scheme usually earn returns that is much higher than this particularly when benefits are increased. Hence, the Aaron-Samuelson rule provides a bottom line of the growth of contributions to a PAYG scheme provided constant rules of the game (Willmore and Bertucci, 1999).

It has been shown by Feldstein and Liebman (2001) that the transition from PAYG into fully funded benefits the younger generation. They show that the PAYG schemes imposed a considerable strain on the young who only enjoy a small rate of return on their pension contribution compared to the older generation.

They have also showed that the under the PAYG schemes labor supply and saving decisions are far from optimal. The influence on welfare is significant deadweight loss that depends on the elasticity of taxable labor income with respect to marginal tax rates (Verbic and Spruk, 2011).

In contrast to fully funded schemes where assets and contributions can be used to pay pension obligations, in a PAYG system benefits are paid directly out of current contribution (usually payroll taxes). Therefore, the ability to fund pension liabilities in a PAYG is very much dependent on the growth rate of labor compensation which is a function of the growth in labor force and labor productivity (Ferrara and Tanner, 1998). In Palestine, dependency in 2000 was 1 to 5 and this increased in 2005 to 1 to 2 (Allawneh, 2012).

3. Sustainability Problem of PAYG financing, the expected of insolvency problem arises when population is ageing fast and when the rate of ageing is higher than the economy's productivity growth. If the government cannot reduce the benefit or increase the contribution, it will have to raise money via borrowing to sustain pension system. As a result, debt will accumulate and once it exceeds a certain critical point, the system will go bankrupt. In the mid-1990s, World Bank (1994) pointed out this risk and urged governments to reform their existing pension system so as to maintain sustainability in the long run.

Unlike the PAYGO model, FF model has a number of advantages. The first advantage is that it may contribute to the national savings rate which in turn supports strongly the capital market reflected in economic growth and people's welfare rates. In addition, it may enhance long-run investments.

The international experience shows that contributions to individual savings accounts are likely to grow by higher rates than contributions to PAYGO defined benefit public pension schemes (Mesa-Lago, 2009; **Guillén** and Mosqueda, 2013). The increase in wages is the main determinant of the growth rate of the contributions to the public PAYGO defined benefit scheme. This growth rate is much lower than the rate of return on capital assets. For instance, the average real rate of return for the Chilean AFP investments is 11 percent during the period from 1981 to 1998 (Piñera, 1999). If we subtract 3 percent to cover administrative expenses, the average return is even lower and it is closer to 7.4 percent ((James, 1997; Kay, 1997).

In the recent years the pension payments have covered approximately 78 percent of the pre-retirement income of pensioners. The real return on assets for the Chilean AFP is relatively low at -2.5%, 3.5%, 4.7%, and -1.1% for the years 1995, 1996, 1997 and 1998 respectively (Piñera, 1999). The future real rate of return on AFP assets can be reasonably estimated to range from 2 to 5 percent annually according to analysts' forecasts (Kay, 1997; Gillion & Bonilla, 1992).

The funded scheme can be sponsored by the government as well as by private companies. However, the privatization of funded pensions is costlier to manage. Therefore, even when private pension grows at a higher rate, the remaining net pension is less after taking out the administrative costs charged by the private company. The small pension accounts are likely to suffer more from admin costs than large accounts. If the pension is underfunded, then incorporating the underfunded liability may also drag down returns (Orzag and Stiglitz, 1999).

Moreover, the switching from public to private sponsorship incurs other transitional costs. In particular, previous commitments have to be satisfied from the assets and contributions to the new scheme. The pension has to continue paying the promised benefits of those who retired and will retire under the previous system.

The government normally does not back on its promises even when the social security system is closed for new entrants. Hence, the payments to those who are retired or those who are members of the current scheme can't be avoided by switching into a different scheme that is composed of retirement individual accounts. Hence, the long term returns of past accounts may be obtained only at the expense of reduced consumption and returns of the newer generations. Therefore, privatization will lead to less growth in newly opened pension accounts and this is one of main drawback of the switch to a privatized scheme (Orzag and Stiglitz, 1999; Gianakopoulos, Mitchell and Zeldes, 1998).

However, privatization may offer many advantages. These include the increase in the availability of investment options, reduced risk and less distortions due to the increase in the rationality labor supply decisions. There will be also an increase in the sense of

ownership and responsibility and more disclosures and transparency. It is reasonable to expect that privatization may improve diversification and benefits future generations (Geanakoplos, Mitchell and Zeldes, 1998)

In crisis the performance of various pension schemes is different depending on how the scheme is structured. For instance, following the recent global economic crisis, the Chilean pension for the elderly suffered lower losses than the Argentinian pension. In Chile, the pension portfolio is segmented into 5 parts: A, B, C, D and E. The A and B portions are risky while the D and E are relatively safe. The C portion contains assets of moderate risk. The contribution of young members is usually allocated to parts A and B and as these members get older these contributions are transferred to the less risky portions in order to protect.

In the Global Economic Crisis from January to October 2008, the total pension plan lost 23 percent of its value. The A part of the pension plan dropped by 41 per cent, while the E portion dropped by only 1 per cent. A typical member who is assuming an average risk and contributing to the C portion of the pension scheme has achieved a real rate of return of 8.9 per cent from the inception of the system until October 2008 (Figueroa, 2008).

In Argentina pension losses during the global economic crisis was 25% which is similar to what Chile had lost. However, as the retirement accounts are not segmented the loss was unanimous and it hits all pension accounts in the same way. To salvage these losses, the Argentinian government had to intervene and reorganize pensions (Mesa-Lago, 2009). The implemented reorganization involved the transfer of all private pension resources to be managed by ANSES. This new public body is granted financial and economic autonomy.

As it is well known in Palestine, there is a bad need for the collection of saving in the light of clear drop of economic growth rates and rise of poverty rates. Nevertheless, this FF model could face some challenges and obstacles in the field of investment. The risk is high due to capital markets fluctuations. Many pension funds play vital roles in the capital markets which mean they are liable to any economic shocks as there are international experiences. The collapse and drop of some stock markets 2008 in particular are a case in point.

Another advantage of the FF is that it doesn't need a third party to pay off the deficit in case the contributions were less than compensations, particularly in the Palestinian case in which the government suffers from a chronic deficit in the public budget which currently stands at around a quarter of public spending.

The transfer for PAYGO to fully funded is costly as the plan needs to acquire assets that are equivalent to obligations. Therefore, funding is required. In Chile, the government have provided funding that covers around 40% of the transfer cost by issuing bonds. These bonds are bought by AFPs and they are gradually exchanged by the government during the retirement years of the old system participants (Piñera, 1999). In this way the burden is distributed across generations. It is worth to note here that there is a decline in the burden by mid 1990s (Edwards, 1998).

3.3.2 Defined Benefit Schemes (DB) Vs. Defined Contribution Schemes (DC)

Unlike DC plans, DB plans secure stability for the employee by providing him with a decent income that matches level of income he has reached during his work. This is always clear and is important for the employee in case of high fluctuations in wages during his practical life and in particular when the differences in wages are during his work.

1. An important advantage of DC is the discouragement of early retirement. The reason is that the DC benefits depend on the accumulation of pension contributions and not on the average wage in the last several working years' salary as in DB plans. Member is induced to continue to work to increase the pension accumulation.

2. However, the advantages of DC plans emerge during periods of instability and inflation. This gives the ability to predict value of accumulations and wealth of retirement pensions and the ability to invest in portfolios to hedge from inflation instead of depending on nominal pensions resulting from DB plans. The very nature of full funding of DC has another advantage. It enables the employees to easily calculate the real current value of their pension benefits through accumulation of saving values which they have made during their work (Bodie, 1988).

3. DC plans require high administrative costs. This has been well documented in the comparison between the two schemes in Nebraska and this is what Anna Sullivan, director of Nebraska public Employees Retirement System said:

“She noted that the administrative costs of a DC plan are high. In Nebraska, they spend more in investment management fees, record-keeping fees, educational programs and material with the defined contribution plans than with the defined benefit plans. In 1999, Nebraska’s plan expenses for their defined contribution plans were approximately 30 basis points (BP) versus 15 BP for their defined benefit plan”. (Opdyke, 2000).

4. In addition, DB plans need a lot of information about the workers and their compensations, thus leading many times the employee to make incorrect calculations (Bodie, 1988). These plans also contribute to early retirement in many cases and particularly among middle administration employees.

3.3.3 Private Schemes Vs. Public Schemes

Following the privatization of pensions in Chile in 1981, many countries in Latin America followed. These countries are: Peru in 1993, Argentina in 1994, Colombia in 1994, Uruguay in 1995, Mexico in 1997, Bolivia in 1997 and El Salvador in 1998 (Mesa-Lago, 1998).

A comprehensive reform to solve pension problems but to preserve the private nature of pensions is adopted in Chile in 2008 as well as in Peru in 2012. However, Argentina has followed a different approach by integrating private pensions with public pensions. This has happened in 2007 (Mesa-Lago, 2009; Guillen and Mosqueda, 2013).

These two different models and how they deal with the issues of private systems is going to be described and in evaluated in what follows

1. The evidence suggests that the transition for a private scheme is good for the economy. The reforms of pensions have definitely contributed to the economic growth that Chile experienced in the early 1980s (Piñera, 1999; Kay, 1997). In general, it is estimated that the annual gains for future generations will be around 5 percent of the GDP. The

drawdown of privatization is the economic and political costs incurred in the transformation (Feldstein, 1997).

In Chile and Peru, the transformed pensions have accumulated assets that are around 63% of the GDP. Therefore, the privatization of pensions has provided additional liquidity and contributed positively to the development of financial markets (Arenas de Mesa & Bertranou, 1997; Guillen and Mosqueda, 2013; OECD website).

The privatization of pensions has also contributed to the development of the financial sector. In particular it has increased the funds that available for investment. The increase in investments improved disclosures. It also increased the demand for the services of the risk classification agencies for fixed income assets. New securities and corporation laws to protect these investments are enacted. The additional exposure to banks necessitates an improved bank supervision and other changes that are associated with modern financial institutions (World Bank, 1994).

The benefits with respect to the development of the financial sector are replicable and they are likely to be repeated in other nations that are at the same stage of economic development.

2. Following the pension reform and during the period that extends from 1986 to 1996, the savings rate increased from about 10 percent to about 29 percent. Many economists attribute this increase in savings to privatization (Edwards, 1998). Alongside pension reforms, there was other reforms, and therefore it is not possible to know how much of the saving increase is due to the pension transformation (World Bank, 1994). Some people believe that the increase in savings due to pension privatization has crowded out other sources of savings (Graham, 1998). Others are skeptical of the savings impact of pension reforms (Kritzer, 1996; Myers, 1992).

3. Private schemes may give a clear support to individuals' security and social safety wherever they work (public, private, self-employed) by allowing them to join the fund through a private account for each of them. This may guarantee continuous social financial stability. In contrast, the public schemes are limited to government employees only.

4. Effective utilization of fund assets. Several studies, which compared returns on private investment in securities markets and governments' transfers to pensioners, have revealed a clear difference in favor of the former. The rate of return on assets in the USA, after deduction of inflation, was 9% in comparison with 1.5- 2% growth in returns from subscriptions in the public sector schemes. (Feldstein, 1997; Geanakoplos, et al., 1998).

The private pension system contributes to the development of stock exchange markets particularly in developing countries which lack bourses or have humble experience with them in comparison with the public system which is mostly used to finance state's expenditures and failure to invest them in economic profitable projects (Willmore and Bertucci, 1998).

5. Alleviation of political risk, the presence of a private pension would contribute largely to the decrease of political fluctuations in countries facing numerous challenges and political upheavals. Palestine is a case in point. However, this doesn't mean elimination or riddance of the impacts of political changes on the private system. It only means that its effect is often less than on its effects on the public system which is linked primarily to the state's administration and activities in general.

6. Increase of disclosure and transparency: Many studies conducted in many countries of the world have revealed that the social pension system run by the public sector lacked explicitly transparency and financial disclosure which contravenes world trends for more disclosure and transparency (Ponds, et al., 2011)

7. One of the most important challenges of private pension is to be able to achieve wide coverage of the labor force. In Chile the system covers 61.2 per cent of the labor force compared to only 24.5 per cent in Argentina at the end of 2007. Therefore, the coverage in Chile is the widest among all Latin American countries (AIOS, 2008). The lowest coverage ratio in Latin-American countries is found to be 16% in Peru (Guillen and Mosqueda, 2013).

In Chile, the voluntary coverage of those who are self-employed is very low at 5 percent. According to the Chilean law those who are self-employed after 2010 have to be covered following a transition period in order to reduce the size of uncovered informal sector.

The self- employed are required to pay 10 percent gradually towards their pension requirements increasing to 100 per cent by 2014. (Lo Vuolo (2008); Mesa-Lago (2008) and Quiroga (2008)).

In Argentina the pension coverage dropped from 60 per cent to 47 per cent (ANSES, 2008). However, according to Mesa-Lago (2009), the actual coverage decreased from 50 per cent to 36 per cent between 1993 and 2007.

The Argentinian legal draft says the following:

The number of members who transferred to public pension is 2.1 million or 28 per cent of total members. Moreover, there is an increase of 1.5 per cent of contributors or 500,000 new members.

Unlike Chile, in Argentina self-employed workers coverage is compulsory. However, only one-third of self- employed workers belong to a pension scheme.

Following the general consensus of 2002 Argentina abolished the social assistance pensions that are granted by Congress. Instead, the country decided to expand the resource-based social assistance pension. Some of the poor elderly lost their coverage as they are not covered by this system. The pension laws that followed in 2007 and 2008 failed to deal with the problem.

7. Privatization eliminates payroll taxes and hence distortions are reduced in labor markets. In the public arrangement of pensions, the work effort and compensation depress productivity and real standard of living. However, in funded systems of individual accounts the required compulsory contribution to fund current and projected liabilities is reduced to only around 3 percent of the payroll. This is far lower than the payroll tax that is expected to increase from 12 to 20 percent in the next 35 years (Feldstein, 1997)

8. The private system is unable to provide support to poor groups with modest contributions (pillar one). However, a public system covers these expenditures from the budget of the state.

9. This problem in private pensions can be solved through the transfers of the social solidarity system. Transfers from the accounts of rich members to the accounts of poor members through joint accounts that are agreed upon by the members. Additionally, the government and some of the supporting institutions in the economy may also provide additional funding for the poor.

In Chile, there is a basic solidarity pension (PBS) for the elderly and people with disability that is established by law. The system replaces the current basic insurance system PASIS that provides very limited coverage. Thus, the solidarity system solves the problem of persons who had no contribution to the pension scheme.

The value of PBS plan in 2008 was around 33% higher than the previous PASIS and it increased by 67% in 2009. It is expected that the APS will improve contribution-based pensions and provide incentives to reduce evasion. An estimated 800,000 persons are expected to benefit from the system in 2009 and more than 1.3 million in 2012(Mesa-Lago, 2009).

Moreover, the Chilean law had created a "collective voluntary savings" program which is financed through contributions that are negotiated between employers and workers. The scheme may be well also financed solely by employers. The incentives are the tax exemptions that the state may provide for companies.

Before the start of the reform process in Argentina, the law provided for a state basic pension to all members. Around 77 per cent of retirees in the private system received government supplements in 2008. The subset of the lower pension received full government funding.

In Peru all private pensions must have a solidarity pension that is close to the minimum wage. This allows private pensioner to obtain a minimum amount of pension same as public pensioners. In the new system the government adds to the contribution of the affiliate's such that there are sufficient funds for a minimum wage.

Following the Peruvian reform of private pensions, the benefits of FF and PAYGO became compatible. But the Fully Funded System is still able to give higher pensions for higher contributions. Something that the PAYG System is not able to give, and so the final balance of benefits tilts towards the FF System (Guillen and Mosqueda, 2013).

10. In private schemes, workers with higher income brackets achieve higher returns on their pension accounts than workers with lower income. The main reason is in the fixed cost of the private pension (Graham, 1998; Kay, 1997).

An arrangement to place the operational costs on the higher pension accounts or imposing internal contributions among the members (accounts) that benefits the less advantaged at the expense of those with high incomes will bring similar returns.

11. In public pension schemes, the promised benefits for men and women are computed using the same actuarial tables. This is not true in private schemes where different tables are used for both men and women. In that sense gender equality is preserved in a public scheme. However, the problem of the lower subscription of women compared to men is not resolved even in public schemes.

In the private systems, gender inequalities are pronounced. There is no transfer of resources between the accounts of men and women and pensions are calculated on the basis of differentiated sex mortality tables. Because of that the average retirement age of women is less and as women live longer their pension is usually inferior to the pensions of men.

To reduce inequality, Chile granted women a universal maternity voucher that is equivalent to 18 minimum salaries. The voucher is given to all mothers for each child and regardless of their socio-economic position (Mesa-Lago, 2009). These vouchers can be invested in the woman's pension account on the date of the birth of the child and can be accessed at the age of 65. These vouchers increase women's pension and partially close the gender gap.

Furthermore, there are 250,000 women without pension benefits who are entitled to receive the Basic Solidarity Pension. These account for 60 per cent of all beneficiaries.

There is also another 30,000 who would get the APS (Solidarity Pension Contribution) (Mesa-Lago, 2009).

In Argentina there are no rules or regulations that improve gender equity. However, the switch from private to public moderate the existing gender inequities. But unlike in Chile, it will not resolve the issue of women's loss of contributions due to years spent in child care (Mesa-Lago, 2009).

12. In order to encourage and improve social participation in the management and pension reforms, the Chilean law created a commission that is composed of five representatives of the following categories: workers, pensioners, AFP, insured remaining in the public system and academia. The representatives are expected to voice their opinions regarding pension performance. They are also required to monitor reforms and the fulfillment of goals and to guide strategies regarding pensioners education and information and communication.

A social insurance pension education fund is created by law and it was financed by the state. The AFP is the entity which is responsible for the dissemination of information and for educating the public on pension matters. It also responds to public enquiries and help the insured to claim benefits (Mesa-Lago, 2009).

In Argentina the 2008 law did not create any form of social participation mechanisms to help managing the integrated pension system. Moreover, Argentina has no mechanisms to provide better information for insured and uninsured citizens on pension matters.

13. In terms of system supervision, the Chilean law cancelled the Superintendence of the AFP and replaced it with a single Pension Superintendence that supervises both pensions: private and public. The administration of minimum pensions by the AFP was also withdrawn. In Argentina the law says that the National Congress Bicameral Commission for Supervision of Social Security Funds is responsible for supervising the new integrated system. However, its decisions shall not be mandatory. The Superintendence of the AFJP is cancelled. The supervision of the system by an autonomous entity is decreased.

14. The transfer of pensions from public to private may have a negative short-term negative implication on the government budget. The government will suddenly lose the contribution revenues which will pour into the private scheme. However, the long-term implication is likely to be less public debt as the pension liabilities removed from the Government balance sheet.

The advocates of privatising the United States pensions suggest a transition that is financed by selling bonds (Beard, 1996).

15. Increase of managerial cost of pension, some studies have indicated that moving from the public sector to the private sector increases the managerial cost four times (Reid & Mitchell, 1995). Some studies, administered on some funds, have revealed that annual administrative expenses on the public system amounted to 1% of contributions (Holland, for example) as opposed to 7% in the employer pension plan and 24% in personal account (Davis, 1997).

There is an additional return from the switch to a private pension. However, the fixed fees may evaporate these additional returns particularly for smaller pension accounts. Hence, it could be true that the participation in the old government PAYGO defined benefit scheme may be more remunerating (Diamond, 1996).

The figures presented for the rate of return of the Chilean pension funds are gross and they do not consider marketing and admin costs. The influence of these on returns is substantial. For instance, the average real rate of return on pensions between 1984 and 1995 drops from 12.7 to 7.4 percent when these costs are subtracted (Kay, 1997).

The numbers from Chile suggest that the cost of managing a private scheme is higher than the cost of managing the old PAYGO scheme (Diamond, 1994).

To reduce costs, Chile introduced a biannual affiliate bidding such that the affiliation of the 200,000 people who enter the labor market annually is given to the AFP with the lowest commission fees. The reduced commission has to be also applied to old affiliates. Moreover, Chile eliminated the fixed-sum commission and allowed banks to manage individual accounts to increase the competition for pension accounts. It is still too early to judge the influence of these measures on the cost of the service.

In Argentina, the 2007 regulations capped net commissions at 1 per cent. It also ended the premium payments to commercial insurance companies against disability and survivors' risks, and instead these risks are financed with a new Mutuality Contribution Fund. The new regulation result in 1% commission which is less than the cost of the service in Chile at 2.4% (Mesa-Lago, 2009).

In the 2008 law it is claimed that the switch to public system is grounded on the high administrative commission which account for a large proportion of salary deductions, thus leaving less in the individual retirement account. The reality that it was the state that decreed a reduction in the workers' contribution after the 2001 crisis. The main objective is to stimulate consumption and the economy. Following the 2007 regulations, contributions are increased and consequently the amount deposited in retirement accounts (Mesa-Lago, 2009).

16. There is a transition cost incurred when we switch from PAYG system to a FF system. The costs include the liabilities and previous commitments promised to old participants. By assuming that society remains committed to these retirees the costs are retained even if the PAYG System is eliminated and replaced by individual accounts. Since payments to existing beneficiaries are made, the returns on individual accounts should not be artificially inflated by excluding their cost (Orzag and Stiglitz, 1999).

17. The shortages and lack of skill in managing assets has a negative influence on returns and it may increase management costs. Corruption and wasting resources of top management is another drawback that drag down the performance of pensions

18. The lack of competition in private pension schemes may increase the management fees and the cost of the pension. In these situations, we may not rely on markets competition to reduce the fees and there is a need to regulate. For instance, there is only a small number of private pensions in Peru. As of December 2012, the fees in Peru averages 1.83% which is higher than the average fees in either Chile at 1.77% or Colombia at 1.31% (Guillen and Mosqueda, 2013).

3.4. International Experience of Pension

This section provides an overview of some international experiences pertinent to pension and operators in particular. The target countries are those of transitional economy, similar to Palestine's. Rich developed countries experience, such as the USA, Canada, Japan, and UK, were excluded because no structural economic changes have taken place there during the last decades.

The pension structural reforms in Latin America have replaced the defined benefits PAYG with private pension regimes. These reforms have been implemented in 11 countries during the last three decades as follows: Chile in 1981, Peru in 1993, Argentina and Colombia 1994, Uruguay 1996, Bolivia and Mexico 1997, El Salvador 1998, Costa Rica 2001, Dominican Republic 2003 and finally Panama in 2008. Table 1 below shows the time line for reform and the state of management of pensions in the respective country.

Table 1: International Experiences of Pension

COUNTRY	Year of change	Old	New	Form		Management
ARGENTINA	1994	PAYGO	PAYGO	Compulsory	Public	Government
		DB – Pub.	FF –DC		Private	Private company
BOLIVIA	1997	PAYGO – DB- Pub.	FF	Compulsory	Private	Private company
BRAZIL	1977	PAYGO – DB- Pub.	PAYGO - DB	Compulsory	Public	Public institution
			PAYGO – DB	Elective	Mixed	Public and private institutions

			FF – DC &DB	Elective	Private	Private institution
CHILE	1981	PAYGO – DB- Pub.	FF – DC	Compulsory	Private	
COLOMBIA	1994	PAYG – DB- Pub.	PAYGO – DB	Compulsory	Public	Public institution
			FF – DC	Compulsory	Private	Private institution
COSTA RICA	2000	PAYGO – DB- Pub.	PAYGO– DB	Compulsory	Public	Public institution
			FF – DC	Compulsory	Private	Private institution
ELSELVADOR	1998	PAYGO – DB- Pub.	FF- DC	Compulsory	Private	Private institution
PERU	1993	PAYGO – DB- Pub.	PAYGO – DB	Compulsory	Public	Public institution
			FF – DC	Elective	Private	Private institution
URUGUAY	1995	PAYGO – DB- Pub.	PAYGO –DB	Compulsory	Public	Public institution
			FF- DC	Compulsory	Private	Private institution
CZECH REPUBLIC	1994	PAYGO – DB- Pub.	PAYGO –DB	Compulsory	Public	Public institution
			FF- DC	Elective	Private	Private institution
ESTONIA	2002	PAYGO – DB- Pub.	PAYGO –DB	Compulsory	Public	Public Institution

			FF- DC	Compulsory	Private	Private institution
			FF- DC	Elective	Private	Private institution
HUNGARY		PAYGO – DB- Pub.	FF – DC	Compulsory	Private	Private institution
				Elective	Private	Private institution
KAZAKHSTAN	1998	PAYGO – DB- Pub.	PAYGO –DB	Solidarity	Public	Public institution
			FF- DC	Compulsory	Private	Private institution
			FF- DC	Elective	Private	Private institution
POLAND	1998	PAYGO – DB- Pub.	PAYGO –NDC	Compulsory	Public	Public institution
			FF- DC	Compulsory	Private	Private institution
			FF- DC	Elective	Private	Private institution

The most important features pertaining to international experiences can be summarized as follows:

1. Most countries moved from public to private pension in the early 1990's of the last century, side by side with the withdrawal of communism, the collapse of the former Soviet Union and the dominance of capitalism and market economy all over the world.
2. Most countries which have converted to the private system hadn't abandoned the public one completely, but had preserved it for the benefit of the needy and disabled people.
3. Most experiences have led to a dual pension system, public and private. The latter was divided into mandatory and voluntary.
4. Under the market economy, the states have kept their commitments towards disadvantaged sectors, which mean that following /adopting the market economy doesn't mean the state's abandoning of its social and economic missions. Even if the market was unqualified, justice would still be a super aim of the socioeconomic country.

In what follows of this section I will evaluate the Chilean and Argentinian experience after more than two decades

A study conducted by Dictuc, a consultancy firm affiliated with the Catholic University of Chile 2013, revealed the following results :

1. The National Social Security provided workers' pensions that were worth 87% of their salaries; 73% of the pension's workers retired on incomes from profit made on investments, whereas the rest 27% were obtained from the participants.
2. The study showed that male workers who contributed 10% of their salary for 40 years got about 87% more than the highest pension salary they ever had.
3. The private system was distinguished. The revenues during the past 30 years exceeded the previous one by six times.
4. The retired workers' savings were not subject to risks that had faced the savings run by the state as it happened in U.S.A where investment revenues were zero.
5. More than 30 countries adopted the private scheme applied in Chile. The USA is still discreet due to the powerful labor unions which insist that labor saving should never be subject to current markets risks.
6. Data showed that during 32 years of work, workers got an average interest rate of 8.7%, while average inflation during the same period was 10%.
7. As a result of this study, it was concluded that the global stock markets would never go bankrupt. In case this happened, all forms of social security would become bankrupted in return.

We can say that the Chilean experience is interesting and it responds to many of the Pension system concerns in Palestine.

For example, the respondent to the pension questionnaire in Palestine were indecisive as to whether pension resources and management should be conducted by the public or the private sector. In that respect, it is shown by the Chilean experiment that the private management is more efficient and that the long-term returns are higher. Therefore, I would like to see a privately managed pension in Palestine.

The second issue that Chile is aware of equality. The government vouchers that support women with children is a good idea that promotes social justice and gender equality. It

may also encourage women to participate in pensions. Moreover, regulating fees and costs of management is another important feature of the Chilean pension regime. Similar regulations are also important in Palestine. The Palestinian financial sector is concentrated and competition is weak. Therefore, management fees are expected to be high if they were left to be determined by the markets. Hence, the pension system in Palestine will benefit from regulations that determine a suitable level of fees that allow for skillful management of pensions but at the same time do not drag on returns

3.5. Social Security in Palestine

The public retirement sector in Palestine is a good example of the absence of vision of the successive governments, the distraction of supervising parties, and the absolute absence of accountancy by the government and the parliament for the vital financial sector, which influences the public employees and their families. This has led to the need for quick solutions on all legal and institutional levels. The following recommendations should be considered:

- 1- The Palestinian social security is dedicated mainly to public sector employees, and large local or international institutions' employees.
- 2- A huge number of small enterprises, self-employed, and informal sector workers don't enjoy social security of any kind.
- 3- Non – contributed pension don't get any coverage, except for little financial support from Social Affairs Ministry, especially after the closure of many charities by the Palestinian National Authority (PNA).
- 4- Those engaged in private sector (such as construction and farming workers) are subject to lose their jobs temporarily, thus lacking any source of income.
- 5- Those who work in Israel don't enjoy any social security coverage whether by the Israelis, or by the PNA.

For all that, it is essential to design a social security program that includes workers of all sectors, but this would not be an easy task, knowing that public and large institution employees enjoy some kind of security programs run by PNA, or by the enterprises or by

the employees themselves. This would make it easier for a new frame to deal with them. It's just a matter of bank accounts transaction then. The real challenge in Palestine, like developed and developing countries, lies in the way of dragging that big sector of the private, small unregistered enterprises, the self - employed, or the Palestinian workers in Israel proper.

3.5.1 Features of Any Proposed Social Security Program

It is essential to design a good pension with a set of merits to ensure its effective performance and success.

1. Coverage and comprehensiveness: the social security fund program should cover the largest sector of the society. As mentioned earlier, the Palestinian social security covers two sectors only: the public sector and large institutions sector. In contrast, all small firm employees, who represent the private sector, are excluded, side by side with self-employed, part-time employees, and informal sector employees in the Palestinian economy.
2. The ability to sustain and increase capacity: A good program is lasting, self-empowered, independent at its advanced stages. Such a program may require an international or governmental support, but that doesn't mean keeping the program dependent in the following phases. It should reach a stage of self-support and sustainability.
- 3- Equity and Efficiency: no doubt that these two issues are economically, and socially most debated, but they are inevitable in economic plans or social choices, so the fund should combine these two conditions for maximum returns, best investment and the largest number of beneficiaries, on the other hand. It should care about those lacking any deposits, who are the majority, rather than increasing the savings of others.
- 4- Confidence and trust: Any program or social fund should attain/win the public's confidence. It should imply a set of divisions: compulsory, gained even in the absence of confidence. The target group is elective, for whom the program's confidence and trust are a must to keep going on. This proves that the program is subject to private entities, like insurance companies and the Palestinian security exchange, both controlled by

governmental institutions. These private entities are officially controlled by the Palestinian Capital Market Authority.

5- Cost - effective: Costs are an important aspect of any pension system. Small fees and charges are able to erode accumulated pension assets considerably over a long-term. Designing low cost systems is important for those related to fund managements, or investments.

Historically, the management of social security in the developing countries was the responsibility of the government mainly due to the great role played by governments in the middle of the last century. It imposed economic roles. Social security used to be known in economic, and social thoughts as part of the vital roles of the state.

However, the withdrawal of the state's economic role, due to several factors, namely, the collapse of communism, the failure to run the economy effectively, the replacement of market economy instead, and the corrective programs imposed on most developing countries, has resulted from a series of crises.

Undoubtedly, moving to a private pension has a number of advantages:

1. Decrease of the political risk: As it is well known, the governments in many situations are vulnerable to political fluctuations due to internal and external factors. This is clearly reflected on the performance of the public system since it is an integral part of the general public system. The presence of a private independent social security system decreases significantly the impact of these fluctuations despite being affected by them, though partly, but less than the public system (Willmore and Bertucci, 1998).

2. Providing a variety of household portfolio choices (Mitchell & Zeldes, 1996)

This would be through diversification of financial investments as they are run by the private sector and are not limited to government instruments in investment. The presence of a private social security system would help in diversification of investment in shares, bonds, real estate and commodity markets. This would clearly lead to distribution of risk, on one hand, and increase of financial collections, on the other hand.

3. Motivating people to work. There is a tradeoff between efficiency losses due to a distortion of incentives and gains due to insurance: the tighter the link between contributions and benefits is, the smaller are both the labor supply distortion and the earnings insurance (Diamond, 1977; Kotlikoff, 1995).

However, it should be maintained that such distortions could be present prior to insurance and security but a private social security scheme could contribute to increase of this relationship, thus reducing this distortion through better efficiency, unification of accounts, provision of social security based on an individual account away from distortion which the government could create as a result of adverse selection which considers all accounts as if they were homogenous. It would deal with the returns as if there were in one pool. (Metchel and Zelldes, 1996).

4. Good management of the fund: This is one of the most important determinants that contributes to broaden its base, and this stems from the consolidation of market forces and raising the competitive levels of governance in the management of the assets in the fund. For example, in Chile, after 18 years of private pension fund implementation, more than 95 percent of Chilean workers have joined it (Rodriquez, 1999).

5. Working within a social security scheme: This is based on market mechanism. A private social security scheme is free to move for individuals' social safety and secure them wherever they work (public, private or self - employed) by allowing them to join the fund through individual accounts which may be reflected in an ongoing stable financial condition.

6. Being reliant on full funding: This system may help in increasing the national savings rates which may support capital market effectively, achieving economic growth and society welfare in addition to enhancing long-term investments.

7. Social security fund's inclusion of all workers in economy. It is not limited to public or big institutions employees; on the contrary, it includes the private employees and the self-employed who don't enjoy any kind of social security in Palestine.

8. In this scheme, every participant may have a private account which means a share in the fund investments that may lead to promoting their economic status while decreasing possible risks and eliminating social classes.

To ensure a successful private social security (Vitas, 1998 and 2003), there is a set of procedures which a government should follow:

1. A political commitment of good governance for comprehensive economic policies to insure stable financial conditions, instead of policies that may lead to risks of unstable economy.
2. A strong and serious commitment not to interfere in running and organizing the market. The government role shall be to supervise only.
3. Availability of a stable, competent, advanced banking system to provide better investing tools to support the fund.
4. Davis (2005) added a fourth condition: elimination of any constraints pertaining to the fund's investments utilization away from any political issues. As for Palestine, a set of challenges had led to abandonment of this obligation by the government:

- Chronic ongoing PNA budget deficit, which topped \$2.4 billion in 2014; moreover, taxes returns had never been enough to pay for salaries.
- Reliability: the PNA sometimes can't pay its employees' salaries; this has been reflected in the citizen's confidence in the government's capacity to provide security at retirement; nevertheless, it attracts insurers from outside the government.
- Historic experiences show that most countries have failed to run such security funds, which were moved to private sectors after sometime. *So, what happened* in many countries as we discussed before.
- Bureaucracy of most governments have led to the failure of many productive economic projects.

3.5.2 Encouraging Voluntary Participation by Non-Public Sector (Informal)

The most important challenge in Palestine is looking for a way to bring all workers together and convince them to join the private sector. As previously mentioned, public and big institutions' employees join a pension while the private sector employees do not, despite the fact that they are the majority contributors to the Palestinian economy.

What are the features of the program that may motivate workers to join?

1. Flexible terms for informal sector workers: The complicated disciplines and rules of a pension are two major obstacles which a worker faces when joining a pension including the mandatory ones (Hu and Stewart, 2009). The flexibility of rules may attract more participants. It's important for a participant to have the right of withdrawal any time, or to move from a public to a private pension freely and smoothly. Many economists see that the state's moving from public pension to private pension should be followed by flexibility and quality facilities. In Chile, for example, and some other developing countries suffering from seasonality of farming sector from time to time, it is possible to depend on the seasons. In other words, a higher contribution percentage in good harvest time is taken, and smaller contributions are taken in bad seasons (Hu and Stewart, 2009). This can apply in Palestine, in the farming sector and olives in particular, as the harvest is never the same annually. The same can be said about Palestinian workers in Israel proper who may intend to withdraw earlier from a pension, and so are workers in the construction sectors.

The flexibility in the rate of contribution, withdrawal and moving from a program to another will surely encourage non-government workers to join a pension: mandatory or voluntary. But it is a must to compromise between rules of flexibility and poor performance of a pension. Early retirement or withdrawal can weaken the program as few participants reach retirement age, thus creating a real crisis. What had happened in Singapore and South Africa are cases in point. (Hu and Stewart, 2009).

2. Providing monetary incentives to promote and increase participation and voluntary participation in particular. Tax incentives, such as the U.S. Act, is a good example. In Chile, when 1980 pension adjustments took place, workers contributed 10%, and got tax incentives (Hu and Stewart, 2009). But such a step was criticized. Would such a way promote new saving, or would it just adjust the then exist saving? (Antolin and Ponton, 2007). Moreover, a tax holiday is not necessarily effective in increasing the numbers of non-government sector workers, who already enjoy tax exemption.

3. Financial education awareness, and educational campaigns may promote participation in a pension, as many workers are ignorant of the details about it. This may enhance their

participation. A survey conducted by Asian Development Bank (A.D.B.) in India showed that about 80% of non-government sector employees did not know what a pension was (A.D.B, 2006) in contrast to 15.8% in Palestine.

In Palestine, the idea of pension is still new. There must be an educational program at schools and universities to inform people about the advantages and merits of joining a pension fund. A governmental managed awareness campaign is essential to enhance citizens' knowledge pertaining to pension.

3.5.3 Proposed Pension Designs in Palestine

Palestine is considered one of a kind in the field of social security due to the great challenges the Palestinians encounter pertaining to funding and the capacity to go on as the PNA is going through a permanent hierarchal deficiency, and the modernity of the pension idea is still a challenge. Against the backdrop of the international trials, the Palestinian design should consider the following factors:

- 1- Public employees who retired before activating the program are to be covered by the government.
- 2- Employees who currently work with PNA are to choose between staying with the official program set in the West Bank and the Gaza Strip, military or civil, or move to the new program, where the government will purchase the working years from the new pension company, but can't do the opposite. In other words, a participant can move from a public pension to private one only.
- 3- All new employees are to join the new pension directly.
- 4- An institution should provide a set of programs to enable employees to choose. Mandatory and elective programs should be available according to the job or the person himself.
- 5- Belonging to a pension is to be a must by law to get any job, in a small or big enterprise. A worker should have the opportunity to choose any program.
- 6- A government should be committed to pay the pension company on behalf of the non-contributed participant.

7- A pension must be run by a private company, and an independent administrative board should be employed, which in return would employ a general manager.

8- The new system shall be a fully funded form due to the Palestinian Authority's (public budget) incapability to pay off any social security deficit.

9- The leading foundation shall adopt a defined contribution formula to achieve justice in savings distribution, banning early retirement which leads to leaving force market at an early age.

10- An item for the disadvantaged (low-income individuals) should be added by a solidarity account with DF and DC to enhance their living upon retirement.

There is no doubt that pension privatization is subject to a number of challenges. The supervising party is the most important. The running government's honesty is the base to join any public scheme. The idea of PAYG is closely related to the degree of the participant's confidence in the administrators. Such a program funds old age now in order to be the responsibility of generations to come. As for the private sector, confidence must be provided in two dimensions:

1. Confidence in the company's capability to last till the participant's retirement. It's worth noting that pension companies in the developing world, in general, and in Palestine, in particular, never live long. Many quit the market after a short while, so there must be some kind of guarantee.

2. The confidence in the companies' capacity to manage participants' contributions effectively in the absence of transparency in the Palestinian economy (according to international frame reports such as the World Bank, and domestic ones such as the Palestinian Legislative Council and some other institutions) at the public and private scales.

In brief, an establishment should gain participant's confidence pertaining to its capacity to expand and last, on one hand, and the capability to manage accounts, on the other. The researcher suggests attachment of such frames to banking institution, noting that Palestinians' confidence in banks is high, knowing that no bank has declared insolvency or failure so far. This is in addition to the rigid bank control imposed by people in charge. Banks have sufficient experience in managing portfolios, which means the ability to cover expenses and keep on doing.

Pertaining to control, the company would be under the supervision of more than one body. The first is the Palestinian Monetary Authority (Central Bank), being a banking frame or entity. The second is the Palestinian Capital Market Authority, which is a major player in the Palestinian financial market. This is in addition to the government, which has social and ethical commitments towards its people and their savings in return. This would be controlled by the Ministries of Social Affairs, Labor and Finance.

3.6. Empirical Results

This section of this study discusses the results of a field study conducted by the Palestinian Institute for the Study of Democracy (MUWATEN).

The population of the study is distributed in two geographical areas: The West Bank and the Gaza Strip. This design took two surveys equally. Therefore, the sample was designed as stratified random sample to include the three areas. The sample was 1,152 firms / workers. The sample rate was 4% and was increased to meet any possible lack of response. The total number of respondents was 1,203 firms (801 in the West Bank, and 402 in the Gaza Strip), 1, 222 paid workers (823 in the West Bank, and 399 in the Gaza Strip). One third of the sample was from the Gaza Strip while two thirds were from the West Bank (based on population representation to be self-balanced). The institution or economic activity size was disregarded due to lack of any perspective differences between all classes. Respondents' views depended on personal perspectives rather than on work experience. Aspects such as age, years left till retirement, qualifications, knowledge, income and family economic features may make a difference. The sample consisted of about 1,200 micro businesses (employing a maximum of 6 employees) in the West Bank and the Gaza Strip, and 1,222 salaried workers. All large institutions were excluded due to the availability of social security in one form or other. The main results were as follows:

1. About 22% of all workers worked in local micro-enterprises (a maximum of 6 workers) as opposed to 44% in the private sector.

2. With respect to age, it was crystal clear that young people were the majority: 62% of workers (of both sexes) were between 20-35 years old, which was in turn an incentive to have social security benefits. But low salaries (averaging \$328/month in small enterprises, \$609 in large ones) prevented such sectors from enjoying any pension.

3. Meanwhile, NGOs and international employees accounted for 1.5% of the total number of workers. Despite the young age of such workers and high salaries (\$781/month on average), it should be noted that rates of resignations were the highest in this sector.

The survey results pertaining to the target's pursuit of social security were as follows:

3.6.1. Employers

This section highlights micro-business owners' perspectives on a set of indicators: location, sector, institution's liability, benefits - such as provident funds or health insurance, work injury insurance, or paid leave in a way to provide a diversity of options and to facilitate a selection.

1. Results of the survey indicated that 70% of employers had a superficial and insufficient knowledge of the social security system and its pros and cons, whilst only 21% had detailed information. About 9% were totally ignorant despite the fact that they were in charge of groups of employees. Despite being introduced to the system and its benefits for the community, the labor market, employees and enterprises, 16% of employers rejected a mandatory social security.

2. Expected short/long- term benefits to the institution: Although the system was introduced to employers, 14% still believed that it did not have any direct or indirect positive impacts on their institutions as opposed to 84% who supported a social security enactment. However, 38% of them rejected any payroll contribution. This leads to the suggestion that, in the case of voluntary contributions, only 62% would join; a little more

than half. Of the other half, the contributions of institutions amounted to only about 6.4% of wages.

The aforementioned indicators that follow were used to compare employers or enterprises to determine factors which influenced perspectives and views of the social security track, and any possible differences (due to characteristics of employers or institutions). Z-test was used, with a 95% significance.

▪ **Locations**

There were significant differences amongst employers (or their representatives) in the West Bank and the Gaza Strip. The latter tended to be more convinced with social security, its importance and positive impacts. They showed a greater interest in paying their employees' contributions. Only 2% were ignorant about the social security system compared to 13% in the West Bank. However, 24% rejected its enactment. This category of employers is scarce in the Gaza Strip. It was also found that 21% of West Bank employers were pessimistic about any positive impact a social security system might have on their firms as opposed to a minority holding the same opinion in the Gaza Strip. As for employers rejecting any contribution on behalf of their employees, the rate was 57% in the West Bank, with microscopic rates in the Gaza Strip. However, the total comparisons pertinent to the region were statistically significant. This may be due to the siege imposed on the Gaza Strip and the private sector's inefficiency in absorbing the unemployed, as well as the tough circumstances facing the labor market in the Gaza Strip nowadays. This has made it necessary to look for self-protection and provide alternatives to state employment, as it currently employs more than 50% of the labor force and lacks a satisfactory number of vacancies.

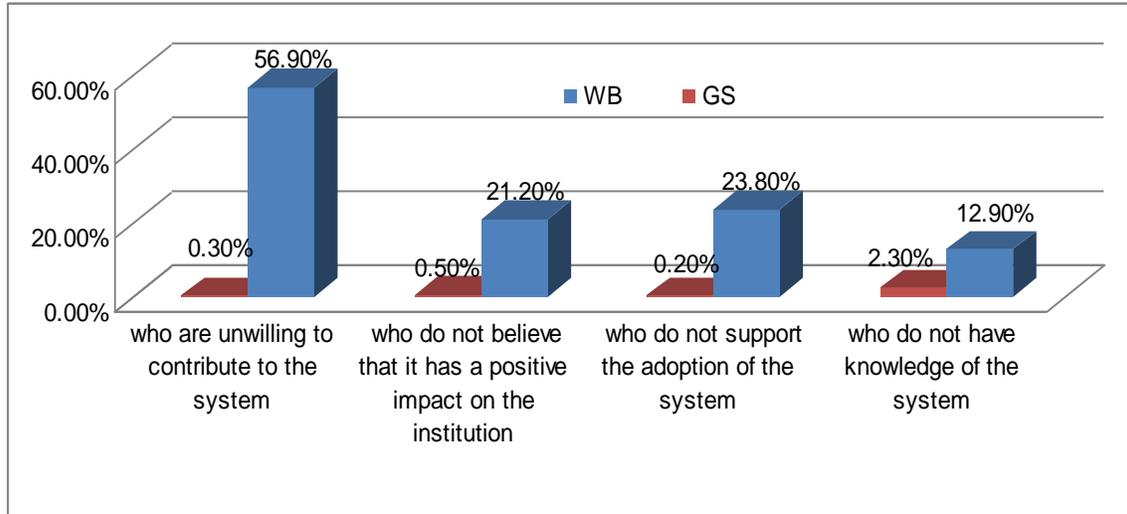


Figure 2: Percentage of employers according to some indicators of the social security system

▪ **Liabilities**

The survey results showed some differences between sole proprietorship and partnerships, such as companies with shared-ownership, in their perspectives towards the system’s impacts on their firms. Some 78% of partnerships, in addition to 86% of sole proprietorships, think that the system had a positive influence, whilst 53% of partnerships’ representatives, and 37% of sole proprietorships rejected any contribution.

▪ **Institution with Special Provident Fund**

There were significant differences between the firms that had self-provident funds and those which did not have. The former showed a tendency towards sharing the system; 11% of self-provident fund companies rejected any contribution compared to 39% of pensionable firms. Also, the average contribution rate was 7.4% for the former, and 6.4% for the latter and this indicates that self-provident fund companies prefer giving management to a third party because of the low returns of savings, investments and administrative costs of running any fund.

- **Insurance and Other Benefits**

Results showed that institutions providing health insurance were more knowledgeable and supportive of social security system details, with bigger numbers of shareholders. This is logical when considering the services provided; the same is true for institutions that provide injury at work insurance.

It is crystal clear that non-insurance companies [which do not provide insurance] were ignorant of the security system, were the least supportive of its enactment and the most negative regarding contributions in any similar system. Firms providing services and benefits for their staff showed a higher tendency towards constructing a social security system. This is a natural reflection of the idea that institutions which voluntarily provide privileges to employees would seek to become part of a social security system and to contribute to it, due to a prior understanding of its benefits and advantages.

3.6.2. Employees

In this part, the most important results regarding salaried workers in micro-businesses are discussed according to a set of indicators (variables): region, gender, education, age, marital status, number of dependents, availability of a contract, a stable income, residency ownership, health insurance for family members of any kind, and whether the client is a member of a pensionable association. The results will show differences between indicators to investigate the clients' awareness and degree of support for the system's enactment. It is to be expected that some clients would oppose it because of poverty or ignorance.

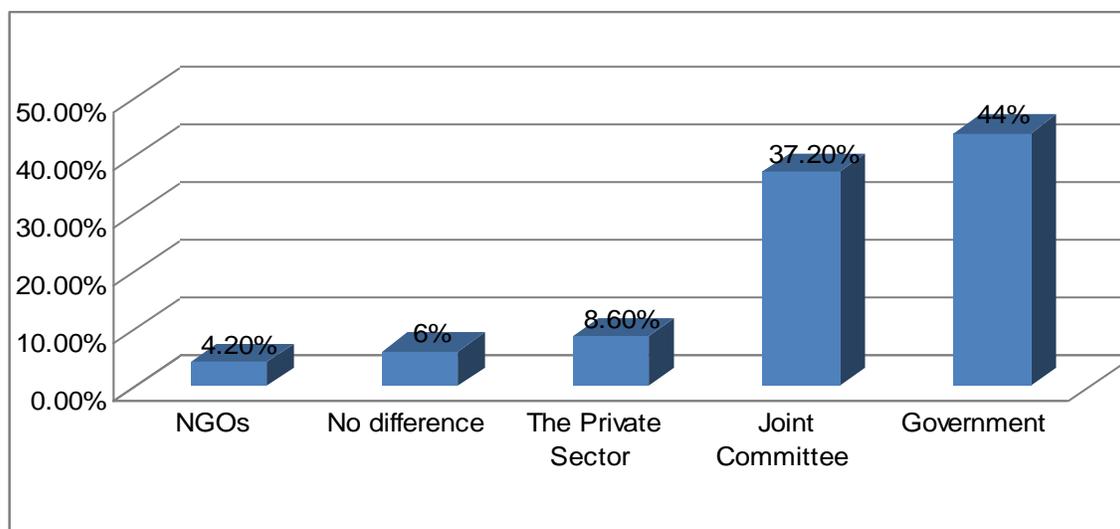


Figure 3: From the salaried employees’ perspective, order the most reliable institution to administer the social security institution.

A comparison will be held between clients regarding the most trustworthy social security administrative body (when launched), the most important types of services, and their views about the best humanitarian and social services that could be included beyond social insurances. Results showed that 16% of Palestinian users were unaware of the social security system and that 94% of salaried workers (the majority) supported its enactment (although it was introduced during personal interviews by field researchers). Regarding the most trustworthy administrative body to run a social security service 44% chose the government; 37% chose a coalition of the government, and the public and private sectors; 9% saw the private sector to be suitable and 6% felt NGOs to be the most suitable. Moreover, the pension service occupied first place as the most vital service in any social security, followed by injury at work insurance, health-care insurance and unemployment benefits. About 92% of recipients supported including elderly people, vulnerable families, mothers’ pension, and child benefit, a strong sign of the prevalence of social solidarity amongst the interviewees.

- **Locations**

About 23% of West Bank workers lacked any knowledge regarding social security system, 9% opposed its enactment or introduction although they were previously informed. This is really a high rate for an issue directly affecting their lives. As for the best administration, 56% of West Bank employees and, 20% of Gaza Strip employees believed that it should be the government, the second choice was a coalition, 17% of West Bank employees, 80% of the Gaza Strip employees supported it, which is an indicator of high trust in these sectors. This may raise a set of questions about the roles NGOs play, their potential administrative skills or the lack of awareness among workers in this respect.

On the subject of the services pursued, workers had different views in the West Bank and the Gaza Strip. The latter saw retirement benefits as the most vital. Differences were obvious with respect to prioritizing work insurance or invalidity compensation. The Gaza Strip workers tended to prefer invalidity compensation and health care insurance due to the harsh conditions they experienced, at a time the West Bank workers prioritized injury at work insurance as the first option. On the other hand, all Gaza Strip workers supported introduction of social assistance for the elderly, the vulnerable sections, the needy and dependent children) in a social security system. Only 5% of workers in the West Bank opposed, arguing that it was unnecessary.

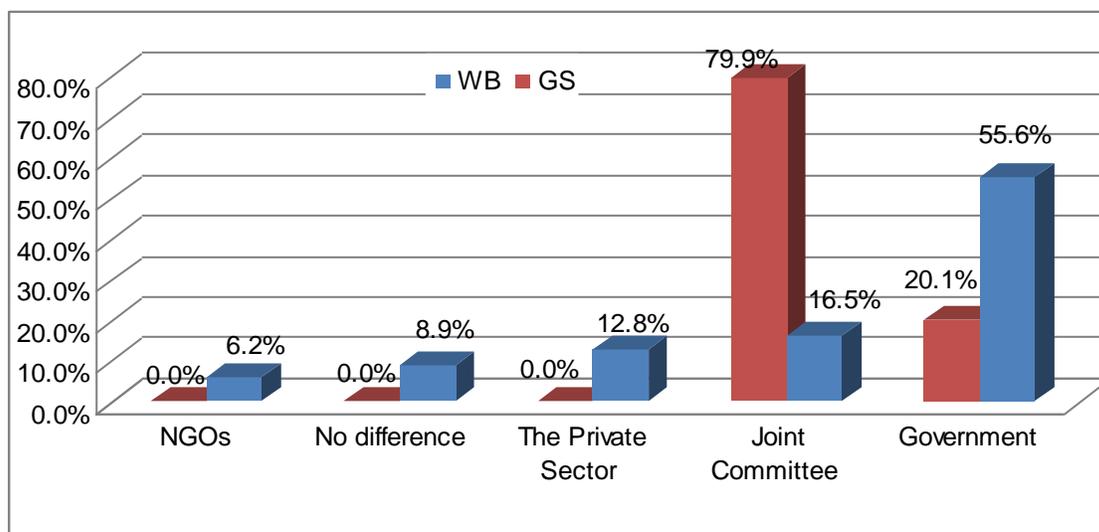


Figure 4: From the salaried employees’ perspective, order the most reliable institution to administer the social security institution.

- **Gender**

There were no significant statistical differences between males and females regarding awareness and support for social security enactment, and selecting the best administration body. The difference occurred in the selection rates: 54% of female employees preferred the government as opposed to 42% males; 23% females supported a coalition compared to 41% males. In contrast, 13% females supported private sector administration as opposed to only 8% of males. Governmental organizations got less female support. With regard to services, males appeared more concerned about future contributions, and pensions in particular, while females seemed to be reluctant about contribution although they were more supportive of retirement than males who stressed the need for a full pension (100% of salary). With respect to the best services to be included, there was one significant statistical difference which has to do with partial invalidity or disability compensation. Females saw this as not important while males thought the opposite. This may be due to the fact that female careers are usually less unsafe so they would rarely appear in social security.

- **Level of Education**

Obvious variations were observed among workers due to their educational level. They were classified as follows:

- 1- Holders of less than secondary school certificate (those without any schooling included).
- 2- Secondary education holders
- 3- Diploma holders and above

Results showed that the more educated a worker was, the more he /she was acquainted with the social security system. There were significant statistical differences with 95% reliability. This is a sound result indicating the correctness of data. However, there were no significant differences regarding workers' views about the most trusted body to run the system except for category II who gave more weight to a coalition, while category I had more confidence in the private sector.

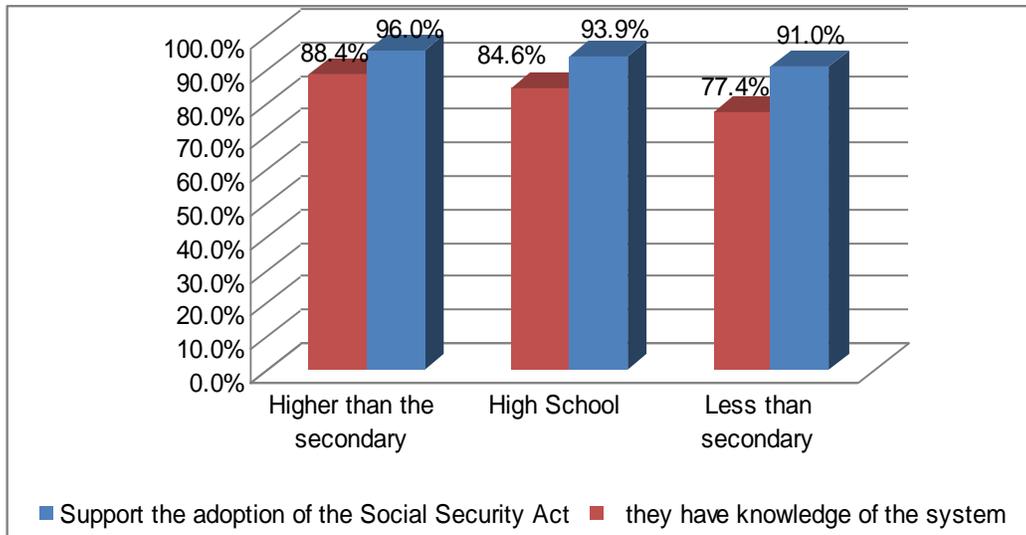


Figure 5: Knowledge and support of the users of the system based on educational level

As for services required, there were significant differences between workers due to educational level. The more educated were more interested in all services contribution. Pension was considered a priority, followed by injury at work benefit, incapacity, life and health care insurance. Differences also occurred in the services to be included. Sorting didn't change, but vitality did. Highly educated employees ranked pensions as the most important, followed by injury at work, and incapacity benefit respectively. On the other hand, the less educated saw pensions first, followed by complete disability benefit, which could be attributed to the high-risk jobs they had.

- **Age Groups**

Workers were divided into three age groups: the young people (less than thirty) the middle-aged people (thirty -forty-four), and people over forty-four.

There were significant statistical differences between the three age groups. The middle-aged group had peripheral knowledge and a lack of detailed knowledge. The older group had more information and details, while the knowledge of the young people seemed to be low; 20% of them had no idea about the system as opposed to 10% of the middle-aged

and 14% of older people. It was clear that older people either had adequate knowledge or nothing. With respect to the system's enactment, the middle-aged group was more supportive than the young: 97% of them agreed in contrast to 92% of the young. Older people were in the middle, but their approval rates were high. When dealing with the best administration, there were no significant statistical differences. Selection was the same. The young gave this responsibility to the government first, then to the private sector, whereas the middle-aged gave the coalition administration greater weight.

There were clear variations in contribution preference rates. The middle-aged expressed a higher interest in pensions first, injury at work benefits, and health care insurance. In contrast, the older people, who didn't participate in pension, showed high rates. About 10% of them were not interested in pension contributions, compared to 2% of the middle-aged. Such outcomes incorporate workers' interests according to age. The young were unaware of how important it was to be secured in the future, whereas the middle-aged looked so intransigent, while the older group already has their eyes on days to come. Regarding services, the differences reflected every group's interests. The older chose life insurance as their priority, while the young and the middle-aged saw pensions as a priority. This was followed by work injury and invalidity benefits. Regarding social assistance, the older a worker was, the more interested he was in social assistance. Older, in return, was ultimate consensus about supporting disadvantaged families, and pensioners. Meanwhile, 95% of young people agreed.

- **Marital Status**

Marital status may be related to age, so the results were more analytic in this respect. Married (including ex-married) workers were more acquainted with and supportive of social security system enactment with an approval rate of 97% compared to 90% of the unmarried. This could be attributed to degree of responsibility and awareness. Regarding administration, single people expressed confidence in the government. With respect to contribution tendency, the married had greater readiness with significant statistical differences. About 97% of them, compared to 91% of the unmarried, were prepared to

contribute. Perspectives varied regarding death compensations: 95% of the married stated that they were ready to contribute, compared to 87% of single people.

- **Dependency**

Social security system awareness goes side by side with dependency which goes along with the system's knowledge and support. (Greater levels of dependency mean more awareness and more support of the system enactment and more confidence in joint administration).

It seems that whenever dependents exceeded 4 members, willingness to contribute was strengthened especially with pension packages. In contrast, workers with 2-4 dependents were more reluctant to contribute or even against making any contribution. This may lead to the conclusion that nuclear families tend to pursue everyday living and expenditure and did not think about the future.

- **Availability of Stable Family Income**

In the following comparison, workers were divided again into three groups: first, a worker with a stable family income (wages or fees); second, a worker with a stable family income from other sources such as land, business or any family schemes; third, a worker with no stable income. Such comparisons aim at investigating each group's support and degree of willingness to contribute to the system depending on the family's financial background. This in turn may reveal how the stability of the family impacts the worker's perspectives and tendency to join the system. Outcomes pointed out some significant anticipated variations. There were no significant statistical differences pertaining to knowledge of social security systems and acceptance of their enactment. The second and third groups were more supportive than the first with 94%, 97%, and 89% respectively. About 61% of the first group were confident of the state's administration, 32% of the second, 44% of the third, who supported a coalition the most. Regarding services pursued by workers, there were significant statistical differences between the first and second groups who expressed a great desire to contribute to the

system. It was evident that the first group was not highly interested in contribution: 78% of them expressed a willingness to contribute to the system, compared with 93% of the second group. The third group was in between the first and second due to low living standard which makes today's breadwinning more vital than tomorrows. This was evident in their stress on including social assistance in the system. There were significant statistical differences regarding services, but there was a consensus on their importance. The first group considered injury at work insurance as a priority, while pension benefits were highly supported by the other groups. The second group supported the whole package included in the system, followed by the third group. Though the first group stressed the importance of that package, a special importance was given to injury at work insurance, followed by pension benefits. In contrast, the second group placed pensions first, injury at work insurance, second, and invalidity benefit, third. The third group gave priority to pension benefits first, injury at work benefits, second, followed by complete disability insurance.

- **Family Health Care Insurance Availability**

The presence of workers' family health care insurance is evidence of stability that may decrease the importance of social security. But this was not the case in this paper. There were never any significant statistical differences, and families with health care insurance were more interested in their future contributions to the system, and especially to pension benefits. Therefore, healthcare insurance will never replace social security programs; on the contrary, it may be a gateway for higher contributions.

- **Workers Joining Syndicate Pension Funds**

About 11.3% of the survey's sample were members in a syndicate pension fund (engineers, doctors, lawyers, etc). There were no actual differences between members and non-members regarding the system law enactment or support, but there was a difference in their perspectives on the best administrative body to run the system. Although they had similar preferences, syndicate pension fund members expressed more

confidence in the private sector. Moreover, they emphasized that their major contribution was to health care insurance followed by complete disability insurance. No differences were observed regarding prioritization of services.

- **Work Contract Availability**

Again, workers were divided into three groups: a worker having a fixed-term contract/renewable; a worker with a temporary contract; a worker with no contract. It was shown that the second group was more supportive of the system's enactment than the third group. They also gave coalition administration more weight. These findings seemed peculiar for non-contracted workers; 18% had either high confidence in their employing institutions, or lack of knowledge. There were no significant statistical differences between the first and second groups regarding services wanted or necessary services to be included in the system. But there were significant differences between the second and third groups pertaining to contributions, as the former were more enthusiastic.

3.7 Determinants of Adherence to the Social Security System for Workers in SMEs

The aim of this part of the study is to identify factors that influence the decision made by workers and employees in small enterprises in the West Bank and the Gaza Strip to join the social security system. The study is about the underlying determinants of workers' acceptance or refusal to join or participate in the system. The workers were introduced by those people, who administered the questionnaires, of the nature of the social security system and services expected to be provided. This is in addition to the cost of joining the social security system.

This study relied on the data collected through Muwaten Foundation. The survey was conducted by Muwaten Foundation in the first quarter of 2011. Around 1,222 questionnaires were administered and several interviews were conducted with workers in private enterprises which employed 6 workers or less to identify the social and economic

conditions of the workers in these institutions, and to identify the desire and ability of those workers to join social security.

3.7.1 Econometrics Models

To make an inference on the factors that determine the probability that employees will subscribe for the pension scheme we use a simple logistic multiple regression model (LMM). The robustness of the results to methodology is checked by using an artificial Neural network (ANN)

(<https://www.csun.edu/sites/default/files/neural-network20-32bit.pdf>;

<http://www.chsbs.cmich.edu/fattah/courses/empirical/29.html>).

In both models we use the same factors.

The logistic regression methodology is based on statistics while the ANN is based on artificial intelligence.

Both methods are widely used and each has its own advantages and disadvantages. The main advantage of the LMM is its simplicity and the easiness with which coefficients are interpreted.

The ANN method has a relatively better fit and hence, it is more accurate in prediction. However, it is more complex and it works through functions of nodes and hidden layers. Specifically, the output in these models is produced as a function of the interaction of inputs in an algorithm.

In that sense, the ANNs is more able to capture any complex nonlinear relationship than the LMM which is constrained by a fixed functional form between the variables.

In classification, the LMM is only adequate when the classes are linearly related to the factors and hence, they are separable by a hyper-plane. However, in the case of a non-linear relationships LMM model is inappropriate.

Another advantage of the ANNs is its ability to identify correlations between independent variables through hidden nodes. In models where there are a large number of factors, obtaining good estimates is difficult due to potential interactions between these factors. In this situation, the ANN model is superior in obtaining more reliable results (Sayeh and Bellier, 2014). Furthermore, the ANNs fit as reflected by the coefficient of determination

and its predictability as measured by the mean squared errors (MSE) is also superior to the LMM models.

In this study I use both methods to obtain better results and to see the robustness of results to the methods used (Dreiseitl and Machado,2002; Kahneman et.al.2001; Tversky and Kahneman, 1974).

The ANN and the LMM models have some in common but several different characteristics. However, the main advantage of the LMM over the ANN is the ability to identify and test parameter estimates. This is important, as it enables me to identify the significance of the predictor variables. This is not possible when using the ANN method and this complicates the specification of the model. That is why the ANN method is considered as an empirical method (Tu, 1996). The existence of various ANN algorithms, makes impractical to define an optimal algorithm to use in the ANN model.

3.7.1.1. Logistic Model Methods

In this model the logit model will be used because the dependent variable is a binary variable; it takes one of the two values: zero or one. Therefore, with such data, the only models that fitted the logit model or probit model the shape of the model would be as follows:

$$P(Y=1|X) = G (\beta_0+\beta_1X_1+\beta_2X_2+\dots+\beta_kX_k) = G (\beta_0 + \mathbf{X} \boldsymbol{\beta}) \dots\dots\dots(1)$$

where G is a function taking on values strictly between zero and one: $0 < G(z) < 1$, for all real numbers z . This ensures that the estimated response probabilities are strictly between zero and one. In the logit model, G is the logistic function:

$$G (z) = \exp(z)/[1 + \exp(z)] = \Omega(z) \dots\dots\dots(2)$$

To find the partial effect of roughly continuous variables on the response probability, we must rely on calculus. If x_i is a roughly continuous variable, its partial effect on $p(x) = P(y = 1|x)$ is obtained from the partial derivative:

$$\frac{\partial p(\mathbf{x})}{\partial x_j} = g(\beta_0 + \mathbf{x}\boldsymbol{\beta})\beta_j, \text{ where } g(z) \equiv \frac{dG}{dz}(z). \tag{3}$$

Equation 3 shows that the relative effects of any two continuous explanatory variables do not depend on \mathbf{x} : the ratio of the partial effects for x_i and x_h is β_i / β_h . In the typical case that g is a symmetric density about zero, with a unique mode at zero, the largest effect occurs when $\beta_0 + \mathbf{X}\boldsymbol{\beta} = 0$. For example, in the logit case with $g(z) = \phi(0) = 1/\sqrt{2\pi} \approx 0.40$ (Wooldridge, 2002).

If, say, x_1 is a binary explanatory variable, then the partial effect from changing x_1 from zero to one, holding all other variables fixed, is simply to obtain the maximum likelihood estimator, conditional on the explanatory variables, we need the density of y_i given x_i .

We can write this as:

$$f(y|x_i;\boldsymbol{\beta}) = [G(x_i\boldsymbol{\beta})]^y [1 - G(x_i\boldsymbol{\beta})]^{1-y}, y = 0, 1 \dots \dots \dots (4)$$

where, for simplicity, we absorb the intercept into the vector x_i . We can easily see that when $y = 1$, we get $G(x_i\boldsymbol{\beta})$ and when $y = 0$, we get $1 - G(x_i\boldsymbol{\beta})$. The log-likelihood function for observation i is a function of the parameters and the data (x_i, y_i) and is obtained by taking the log of (4):

$$\ell_i(\boldsymbol{\beta}) = y_i \log [G(x_i\boldsymbol{\beta})] + (1 - y_i) \log [1 - G(x_i\boldsymbol{\beta})] \dots \dots \dots (5)$$

Because $G(\cdot)$ is strictly between zero and one for logit and probit, $\ell_i(\boldsymbol{\beta})$ is well-defined for all values of $\boldsymbol{\beta}$.

The log-likelihood for a sample size of n is obtained by summing (5) across all observations: $L(\boldsymbol{\beta}) = \sum \ell_i(\boldsymbol{\beta})$. The MLE of $\boldsymbol{\beta}$, denoted by $\hat{\boldsymbol{\beta}}$, maximizes this log likelihood. If $G(\cdot)$ is the standard logit cdf, then $\hat{\boldsymbol{\beta}}$ is the logit estimator; if $G(\cdot)$ is the standard normal cdf, then $\hat{\boldsymbol{\beta}}$ is the probit estimator.

Variable Selection

Variables were selected based on specific statistical mechanism where the bivariate correlation between the dependent variable and most of the variables that the researcher thought to have an impact in the user's decision to join the social security system. They were included in the survey.

The first was the variable of sex, where it is expected that there will be highest female desire to join the social security, because the possibility of having income after retirement is weak, for several reasons like the inability of women to exercise entrepreneurship practiced by men in addition to his job due to lack of one's resources and/ or social obstacles and constraints. In addition to that, males are characterized by high amount of savings because of the high-income usually males earn compared to females and because they sometimes have more than one job.

In contrast, the family depends on men, thus making the importance of participating in the social security fund equally a key task for both men and women.

The second variable is age, where it expected that as people become aged, it becomes more important and urging for them to join a social security fund. On the other hand, the trend of the newly employed person is to achieve self-actualization, through having and providing a decent living standard for himself and his family, having less interest in the future, especially when the period left for retirement is long. This trend declines as people become more aged; they become more interested in achieving stability after their retirement age to be replaced by a tendency to stabilize the post-retirement.

The third variable is the marital status; the social situation was divided into two parts: married and engaged; it took the value one (1) and the others took the value zero (0). This classification was based on the assumption that there is direct responsibility for a partner or there is not. It is expected that the sign of this variable will be positive; a married person shall create an incentive to join social security due to the extension of dependency relationship of the other partner.

The fourth variable is the number of dependents: the number of dependents the worker spends on, or participates in spending on. The sign might be positive or negative because dependency means that the larger the number of dependents is, the more the worker/employee becomes interested in providing a decent living for them, and have less interest in the future. On the other hand, as far as the number of dependents increases, the employee becomes more interested in joining social security to secure a decent life for him/her in the case of unemployment or death, since the relationship between the number of dependents and the size of savings is inverse.

The fifth variable is whether the worker/employee is joining a certain union social security in which he is a registered member like engineers, doctors and lawyers..... It is expected that the impact of joining a professional association, providing social security services, is negative towards joining the social security service because the desired service is already provided for him.

The sixth variable is house ownership; there is no explanation for the shape of the relationship between having a house and the desire to join a social security system.

The seventh variable is the years of work or the number of years the worker/employee spent in work (experience). It is expected that the more years the employee spends in work, the more desire he / she has to join the fund.

The eighth variable is prior knowledge of the social security, the services provided, and its obligations. The more they know the system, the more they will contribute to join the system.

The tenth variable is gross salary received by the worker/employee. The salary might have double effects and each one might phase out the other.

First, if the salary is small, then there is no desire to sacrifice any part of it, because the marginal utility of the \$ is very high. On the other side, when the salary is small, the possibility of savings and preparation for the future is low, which means that the worker/employee is caring about the current time; therefore, as far as the income increases, there is a tendency to join social security.

The eleventh variable is place of residence: The West Bank takes the value one, while the Gaza Strip takes the value zero. It is worth mentioning that this variable is negative which means that the inhabitants of the Gaza Strip shall be more directed to join the social security than the inhabitants of the West Bank as a result of the harsh conditions which Gaza inhabitants are suffering from.

The twelfth variable is the level of education: secondary level and below, diploma level and bachelor degree or higher level. This variable took the shape of fictitious variables. It is expected that the more education workers/employees have, the greater desire and willingness they have for joining the system.

Variables selection mechanism within the model

A Bivariate correlation test was conducted to find out the link between the dependent variable and the variables mentioned above. The variables that have the value of P, more than 10%, were excluded although this ratio is non-conservative ratio.

Table 1: Bivariate-correlation coefficient

Bivariate correlation of y with		
Variable	Corr.	Sig.
Sex	0.014	0.636
Age	0.089	0.002
mutstat	0.115	0.000
dependent	0.073	0.012
pension	0.014	0.616
Own house	0.021	0.464
experience	0.055	0.056
information	-0.044	0.121
salary	0.020	0.502
West Bank	-0.170	0.000
Education 2	0.076	0.008
Education 3	-0.055	0.056

On the basis of table 1 we choose the following factors to include in the model: Age, marital status, the number of dependents, years of work, place of residence, education, and prior knowledge about the system.

Hence, the logistic equation can be written as:

$$P(\text{participant}=1|x) = \varphi(\beta_0 + \beta_1 \text{age} + \beta_2 \text{mutstat} + \beta_3 \text{dependent} + \beta_4 \text{experience} + \beta_5 \text{information} + \beta_6 \text{West Bank} + \beta_7 \text{edu2} + \beta_8 \text{edu3})$$

Before estimating the model, we look at the simple correlation between the independent variables. Table 2 presents the correlation between the factors used to explain the decision to subscribe in the pension.

Table 2: Correlation Matrix of Explanatory Variables

	Mustat	dependent	information	experience	westbank	Edu2	Edu3
Age	.159**	.441**	.145**	.576**	-.285**	.076**	.073*
	.000	.000	.000	.000	.011	.008	.011
Mustat		.209**	.112**	-.032-	-.362**	.011	.062*
		.000	.000	.262	.003	.698	.032
Dependent			.121**	.152**	-.418*	.011	.084**
			.000	.000	.000	.699	.004
Information				-.057*	-.278**	.028-	.023-
				.049	.000	.330	.421
Experience					.209**	.047	.042
					.000	.105	.149
Westbank						.021-	.122**
						.469	.000
Edu2							.226-

							**
							.000
The number between parentheses are confidence error for significant test (P - value)							
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Table 2 shows that there are some correlations between all of the independent variables included in the model. The highest correlation is between the age and experience at 0.57 and it is significant. This means that the model may suffer from the problem of multicollinearity. The overlap between the variables may influence the distribution of effect and significance on the dependent variable across these factors. Therefore, I think that the ANNs is able to provide a more accurate results in terms of deciding the relative influence of the factors in the decision to subscribe to pensions.

Table 3: Logistic Regression Results

Logistic regression				
LR chi2(8) = 76.52	Prob > chi2 = 0.000	Log likelihood = -220.659	Pseudo R2 = 0.1478	
Y	Coef.	Std.Err	Z	P=value
Age	-0.0238	.0295	-0.81	0.42
Mutstat*	0.4371	.2684	1.63	0.10
Dependent	-0.0399	.0465	-0.86	0.39
Experience	0.0995	.0410	2.43	0.02
Information*	-0.9984	.4139	-2.41	0.02
West Bank *	-3.9950	1.0496	-3.81	0.00
Edu2 *	0.9952	.4855	2.05	0.04
Edu3 *	-0.0855	.3049	-0.28	0.78
_Cons	7.1179	1.4050	4.36	0.00

(*) dF/dx is for discrete change of dummy variable from 0 to 1 z and P>|z| corresponds to the test of the underlying coefficient being 0.

Table 3 presents the estimation results of the LMM model. As can be seen from the table, the significance of the loglikelihood function of the model is appropriate. The sign of the estimated parameters is not consistent with the theoretical expectations. For instance, it is

expected that older, more educated, informed, married individuals with dependents are more likely to subscribe in the pension system. However, the signs of the estimated parameters show that these factors are associated with lower probability to subscribe in pensions. But still, three of the factors with the wrong sign are not significant and the parameters are statistically not different than zero. These are the age, the number of dependents, and the post-secondary education.

As expected, married employees are more likely to join the system. The parameter associated with this factor is positive and significant at the conventional levels.

The estimates also show that years of experience matters and that people with more years in employment are more likely to subscribe to pensions. This is logical as the more years in employment, the closer the employee to retirement. Therefore, participating in a pension becomes an important decision to undertake.

Education is also an important factor that determines the choice of the pension option. The estimates show that the education to a school level is the most important factor. Those individuals who finished their school education are more likely to subscribe in the pension scheme. However, the model shows that the influence of higher than secondary education is not significant and it has no effect of pension subscriptions.

The intensity of the influence of the factors on the probability to pension is measured by the marginal effect which is computed from the estimated logistic regression equation. The effects are presented in the following table:

Table 4: Marginal Effect of Logistic Regression Results

ME of logistic regression				
Y = Pr(y) (predict) = .9775				
Y	dy/dx	Std.Err	Z	P= value
Age	-.0005	.0007	-0.79	0.43
Mutstat	.0101	.0072	1.40	0.16
Dependent	-.0009	.0011	-0.83	0.41
Experience*	.0022	.0011	2.00	0.05

Information*	-.0165	.0073	-2.27	0.02
West Bank *	-.0800	.0128	-6.25	0.00
Edu2 *	.0167	.0080	2.10	0.04
Edu3 *	-.0019	.0071	-0.27	-0.27

(*) dF/dx is for discrete change of dummy variable from 0 to 1 z and $P>|z|$ corresponds to the test of the underlying coefficient being 0.

As can be seen in the table, the marital status and the basic education are the two most influential variables.

3.7.1.2. Artificial Neural Networks (ANNs)

The artificial neural network approach (ANNs) is a powerful tool that is used to analyse a complex phenomenon. The artificial neural network is a network architecture that consists of artificial neurons. The main aim of the neural network is to get a meaningful output from inputs. The human brain is the most efficient for pattern recognition despite its shortcomings at processing huge quantities of discrete data.

The ANN resembles the function of the human brain in predicting patterns based on learning and recalling processes (Najjar et al., 1997; Al –Barqawi & Zayed 2006). It is composed of artificial neurons that are used as processing elements. These are called nodes or neurons. These elements are arranged in layers. There are input layers, intermediate hidden layers and output layers. Each of the layers has its individual neurons such as those shown in figure 6.

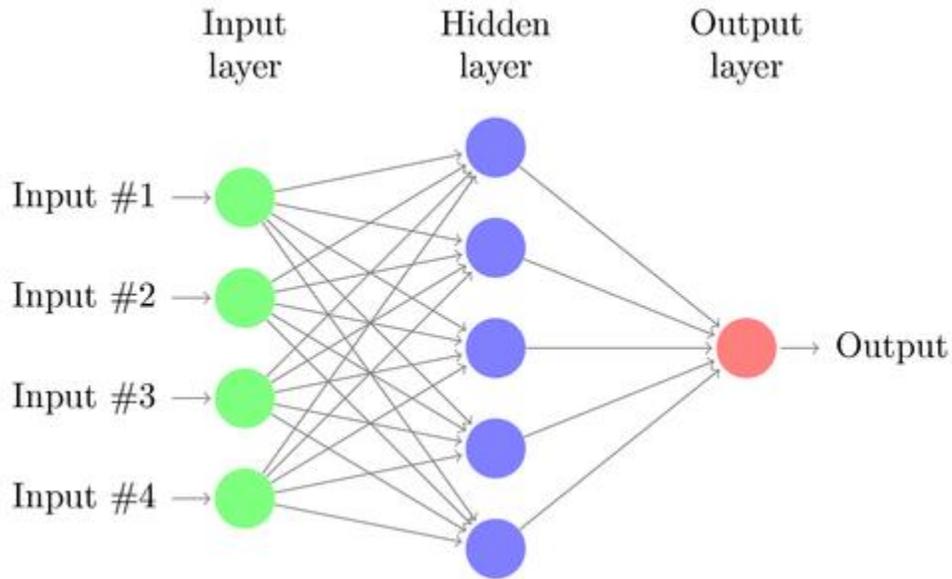


Figure 6: Artificial Neural Network model

Neural network: input / output transformation

$$Y_{out} = F(X.W)$$

Where Y_{out} is the output values and x are the input values; the W matrix contains all of the weight vectors that gives the weights of the connections between the input layers and hidden layers

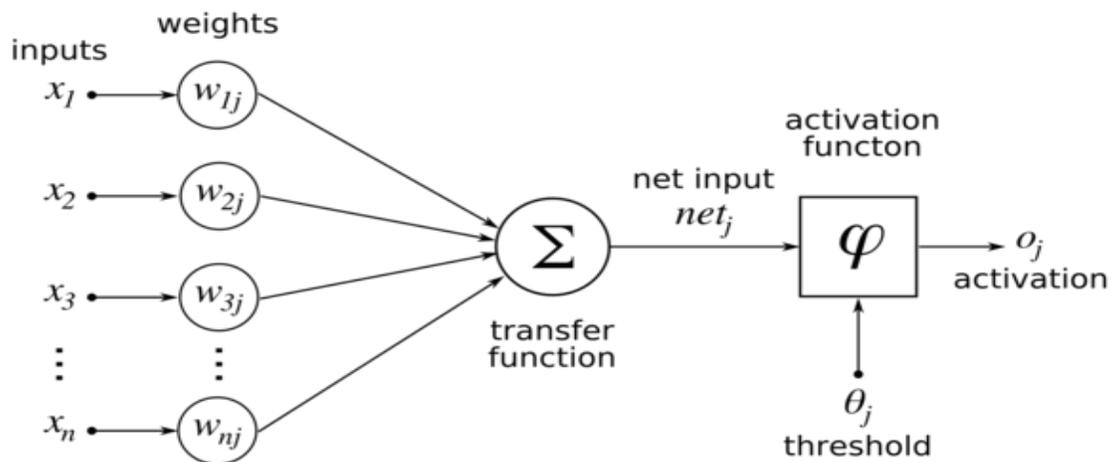


Figure 7: The McCulloch – Pitts Model

McCulloch and Pitts proposed a binary threshold unit as a computational model for an artificial neuron (see Figure 7). In their model the mathematical neuron is computed as a weighted sum of its n input signals, $x_j, j = 1, 2, \dots, n$, and it generates an output of 1 if this sum is above a certain threshold U . Alternatively, an output of 0 is given (Landwehr, Hall and Franck, 2005).

Mathematically,

$$Y = \theta [\sum W_j X_j - U]$$

Where $\theta(\cdot)$ is a unit step function at 0, and w_j is the synapse weight associated with the j th input.

For simplicity of the notation, we often consider the threshold U as another weight $W_0 = -U$ that is attached to the neuron with a constant input $X_0 = 1$. The positive weights correspond to excitatory synapses, while negative weights model inhibitory ones.

McCulloch and Pitts proved that, in principle, a suitably chosen weights let a synchronous arrangement of such neurons perform universal computations. The McCulloch and Pitts model (McCulloch and Pitts, 1943), however, contains a number of simplifying assumptions that do not reflect the true behavior of biological neurons.

The McCulloch-Pitts neuron can be generalized in many ways. An obvious generalization is to use activation functions different than the threshold function, such as the use of piecewise linear, sigmoid, or even Gaussian. The sigmoid function is by far the most frequently used in ANNs. It is a strictly increasing function that exhibits smoothness and that has the desired asymptotic properties. The standard sigmoid function is the logistic function which is defined as

$$G(x) = 1 / (1 + \exp(-\beta x))$$

where β is the slope parameter.

This is the generalization of logistic regression that we can use for multi-class classification and under the assumption that the classes are mutually exclusive. In contrast, we use the (standard) Logistic Regression model in binary classification tasks.

In the softmax regression (SMR), the sigmoid logistic function is replaced by the softmax *function* ϕ (Sutton and Barto, 1998):

$$P(y = j | z^{(i)}) = \phi_{softmax}(z^{(i)}) = \frac{e^{z_j^{(i)}}}{\sum_{k=0}^k e^{z_k^{(i)}}},$$

the net input z is defined as

$$z = w_0x_0 + w_1x_1 + \dots + w_mx_m = \sum_{l=0}^m w_lx_l = \mathbf{w}^T \mathbf{x}.$$

Where w is the weight vector, x is the feature vector of 1 training sample, and w_0 is the bias unit.

The softmax function computes the probability that the training sample $x^{(i)}$ belongs to class j given the weight and net input $z^{(i)}$.

So, we compute the probability $p(y = j | x^{(i)}; w_j)$ for each class label in $j = 1, \dots, k$. Note the normalization term in the denominator which causes these class probabilities to sum up to one.

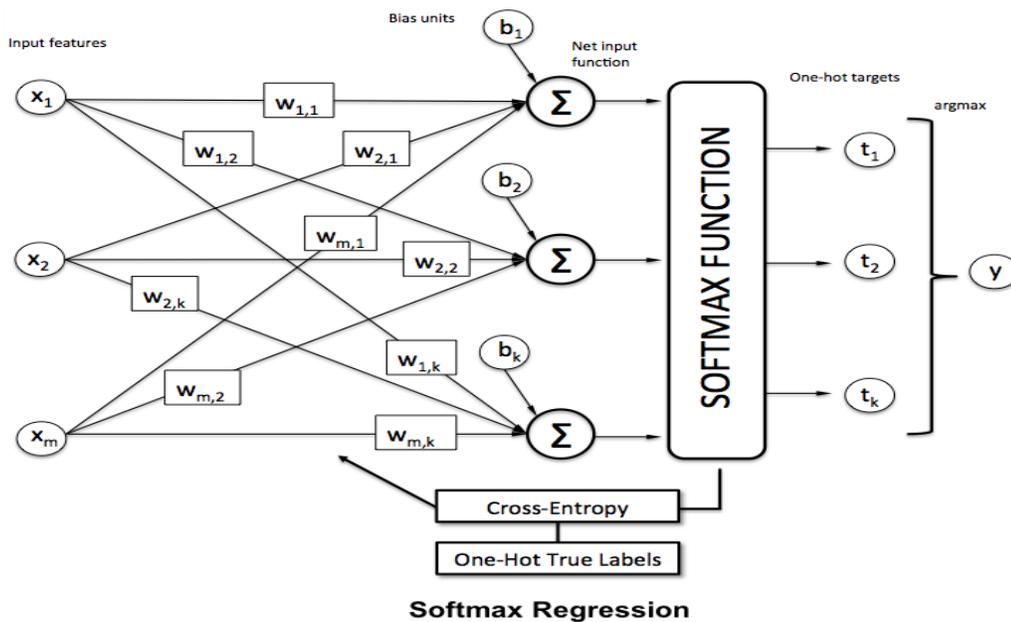
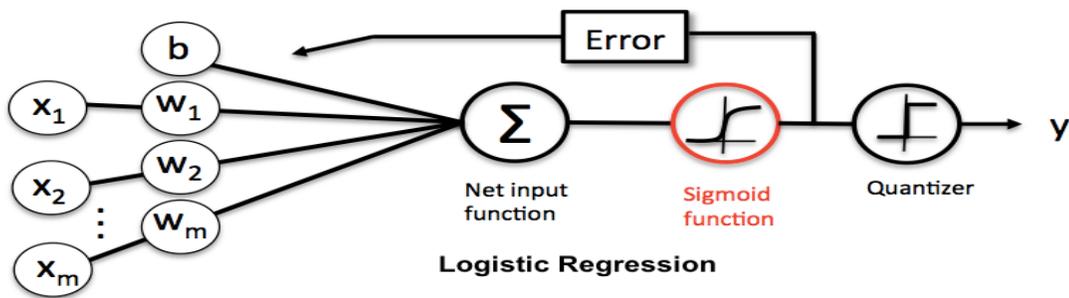


Figure 8: Sigmoid function to Softmax function

Data reparation (training, testing and validation)

In the ANNs approach the data is split into three sets:

1. The training set, which is used to train the neural network and adjust the connection weights.
2. The testing set, which measures the ability of the model to be generalized. The performance of the model is also checked during this phase, which is also used to determine the optimum network architecture.
3. The hold out set, which is used to determine the performance of a neural network on patterns, which were not used in the previous phases.

Table 5: Determination of the optimal data repartition in the ANN modeling

Repartition Scenarios	% of training	% of testing	% of holdout	Total R- square
1	70	30	0	0.947
2	50	25	25	0.936
3	100	0	0	.941
4	66	26	8	.934
5	74	18	8	.943

Table 5 shows the scenarios tested in the model. We find that the first scenario gives the best results ($R^2 = 0.947$). then we will use this model to analysis ANNs results.

Table 6: Determination of the optimal ANN architecture

Model	No. of hidden layers	No. of nods	Training sum of square error	Testing sum of square error	R- square
M1	1	1	163.427	62.586	0.940
M2	1	2	135.592	73.883	0.947
M3	1	3	148.832	56.794	0.938
M4	2	5	41.046	18.721	0.941

Table 6 shows the scenarios tested in the model. The M1 scenario contains one hidden layer and two neurons gives the best results with $R^2 = 0.947$. It provides the coefficient of connection in the neural network. For example, H (1:2) designate the weight of the connection between the input of cell one and cell two in the hidden layer.

Table 7: Repartition of data in the ANN modeling

	Number of Person	%
Training	813	70.1
Testing	347	29.9
Holdout	0	0
Valid	1160	100
Excluded	61	
Total	1221	

Table 8: Weights of connections in the neural network

Predictor		Predicted			
		Hidden Layer 1		Output Layer	
		H(1:1)	H(1:2)	[y=0]	[y=1]
Input Layer	(Bias)	-1.390-	-.285-		
	Age	-.093-	.020		
	Mustat	-.508-	.136		
	dependent	1.397	-1.538-		
	experience	-.852-	-.468-		
	information	-.101-	.504		
	West Bank	1.437	.885		
	edu2	-.679-	-.179-		
	edu3	-.094-	.372		
	(Bias)			-1.212-	1.471
Hidden Layer 1	H(1:1)			.629	-.669-
	H(1:2)			.524	-.707-

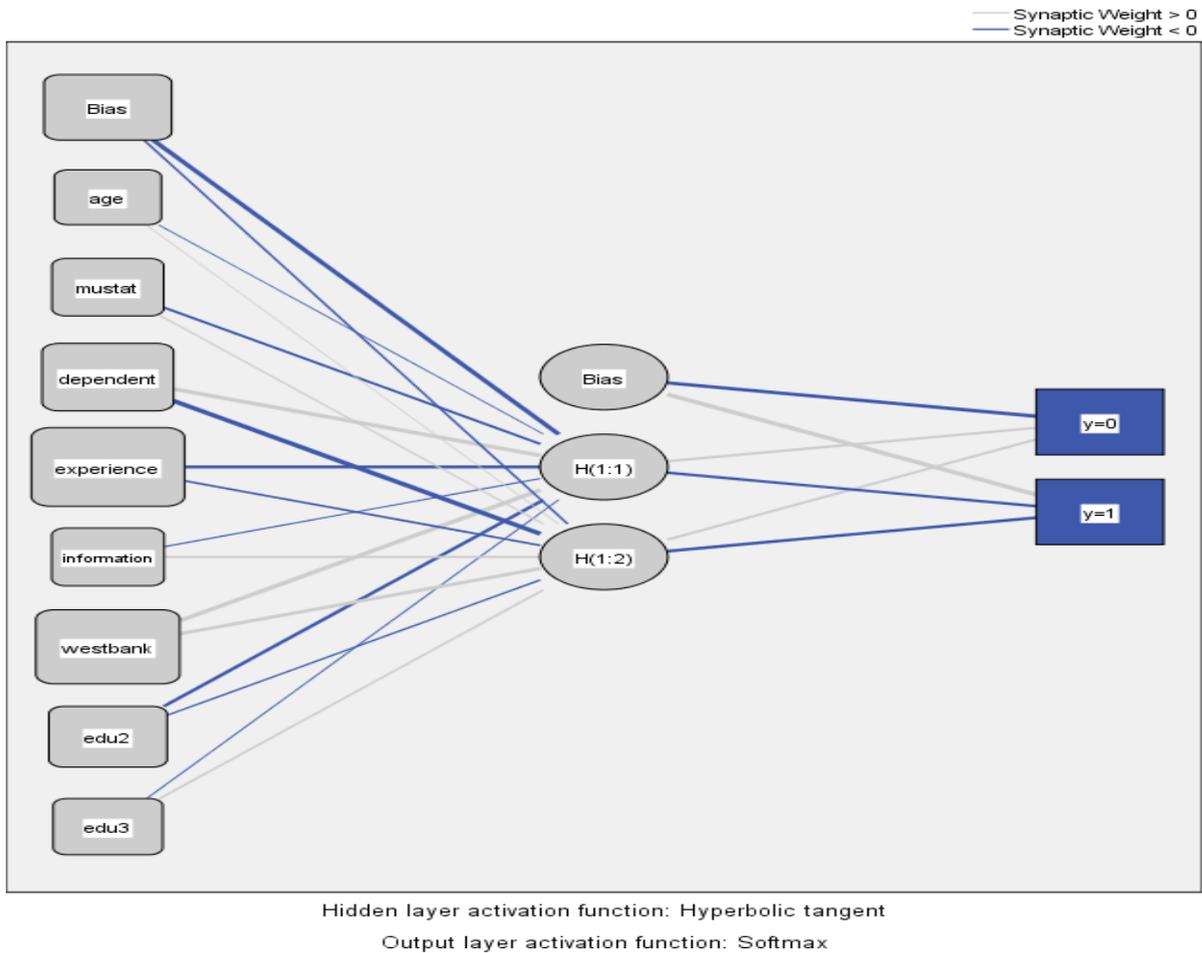


Figure 9: Hidden layer activate function

Table 8 shows the weights of connection between inputs and hidden layer and the connection between hidden layers and output. For example, the weight of age in the hidden layer 1 was -0.093 and the hidden layer affected the output ;if $y=0$ is 0.629 and -0.669 if $y=1$ and so on.

Table 9 : Independent Variable Importance in the ANNs

	Importance	Normalized Importance
Age	.028	9.3%
Mustat	.057	19.0%
Dependents	.171	57.2%
Experience	.300	100.0%
Information	.061	20.2%
West Bank	.245	81.9%
edu2	.094	31.5%
edu3	.044	14.6%

Table 9 and Figure 10 indicate the weight of each input parameters on the ANN model prediction. This result is compared to that obtained by the logistic model in Figure 11. A gap is observed between two models.

In the ANN model, the years of work (experience) had the highest weight, followed by the location (West Bank or Gaza Strip), the number of dependents (number of dependent people), educ2, (information) knowledge of social security, mutual status, edu3 and finally age of person.

In contrast, in the logistic model, the location (West Bank or Gaza Strip) had the highest weight, followed by educ2, (information) knowledge of social security, mutual status, the years of work (experience), edu3, the number of dependents (number of dependent people) and finally age of person.

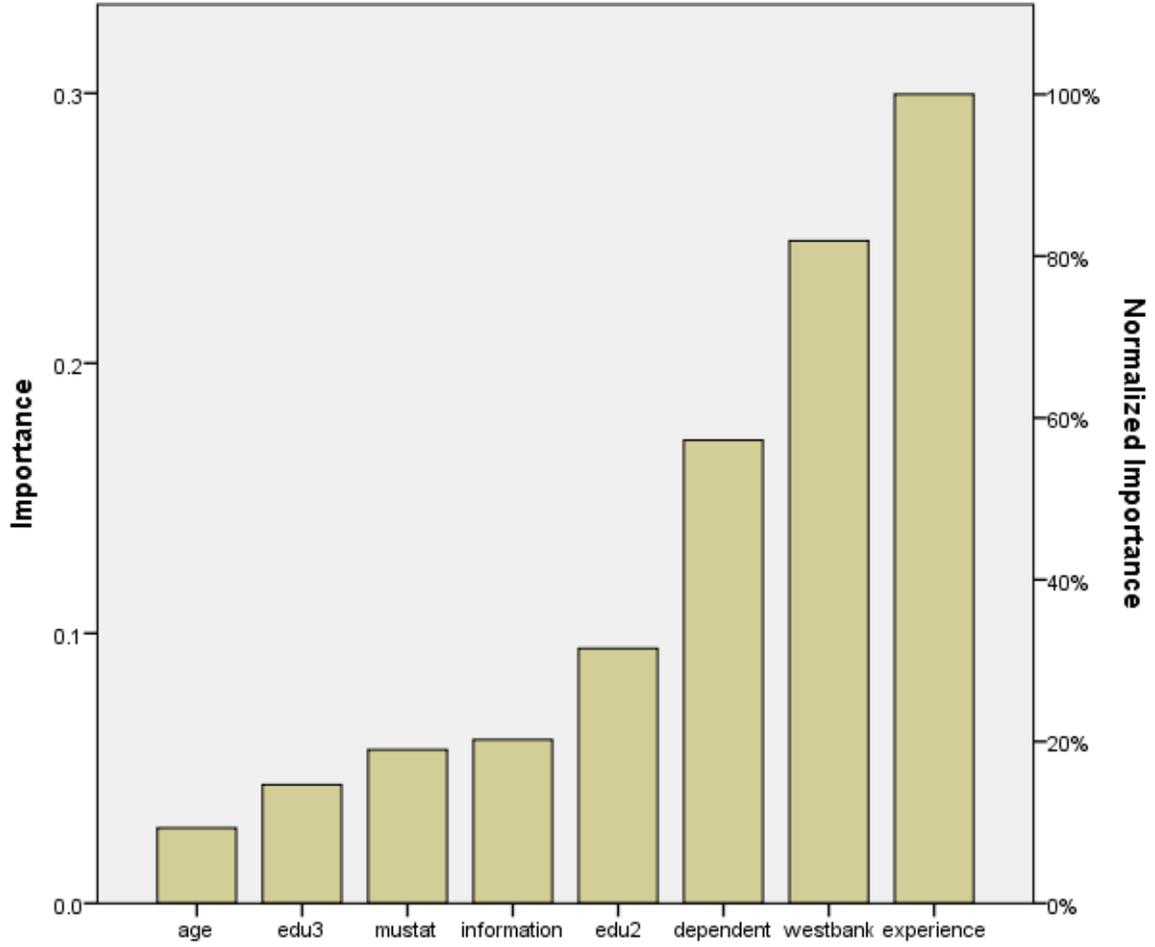


Figure 10: Normalized Importance Value of the indicators for ANN methods

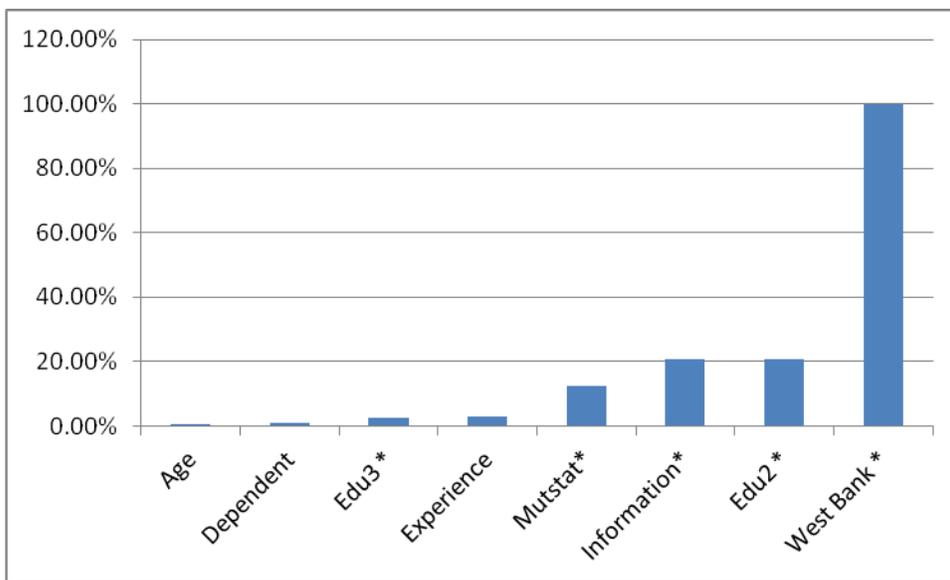


Figure 11: Normalized Importance Value of the indicators for LM methods

3.8. Conclusion

The Palestinian data show that Palestine has no comprehensive social security program. The pension coverage only includes public sector and professional unions employees. Despite privatization of pension funds internationally, the survey results shows that respondents prefer a public private partnership in the management of pensions in Palestine.

In this study I used logistic model and ANN model to study the determinants of employee decisions for pension subscription. The models have used the following explanatory factors: age of person, mutual status, number of dependent, years of work, knowledge on social security, location (West Bank or Gaza Strip) and level of education. The ANN model result is more valid and logical than the Logistic model.

The results show that there is significant difference between the attitude of workers to pensions in both the West Bank and the Gaza Strip when it comes to joining the social security system.

Moreover, there is no difference between males and females in terms of the decision to join social security in small enterprises.

There is a positive effect of knowledge of pensions and education on the possibility of joining a social security program.

In the ANN model, it is found that the years of work (experience) is the most important as it obtained the highest weight, followed by the location, the number of dependents, secondary education, knowledge of social security, mutual status, graduate education and finally the age of the person.

However, in the logistic model, the location obtained the highest weight, followed by graduate education, knowledge of social security, mutual status, the years of work, secondary education, the number of dependents and finally age of person.

3.9. REFERENCES

- Aaron, H. J. (1966), The Social Insurance Paradox, *Canadian Journal of Economics and Political Science* 32, 371-374.
- ADB (2006). Pension reforms for the unorganised sector.
- Administración Nacional de la Seguridad Social (ANSES), (2008). Reforma del Sistema Previsional Argentino, ANSES, Buenos Aires.
- Al –Barqawi, H.; Zayed, T. (2006). Assessment Model of Water Main Condition. Conference Pipelines, American society of civil engineering. Chicago, Illinois, July 30to August 2, 2006.
- Alawneh, Atef. (2011), Pension Reform in Palestine, Bank of Palestine, Ramallah – Palestine.
- Antolin, P. and Ponton, E. L. (2007). “The impact of tax incentives on retirement savings: a literature review,” *Proceedings of OECD/IOPS Global Private Pensions Conference*. OECD, Paris.
- Arenas de Mesa, A., & Bertranou, F. (1997). Learning from social security reforms: Two different cases, Chile and Argentina. *World Development*, 25, 329-348.
-
- Artificial Neural Networks: An Introduction. 2005.
- Asaminew, E. (2010). Adopting Private Pension System in Ethiopia. The African Symposium.
- Asociacion Internacional de Organismos de Supervision de Fondos de Pensiones (AIOS) (1999 to 2008) Boletín Estadístico AIOS, 1–18.
- Barr, N and P. Diamond (2006), “The Economics of Pensions” *Oxford Review of Economic Policy* 22.1,15-39.
- Barr, N and P. Diamond (2008), “Reforming pensions” *International Social Security Review*.
- Beard, S. (1996). Restoring hope in America: The Social Security solution. San Francisco: ICS Press.

- Bodie, Zvi. Alan J. Marcud and Robert C. Merton. (1988). *Pensions in the U.S. Economy* University of Chicago Press.
- Cichon, Michael (1999). “National defined-contribution schemes: Old wine in new bottles” *International Social Security Review*, 52(4/99), 87-102.
- Davis, P. (1997). “The reform of retirement income provision in the EU”, *The Pensions Institute Discussion Paper PI-9708*, Birkbeck College, University of London.
- Davis, P. (2005). *The Role of Pension Fund as Institutional Investors in Emerging Markets*, Seoul.
- Diamond, P. A. (1994). Privatization of social security: Lessons from Chile. *Revista de Análisis Económico*, 9, 21-33.
- Diamond, P. A. (1996). Proposals to restructure Social Security. *Journal of Economic Perspectives*, 10 (3), 66-88.
- Diamond, Peter. (1977). “A Framework for Social Security Analysis” *Journal of Public Economics*, pp 275 -298.
- Dreiseitl S, Ohno-Machado. (2002) Logistic regression and artificial neural network classification models: a methodology review. *J Biomed Inform*;35: 352–359
- Edwards, S. (1998). The Chilean pension reform: A Pioneering program. In M. Feldstein (Ed.), *Privatizing Social Security* (pp. 33-57). Chicago: University of Chicago Press.
- Feldstein, M. and J. Liebman, (2001). *Social Security*. National Bureau of Economic Research, Cambridge MA, Working Paper 8451.
- Feldstein, Martin. (1997), “The case for privatization”, *Foreign Affairs*, 76. 4. pp.24-38.
- Ferrara, P. and Taneer, M. (1998). *A new deal for Social Security*. CATO Institute, Washington, D.C.
- Figueroa, L. (2008) ‘Crisis financiera internacional y fondos de pensiones en Chile’, Superintendencia de Pensiones, Santiago de Chile, December.
- Geanakoplos, John, Olivia S. Mitchell and Stephen P. Zeldes. (1998). “Would a privatized social security system really pay a higher rate of return?” Wharton School of the University of Pennsylvania, Pension Research Council Working Paper 98-6.

- Gillion, C., & Bonilla, A. (1992). Analysis of a national private pension scheme: The case of Chile. *International Labour Review*, 131, 171-195.
- Graham, C. (1998). *Private markets for public goods*. Washington, D.C.: Brookings Institution Press.
- Guillén, J. & Mosqueda, R. (2013). "Pay as you Go System versus Fully Funded Pension in Peru," *revista ecos de economia*. Universidad eafit.
- Han, Jun; Morag, Claudio (1995). "The influence of the sigmoid function parameters on the speed of back propagation learning". In Mira, José; Sandoval, Francisco. *From Natural to Artificial Neural Computation*. pp. 195–201.
- Hu, Y. and F. Stewart (2009), "Pension Coverage and Informal Sector Workers: International Experiences", *OECD Working Papers on Insurance and Private Pensions*, No. 31, OECD publishing.
- IMF, 2007, *Medium – Term Macroeconomic and Fiscal Framework for the West Bank and Gaza*, report for the donors' conference, Paris, December 17, 2007.
- James, E. (1997). *New systems for old age security: Theory, practice, and empirical evidence*. (Policy Research Working Paper No. 1766). Washington, DC: World Bank.
- Kahneman D. Slovic P. and Tversky A. (2001). *Judgment under uncertainty: heuristics and biases*. Cambridge, England: Cambridge University Press,
- Kay, S. J. (1997). *The future of Social Security for this generation and the next*. Testimony before the Subcommittee on Social Security of the House Ways and Means Committee, U.S. House of Representatives.
- Kotlikoff, Martin. (1995). "Privatization of Social Security: How It Works and Why It Matters" *NBER Working Paper Series*, Paper No. 5330. Cambridge, MA 02138.
- Kritzer, B. E. (1996). *Privatizing social security: The Chilean experience*. *Social Security Bulletin*, 59 (3), 45-55.
- Kune. J. (2001), "The Controversy of Funding Versus Pay –As- You – Go: What Remains of the Debate?", *The Geneva Papers on Risk and Insurance* Vol. 26 No. 3 pp 418 -434.
- Landwehr, N., Hall, M., and Frank, E. (2005). *Logistic model trees*. *Machine Learning*, 59(1-2), 161-205.
- *Legislator's Guide to Nebraska Retirement Systems*, December 1998.

- Lo Vuolo, R.M. (2008) Promesas falsas y necesidades ciertas: acerca del proyecto de creación del Sistema Integrado de Previsión Argentino, CEIPP, Serie Análisis de Coyuntura, no 18, Buenos Aires.
- McCulloch, W. and Pitts, W. (1943). A logical calculus of the ideas immanent in nervous activity. *Bulletin of Mathematical Biophysics*, 5:115–133.
- Mesa-Lago, C. (2008). ‘Social protection in Chile: Reforms to improve equity’, *International Labour Review* 147 (4): 377–402.
- Mesa-Lago, C. (2009). ‘Re-reform of Latin American Private Pensions Systems: Argentinian and Chilean Models and Lessons’ *The Geneva Papers on Risk and Insurance. Issues and Practice* Vol. 34, No. 4, SPECIAL ISSUE ON THE FOUR PILLARS (October 2009), pp. 602-617
- Mitchell, Olivia and Zeldes, Stephen P. (1996) “Social Security Privatization: A Structure for Analysis” *The American Economic Review*, 86. 2, 1996 pp. 363 – 367.
- Najjar, Y, Basheer, I.; Hajmeer, M.(1997). Computational neural networks for predictive microbiology.:I. methodology. *International Journal of Food Microbiology* 34(1), 27-49.
- OECD website, <http://www.OECD.org>.
- OECD. (2008), *Latin American Economic Outlook 2008*, ISBN 978-92-64-03826-4.
- Opdyke, Jeff. (2000). “State Worker’s Pension Plans Spark Debate,” *The Wall Street Journal*, May 5.
- Orzag, Peter and Stiglitz, Joseph. (1999). "Rethinking Pension Reform: Ten Myths About Social Security Systems". Washington, DC, World Bank.
- Palmer, E. (2006), ‘What is NDC? in R. Holzmann and E. Palmer (eds), *Pension Reform through NDCs: Issues and Prospects for Non-Financial Defined Contribution Schemes*, Washington, DC, World Bank, 17–34.
- Piñera, J. (1999). A real solution to the Social Security crisis. Testimony before the Committee on Ways and Means, U.S. House of Representatives.
- Ponds, E., C. Severinson and J. Yermo (2011), “Funding in Public Sector Pension Plans: International Evidence”, *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 8, OECD Publishing.

- Queisser, M. (1999). Pension reform: Lessons from Latin America. (Policy Brief No. 15). Paris:OECD Development Center.
- Quiroga, Y. (2008) ‘De modelo ejemplar an objeto de enmiendas: El sistema de pensiones en Chile’, Nueva Sociedad 217: 24–38.
- Reid, Gary and Mitchell, Olivia S. (1995) “Social Security Administration in Latin America and the Caribbean.” *World Bank Report* 14006, Washington, DC, March 1995.
- Rodriguez, L. (1999), 18 Years of Private Pensions in Chile. Cato Institute <http://www.cato.org/publications/comm...-pensions-chile>.
- Samuelson, P. A. (1958), An Exact Consumption-Loan Model of Interest with or Without the Social Contrivance of Money, *Journal of Political Economy* 66(6), 467-482.
- Sayeh, W and Bellier, A. (2014). “Neural networks versus logistic regression: the best accuracy in predicting credit rationing decision”. World Finance & Banking Symposium held at Nanyang Business School, Singapore, December 12-13, 2014.
- Shimasawa, Manabu (2004),” Population ageing, policy reforms and endogenous growth in Japan: a computable overlapping generation approach” Economic and Social Research Institute, Tokyo, Japan.
- Sutton, R. S. and Barto A. G. (1998). Reinforcement Learning: An Introduction. The MIT Press, Cambridge, MA, Softmax Action Selection
- Tapia, W. (2008), "Description of Private Pension Systems", OECD Working Papers on Insurance and Private Pensions, No. 22, OECD publishing.
- The Portland trust (2007), Developing a Private Sector Pension System in the West Bank and Gaza Strip.
- Tu, J. V. (1996). Advantages and disadvantages of using artificial neural networks versus logistic regression for predicting medical outcomes. *Journal of clinical epidemiology*, 49(11), 1225-1231.
- Turner, J. (2001). Social Security Reform around the World. Washington D.C. Public Policy Institution.
- Tversky, A. and Kahneman, D. (1974). Judgment under uncertainty: heuristics and biases. *Science*;185: 1124–1131

- Vitas, D. (2003). The Role of Occupational Pension Fund in Mauritius. The World Bank. Policy Working Paper Series 3033.
- Vitas, D. (1998). Regulatory Controversies of Private Pension Fund. World Bank Working Paper No. 1893.
- Williamson, J. and Williams, M. (2013) “The Notional Defined Contribution Model: An Assessment of the Strengths and Limitations of a New Approach to the Provision of Old Age Security” Center for Retirement Research at Boston College (CRR). Chestnut Hill, <http://www.bc.edu/crr>.
- Willmore, Larry and Bertucci, Guido. (1999). “Public versus Private Provision of Pensions,” DESA Discussion Paper No. 1
- World Bank website, <http://www.worldbank.org>.
- World Bank. (1994). Averting the old age crisis policies to protect the old and promote growth. Oxford University Press.
- Verbic, Miroslav and Spruk, Rok. (2011). “Aging population and public pensions: theory and evidence” University of Ljubljana, Institute for Economic Research, Ljubljana.