

The Impact of Demographic Changes on Economic Growth in Egypt

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ABSTRACT:

Demographic changes have a strong impact on economy, especially in GDP and there are many of interconnections between them. The demographic variables had many changes in recent years. This study will describe some of demographic variables such as life expectancy at birth, Education rate of women to men, Relative distribution of the population by age group, Fertility rate, Labor force in Egypt during the period 1980 to 2010. This study will analyze and test if there is a significant relation between the demographic variables and GDP, it will also measure the impact on economic during this period. It will give an interpretation of these relationship and link between them whether positive or negative relation and calculate the regression equation to predict GDP depending on demographic variables using the regression in simple and multiple forms, linear and non-linear methods. This study will use statistical measures to test the efficiency of the estimates.

So it should take the most benefits of these changes and opportunities that arise from it, do more studies that illustrate these overlaps, prepare development and strategy policies which lead ultimately to achieve economic growth rates on short, medium and long run.

Key Words: GDP, economic growth, demographic changes, multiple regression.

INTRODUCTION:

Demographic changes have a significant economic impact. Accordingly we will examine the impact of demographic changes on economic growth of Egypt. The results in recent years show that the demographic changes changing significantly with the change in the labor force as well as a decrease in the dependency ratio, those changes give a great opportunity to short and medium term to boost the economy and growth. Reviewing the demographic transition in Egypt over the past 30 years, we find that Egypt witnessed a significant change in demographic characteristics.

This study is based on the description and analysis and interpretation of the links and relationships between these demographic changes and economic growth during the period from 1980-2010, such as the change in the fertility rate, which affects the population of all groups age, and the change in life expectancy at birth, and the change in the size of the labour force and its impact on the dependency ratio, and the change in population density, and the change in the contribution of women in the labor market, and the change in the educational level of women, where it had a significant impact on economic growth rates, and changes in the age structure of the population also has important effects on the economy in general .

IMPORTANCE OF STUDY:

The Importance of this study is to measure current demographic changes in Egypt, which change with clear rates such as population age structure, labor force, fertility rates, life expectancy at birth, women's education level and their participation in the labor force and change in dependency ratio which affects on the Gross domestic product (GDP) and thus influence the economic growth rate and use the better regression model to predict GDP depending on Demographic variables.

OBJECTIVES:

The main objective of this study is to investigate the relationship between changes in the characteristics of population and economic growth through a theoretical framework that defines that

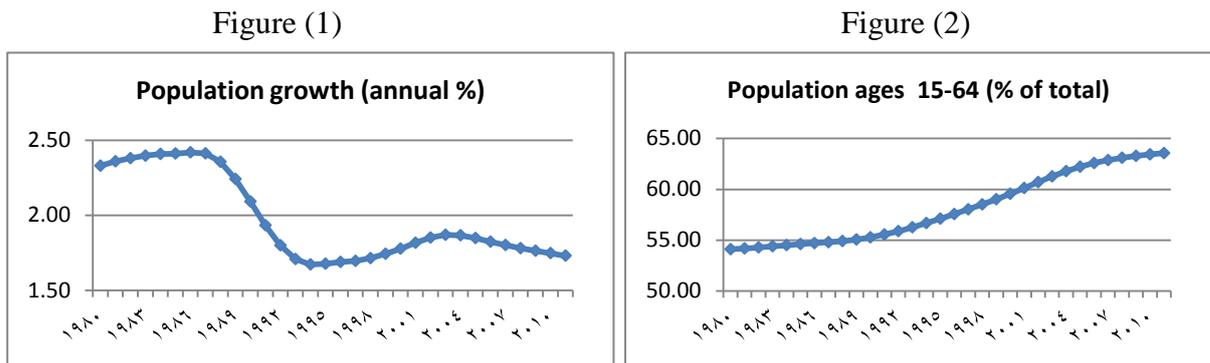
relationship. And describe and analyze the demographic variables affecting population growth and significant interpretation of the relations between these variables which related to the economy.

METHODOLOGY:

This study is based on the use of quantitative analytical and descriptive methods to study the demographic variables which affecting economic growth through uses the statistical analysis techniques in simple forms and multiple linear and non-linear regression and use statistical measures to test the efficiency of the estimates. This study based on time-series data for the variables that have been obtained from various sources for the period (1980-2010).

1. Description of some important explanatory variables:

1.1 Annual growth rate of the population:



Source: Figure 1,2 The United Nations Population Division's World Population Prospects The 2010 Revision.

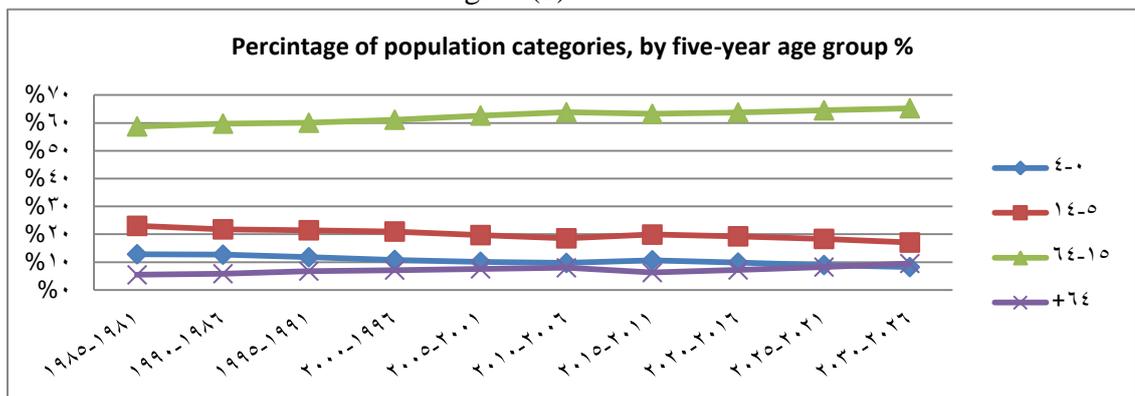
There are decreasing in annual population growth from 2.33 in 1980 to 1.73 in 2010 as we can see from figure (1) but The ratio of working age (from 15-65) to total population keeps increasing from 54% in 1980 to reach 63% in 2010 as we can see from figure (2).

1.2 The relative distribution of the population by age groups:

Figure (3) reveals three main features of the Egypt demographic transition:

- a. The ratio of working age (from 15-65) to total population keeps increasing until it will reach 65% in 2030. This obviously brings about potential for economic growth in one hand, and pressure on employment creation on the other hand.
- b. The ratio of old people is also on an increase from 5% in 1981 to around 10% in 2030. This sharp increase requires a well-built plan for health care system as well as social security.
- c. The ratio of young children (0-14) is decreasing and this decline is about enough to off-set the increase in the rate of population, leaving the number of young children remains unchanged or decreases a bit.

Figure (3)

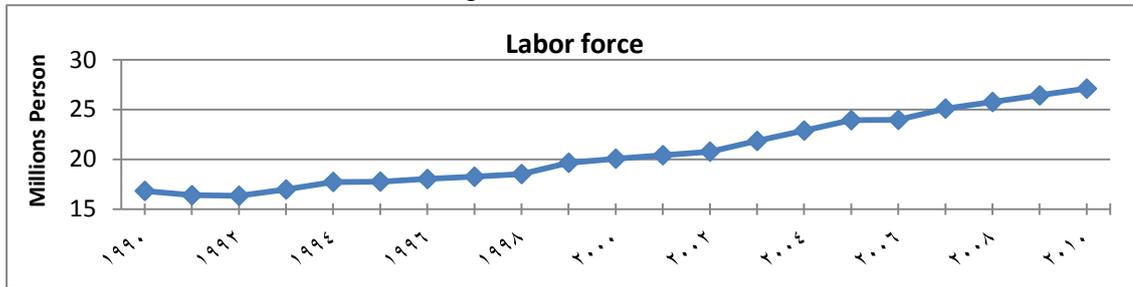


Source: The United Nations Population Division's World Population Prospects The 2010 Revision.

1.3 Labor force:

As a result of increased population category (15-64) years over the past 30 years as we can see from figure (4) it led to an increase in labor force from 16.8 to 27.1 million, mean increase of 58% and this leads to an increase in GDP per capita as increase in output of the labor force.

Figure (4)



Source: International Labour Organization, Key Indicators of the Labour Market database.

1.4 Total fertility (children per woman):

Egypt had a high fertility rate, it reached 5.7 in 1970-1975 and it was 4.5 in the world, while today it enjoys a rate that equal the world average level 2.7. The decline in fertility rate is most speedy since 1980-1985.

The total fertility rate in the world decline from 4.5 in 1970 to 2.5 in 2010 it mean decrease of 44% and in Africa it decline from 6.5 in 1970 to 4.5 in 2010 it mean decrease of 33% Also Egypt it decline from 5.7 in 1970 to 2.7 in 2010 it mean decrease of 52% as we can see from figure (5).

As a medium expected, the total fertility rate in Egypt will reach to 2.2 in 2030 as we can see from figure (6).

Figure (5)

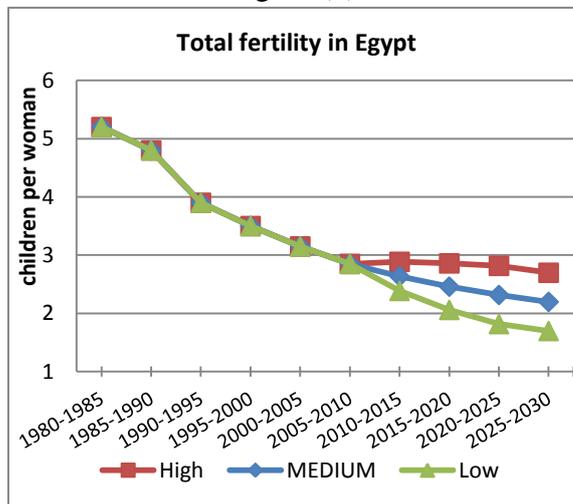
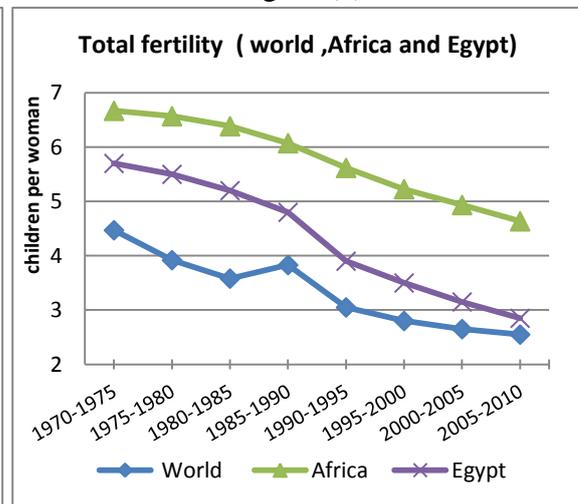


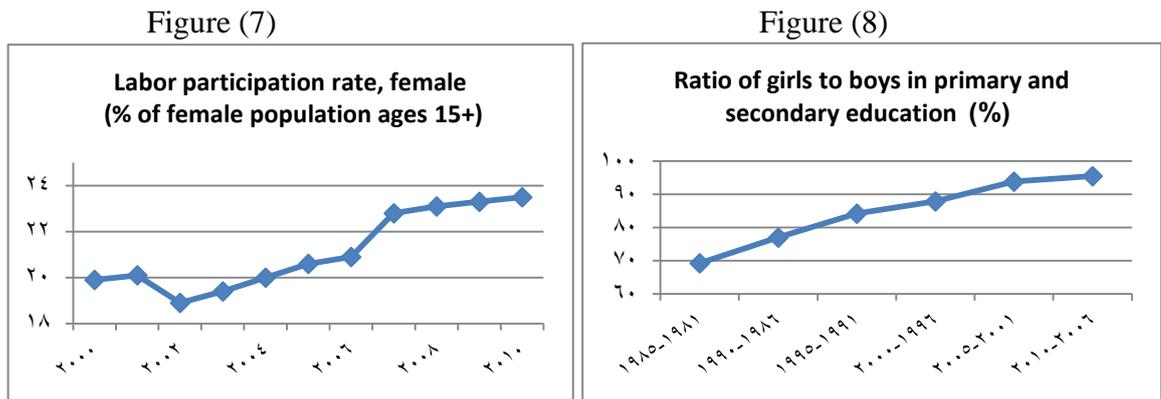
Figure (6)



Source: Figure 5,6 Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. World Population Prospects: The 2010 Revision.

1.5 Female Labor participation rate and their education :

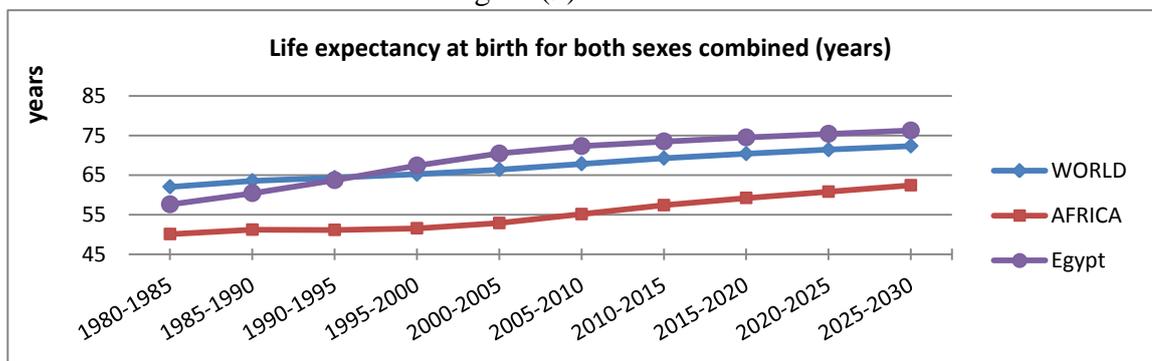
In the last years the Female Labor participation rate increase from 19.8 % in 2000 to 23.5 % in 2010 as we can see from figure (7) as a result of increase in female education and their skills as it is shown in figure 8 ,that lead to increase in number of labor force and its qualification.



Source: Figure 7. International Labour Organization, Key Indicators of the Labour Market database. Figure 8. UNESCO Institute for Statistics.

1.6 Life expectancy at birth:

Figure (9)



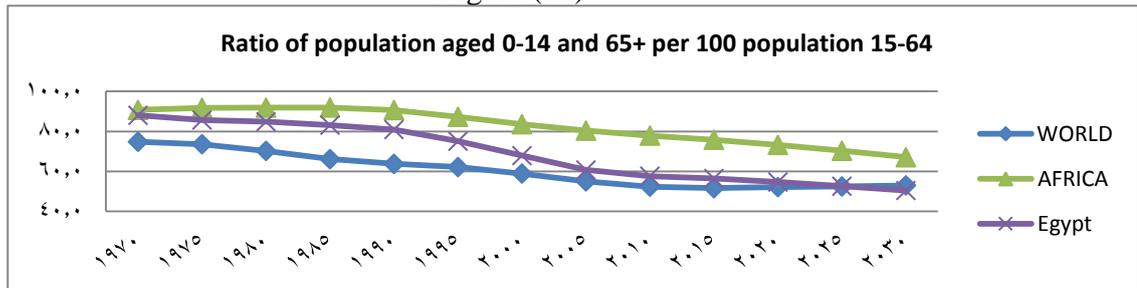
Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. World Population Prospects: The 2010 Revision. <http://esa.un.org/unpp>

In Egypt Life expectancy at birth as we can see from figure (9) increased from 57 to 73 years from 1980 to 2010, and Expected to reach 77 years in 2030 . It means that Life expectancy at birth in Egypt will increase 20 years through 50 years ,this result of improvement of the health care system of Egypt as well as the innovations in medicine. But Life expectancy at birth in the world increase 10 years and Africa increase 15 years only from the period (1980-2010).

1.7 Total dependency ratio

Total dependency ratio in 1970 in Egypt 90 % as equal to Africa Ratio but the world total dependency ratio 75 % in the same year , and in 2030 expected that ratio in Egypt to be less than world and Africa ratio and decrease 40 % to reach 50 % also the world ratio expected to be 52% and Africa 67% in the same year as we can see from figure (10) . This decrease in total dependency ratio in Egypt as a result of increase in labor force in the same period as we explained before.

Figure (10)



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. World Population Prospects: The 2010 Revision. <http://esa.un.org/unpp>

2. Analyzing and testing the relationship between some important explanatory variables:

Analyze and test relations between some demographic variables (Life expectancy at birth for both sexes combined, Ratio of girls to boys in primary and secondary education (%) , Population ages 15-64 (% of total) , Total fertility (children per woman), Labor force, Total dependency ratio) and measure the impact on GDP.

2.1 Multiple regression model of GDP on all demographic variables in the study:

Table (1) Coefficients ¹ Dependent Variable: GDP									
Model	Unstandardized Coefficients		t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error			Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-2892.792	2713.130	-1.066	.304					
PA	8.433	27.900	.302	.767	.968	.081	.010	.002	511.361
LF	3.306E-5	.000	4.168	.001	.991	.744	.134	.015	64.618
TF	-108.853	211.445	-.515	.615	-.959	-.136	-.017	.002	566.806
GE	.903	2.100	.430	.674	.885	.114	.014	.087	11.439
DR	17.156	19.174	.895	.386	-.955	.233	.029	.001	1.748E3
LE	16.836	12.602	1.336	.203	.913	.336	.043	.008	120.500

Source: by the author

It is clear that these demographic variables included in the model explain by 98.3% change that occurs in the GDP. And significant of F test emphasizes significant regression model as we can see from equation number (1), but in Table (1) we find multicollinearity² problem.

Multiple linear regression equation (1)

$$GDP = -2892.792 + 8.433 PA + 3.306E-5 LF - 108.853 TF + .903 GE + 17.156 DR + 16.836 LE$$

To ensure the multicollinearity problem between the independent variables it should be done a scatter plot (Matrix) to measure the correlation between the demographic variables to each other in the presence of GDP as the dependent variable so as not to affect those correlations for the next analysis.

It is clear that from Table (2) there are significant correlation relationships (strong, moderate) between demographic variables, whether positive correlation relationships such as fertility rate and dependency ratio (97%) or negative such proportion of the population in the age group of (15-64) and the dependency ratio (96%).

And also the Figure (11) Scatter plot matrix for independent variables of each other in the presence of the dependent variable GDP it show strong relationships between these variables, which in some variables reach to be linear.

It's clear that the multiple linear regression model is non significant and to avoid the problem of Multicollinearity it must use simple linear and quadratic regression models between each of the independent demographic variables on GDP as the dependent variable.

¹ Gross domestic product in constant prices (GDP) , Life expectancy at birth for both sexes combined (LE) , Ratio of girls to boys in pre-university education (%) (GE) , Population ages 15-64 (% of total) (PA) , Total fertility (children per woman) (TF) , Labor force (LF) ,Total dependency ratio (DR).

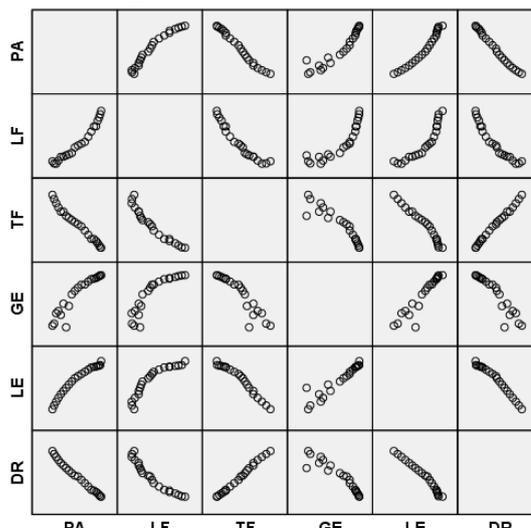
² Multicollinearity is a problem in multiple regression that develops when one or more of the independent variables is highly correlated with one or more of the other independent variables.

Table (2)
Scatter plot (Matrix) for all Variables

	GDP	PA	LF	TF	GE	DR	LE	
Pearson Correlation	GDP	1.000	.968	.991	-.959	.885	-.955	.913
	PA	.968	1.000	.973	-.993	.939	-.996	.975
	LF	.991	.973	1.000	-.963	.880	-.958	.910
	TF	-.959	-.993	-.963	1.000	-.929	.998	-.982
	GE	.885	.939	.880	-.929	1.000	-.940	.944
	DR	-.955	-.996	-.958	.998	-.940	1.000	-.987
	LE	.913	.975	.910	-.982	.944	-.987	1.000
Sig. (1-tailed)	GDP	.	.000	.000	.000	.000	.000	.000
	PA	.000	.	.000	.000	.000	.000	.000
	LF	.000	.000	.	.000	.000	.000	.000
	TF	.000	.000	.000	.	.000	.000	.000
	GE	.000	.000	.000	.000	.	.000	.000
	DR	.000	.000	.000	.000	.000	.	.000
	LE	.000	.000	.000	.000	.000	.000	.

Source: by the author

Figure (11)
Scatter plot for all Variables on GDP



Source: by the author

CONCLUSION:

- Egypt faced during the past 30 years to clear changes in the demographic characteristics where the annual population growth rate dropped from 2.33 in 1980 to 1.73 in 2010, The proportion of the population (15-64) to the total population increased from 54% in 1980 to 63% in 2010, Labor force increased from 16.8 million in 1990 to 27.1 million in 2010, an increase average of 58%, The fertility rate decreased from 5.7 on average during the period from 1970 to 1975 to 2.7 during the period from 2005 to 2010 and will reach almost 2.2 on average as expected in 2030, Participation rate of women in the labor market increased from 19.8% in 2000 to 23.5% in 2010, Life expectancy at birth increased from 57 years to 73 years from 1980 to 2010 and expected to continue this increase to up to 77 years in 2030 and finally Dependency ratio fell from 90% in 1970 to 57% in 2010 and expected to decline this rate to reach 50% in 2030.
- Demographic changes have strong impact on the economy and especially GDP and gathered many of the interconnections and must make the most of these changes and opportunities that arise from it and do more studies that illustrate these entanglements and prepare development and strategy policies which leading ultimately to achieve economic growth rates on Short-term timeframe, medium and long term.

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