

# Measuring the Elasticities of Poverty Indicators to Growth and the Degree of Inequality of Income Distribution “An applied study on the Egyptian economy”

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## Abstract:

This study aims to measure the elasticity of different poverty indicators for each of the economic growth and the degree of inequality of income distribution and access to calculate the marginal substitution between growth and the relative degree of justice .

The study found that there are opposite directions to the effects of growth and inequality on poverty indicators in Egypt for some periods, it could have been more volume if coupled with the growth process for the redistribution of targeting individuals poorer. This study also found that the growth is more effective in reducing the ratio of the poor people (poverty headcount ratio) compared to the other highest-ranking indices (the poverty gap, severity of poverty), which the policies associated with the income distribution occupies the of priority.

**Keywords:** Poverty, Economic Growth, Income distribution, Elasticity of poverty

## 1. INTRODUCTION:

Understanding the potential relationships between distribution, growth and poverty is the real challenge to a development strategy for poverty alleviation. The recent period has witnessed an increase in the number of studies analyzing the relationship between economic growth, the degree of inequality in the distribution of income and the level of poverty. These studies unanimously agreed on a number of facts that have been settled through observations in various countries of the world.

There is considerable agreement on the importance of economic growth in poverty reduction. Countries with the best rates of poverty reduction are those with long periods of sustained growth (dollar and Kraay 2001). For example, over the period 1981-2000, China achieved a significant reduction in poverty rates from 50% to about 8%. As a result of average per capita income growth of 8.5% per year, Vietnam succeeded in halving poverty rates through 1993-2003, from 58% to 29%, with an average annual growth rate of 6% (López, 2006).

Evidence also points to the importance of equitable income distribution in achieving a significant reduction in poverty (Ravallion, Martin, Squire, and Bruno, 1996). Working to link economic growth to income redistribution in favor of lower-income groups will reduce poverty more than if growth is neutral impact on income distribution. Poverty reduction will also be more responsive to growth whenever it is accompanied by greater equity in income distribution.

In Ethiopia, for example, growth could have reduced the number of poor individuals by about 31% between 1981-1995 if income distribution had stabilized, but as a result of changes in distribution that contributed to a 37% increase in poverty, the net effect is about 6%. For the period 1996-1999, the case of Indonesia shows a different situation from that in Ethiopia, where it showed that greater equity in income distribution was offset by the adverse impact of growth on poverty (Bourguignon, 2004).

This study analyzes the two-way relationship between growth and the degree of inequality in income distribution. In addition, the study also try to address the relative weight of both growth and income distribution in poverty reduction at the theoretical and applied levels and calculate the elasticity of poverty indicators for growth and the degree of inequality.

The rest of the article is organized as follows. Section 2 describes the general trends of the role of growth and income distribution in the evolution of poverty indicators in Egypt, followed by a section 3 that reviews the literature. Section 4 presents the methodology and empirical results. Section 5 has a conclusion.

## 2. GENERAL TRENDS OF THE ROLE OF GROWTH AND INCOME DISTRIBUTION IN THE EVOLUTION OF POVERTY INDICATORS IN EGYPT:

The study pointed out that during the period 81/1982-90/1991 there was a decrease in the average per capita income as well as the deterioration of the distribution of income, which increased the number of poor. The decline in the average annual real GDP growth rate in the 1980s to below 4%

according to The World Bank estimates, was associated with an increase in the Gini coefficient from 29.6 to 35.1, pushing poverty measures to increase from 29.8% to 39.1% according to the highest poverty line and from 17% to 25% according to the minimum poverty line (Human Development Report, 1996).

However, the percentage of the poor tended to decrease at the beginning of the second half of the nineties, where it recorded 19.41% of the population estimated by Laithi and Khairuddin based on the minimum poverty line, and this decline in poverty measures associated with the trend of income distribution to improve where the Gini coefficient was 31.6 in 1995 compared to 35.1 in 1991, despite a significant decline in economic growth rates coinciding with the first phase of the monetary and financial reform program.

The significant economic growth in the second half of the 1990s (World Bank data of 6.3% in 1998/99) has reduced poverty, although the Gini coefficient has risen to 36.2. Therefore, estimates of Laithi and Khairuddin estimates based on the lower poverty line indicate that the percentage of poor in the second half of the 1990s decreased from 19.4% in 1995/96 to 16.74% in 99/2000 (Khair al-Din and Laithi, 2006).

The poverty rate in Egypt tended to increase in the years (2000-2005) reaching 19.56% in 2004/2005 according to the minimum poverty line in the estimates of the Egyptian Human Development Report 2005, thus slightly exceeding the level in 1995/1996 after falling to 16.7% during 1999/2000. This shows that many individuals who have crossed the poverty line during the period 1995/96 to 1999/2000 have returned to it again in the next five years. This increase in poverty rates was associated with a fluctuation of the economic growth rate during this period from 3.2% in 2002/03 to 4.5% in 2004/05, compared to a slight improvement in the distribution of income, where the Gini coefficient decreased to 32 in 04/2005 (Egyptian Human Development Report, 2005).

The percentage of poor people continued to increase according to the low estimates of the poverty line in the Income, Expenditure and Consumption survey for the years (2008/2009, 2010/2011), where these estimates recorded 21.6% in 2008/2009 and then jumped to 25.3% in 2010/2011. This increased trend of poverty measures has been associated with a relatively stable distribution of income, where the Gini coefficient reached 31 in the years 2008/2009 and 2010/2011, against the fluctuation of economic performance between achieving relatively high growth rates of 7% annually during the fiscal year (2005/2006), and low growth rates during the years 2008/2009, 2010/2011 due to the negative impact of the global financial crisis in (2008/2009) and the January 25 revolution in 2011 on economic performance. Poverty rates continued to rise until they reached 26.3% in 2103

According Central Agency for Mobilization and Statistics (CAPMAS) in Egypt Poverty rates in the country increased to 32.5% the population by the end of the fiscal year 2017/2018, compared to 27.8 percent in 2015/2016.

In general, economic growth in the Egyptian economy has not been sufficient to achieve a significant reduction in poverty

rates over the period under review, as structural changes and economic policies are far from optimal for achieving sustainable development and an acceptable level of fair distribution of income (Touny, 2017).

### 3. LITERATURE REVIEW

Economists are interested in examining the relationship between economic growth and income distribution. There are many channels through which economic growth can affect income distribution and welfare. As part of the development process, economic growth leads to a reallocation of resources across sectors and a change in relative prices and factor returns, which has a direct impact on income distribution.

The hypotheses of labor market incomplete and inter-sectoral variability have been the main theoretical explanations for the Kuznets curve known as U invert, which links inequality and development for 50 years in many developed and underdeveloped countries. The large changes in the structure of the economy during the development process and the incomplete labor market prevent the transfer of employment between sectors that do not clearly benefit from the development process to those whose share is greater than this development, which creates an increasing disparity in labor productivity between these sectors. Causes deterioration in income distribution.

The improvement in income distribution begins with the progress of economic activity as a result of development, since increased national income will enable the State to develop social policies that will reduce income inequality. The wider and better spread of development-driven education will also contribute to the building of human capital, which provides better areas for work and higher incomes

The traditional model presented by Stiglitz (1969) also clarified the same idea by accumulating capital returns that increase at the beginning of the growth stages and are obtained by the rich until the economy reaches a level where marginal returns on capital may decrease, while the marginal returns of human capital may rise. The distribution of income tends to be a better degree of equity.

The Kuznets hypothesis was tested during the 1970s in several economic studies, based on cross-sectional data (where countries were used as observational units), where an econometric relationship was expressed in which the variable of inequality of distribution was expressed (expressed in a Gini coefficient or The share of the richest 20% of the population to the share of the poorest 20% of the population), and the independent variable with the average real per capita income is expressed as a non-linear function. Through these estimates, Oshima (1970) came to confirm this hypothesis, as Ahluwalia (1976) described it as a distinct fact, and even Robinson (1976) considered it an economic law.

The Kuznets hypothesis has been widely criticized from the point of view of development policy formulation in developing countries during the 1990s. The study was conducted by Ravallion, Martin, Squire, and Bruno. (1996)

addressed the thesis by using data collected from 63 surveys over the period 81-92 to cover 44 countries. It concluded that there was no evidence to support Kuznets' hypothesis of an inverted U-shape, ie, no significant correlation between growth and degree of inequity. This is also confirmed by previous results obtained from small samples by the World Bank (1990).

Many subsequent studies have also suggested that there may be a relationship between development and inequality in distribution in a form contrary to Kuznets, for example, dollar and Kraay (2001) found that, on average, the income of the poorest 20% of the population would rise in proportion to average incomes.

In general, it can be argued that growth will not necessarily lead to a deterioration in income distribution. Growth may occur with an improvement in income distribution. Similarly, growth does not mean dispensing with accompanying policies that limit its potential negative impact on income distribution (Ghamri, 2008)

On the other hand, several studies have examined the impact of equity in income distribution on economic growth. In this regard, Arthur Okun (1975) noted that equity in income distribution can reduce growth efficiency. Increased equity in income distribution can reduce incentives for work and investment, as well as the high cost of mechanisms associated with redistributive efforts such as imposing some tax adjustments or minimum wages.

On the contrary, a relatively recent trend has emerged that distribution equity may be pro-growth and that lower growth rates are associated with higher levels of income inequality. This trend was led by Galor and Zeira (1993), which was supported by the emergence of several experimental researches by Tabellini and Persson (1994), Alesina and Rodrik (1994). These studies have suggested several mechanisms that could explain the positive impact of progressive redistribution on growth. First, the more the distribution worsens in a society where resources are concentrated in the hands of venture capitalists, it is a motivation for governments to raise tax rates above their optimal levels of redistribution, thereby reducing savings, investment and growth. Second, deteriorating distribution is a potential source of social tension that impedes the process of development, which requires a degree of political and social stability. Third, the imperfect credit market suggests that the redistribution of capital from enterprises or rich individuals to poor capital and credit-constrained people will increase efficiency, investment and growth.

In addition, the Berg and Jonathan (2011) study went further in that equity in income distribution is the most important factor in promoting and sustaining growth. The study measured the correlation between the period of continued growth and the differences in characteristics and policies between countries. It concluded that the level of equity in income distribution is the main difference between countries that have succeeded in continuing to grow rapidly over long periods of time, and others that have experienced growth over short periods, taking into account the importance of many other factors such as the quality of economic and political

institutions. Outward economy, macroeconomic stability, human capital.

Several other empirical studies have more accurately assessed the relative role of growth and distribution in poverty changes using simulation modeling by demonstrating the effect of initial levels of per capita income and level of inequality on the value of partial elasticity of poverty to growth rate in average income and inequality.

López and Servén (2005) used a simulation model to demonstrate the effect of different combinations of Gini coefficient and per capita income level of the poverty line on the partial resilience of the three poverty indicators (Poverty Ratio, Poverty Gap, Poverty Acuity), which confirmed the results of the Bourguignon study(2003), which suggests that increasing the degree of inequality in income distribution reduces the effectiveness of growth towards poverty reduction, which means that the value of partial poverty elasticity to growth is low. In addition, increasing the degree of inequality (Gini coefficient) with constant per capita income will decrease the value of partial poverty resilience to inequality, ie, high levels of inequality have a multiplier negative impact on poverty reduction, so effective redistribution policies may have multiplier effects: Immediate poverty reduction through distributional impact, and future poverty reduction as a result of increased poverty sensitivity to growth. The analysis also indicated that low per capita income levels are also an impediment to poverty reduction attempts, as they will reduce the partial elasticity of the three poverty indicators to growth and income distribution.

In this context, the Bigsten and Shimeles (2003) study indicated that the optimal strategy for prioritizing growth and distribution in order to reduce poverty will vary from country to country depending on the conditions in each country. A change in income distribution is more important for middle-income countries with greater inequality in income distribution, and thus policymakers may be more willing to accept a decline in growth versus reducing inequality. Growth is relatively more important for low-income countries with less inequality in income distribution, meaning that they will be able to withstand declining income distribution in return for faster growth. In sum, achieving the maximum possible reduction in poverty will depend on the replacement rate, ie the ratio of poverty elasticity to the change in the Gini coefficient ( $\eta_{pg}$ ) and the poverty elasticity to the growth rate in the average income( $\eta_{py}$ ), as shown in equation (1):

$$v = \eta_{pg} / \eta_{py} \text{ --- (1)}$$

Thus, the effectiveness of redistribution as a poverty reduction tool would be low if the replacement rate ( $v$ ) was low, while the redistribution strategy would be more effective if the replacement rate ( $v$ ) was high value. in general, the results of the empirical studies did not settle on the specific impact of income distribution on growth, where some of these results showed a positive impact of justice, while others showed a negative impact. Therefore, studying the characteristics of each economy individually occupies an

important place in understanding the direction and determining the relationship between the degree of equity in income distribution and economic growth.

marginal proportion ratio of substitution (MPRS) between average spending and income distribution index measured by Gini coefficient.

#### 4. METHODOLOGY AND EMPIRICAL RESULTS

This part of the study aims to measure the relative contribution of both growth and the degree of inequality of income distribution to the evolution of poverty rate in the Egyptian economy over the period under study by relying on the Kakwani static approach Kakwani (1997), which aims to estimate poverty changes due to the change in average spending and the change in the distribution of this expenditure, using the Lorenz curve to measure the elasticity of the FGT (poverty impact, poverty gap, severity of poverty) to change in both average spending (assuming constant distribution of income) and a change in the Gini coefficient (assuming constant average Spending).

Change in poverty is expressed as a function of growth in average income and changes in income distribution.

**Change in poverty = d (growth, change in income distribution)**

The above relationship is expressed by the following equation:

$$p = \eta_{py}y + \eta_{pg} \cdot g \dots \dots \dots (2)$$

Where P: change in poverty, y: rate of income growth, g change in the Gini coefficient,  $\eta_{py}$  is the partial elasticity of poverty to growth Assuming the degree of inequality is constant (elasticity here is negative),  $\eta_{pg}$  is the partial elasticity of poverty to inequality with the assumption that the average Per capita income is constant (elasticity here is positive).

The previous equation indicates that the change in the level of poverty over time has two components: one is called the growth component and the other is the component of inequality in the distribution of income. The growth component measures the effect of growth in per capita income on poverty with the assumption of inequality constant; on the contrary, the inequality component measures the change in poverty due to the change in inequality with the assumption of average income (Datt and Ravallion, 1992).

This study uses the data of the Central Agency for Mobilization and Statistics (CAPMAS) based on income, expenditure and consumption surveys for the period 1991-2015. Income, Expenditure and Consumption Surveys for the period 1991-2015. The researcher will also use the statistical package DASP to analyze this data and get the results of some of those surveys obtained.

Table (1) presents the results of the static approach of Kakwani (1993), where the elasticity of the FGT measures (poverty impact H, PG poverty gap, FGT poverty) is presented for change in both average spending (assuming constant distribution of income) and change in Gini coefficient ( Assuming constant average spending), the

**Table (1)**

**The elasticities of poverty indicators for growth and the degree of inequity**

	Poverty indicator	elasticity of poverty to average spending	elasticity of poverty to Gini coefficient	MPRS
1990/1991	H	-1.85	3.15	-1.7027
	PG	-2.79	7.47	-2.67742
	FGT	-3.71	11.75	-3.16712
1995/1996	H	-3.49	2.77	-0.7937
	PG	-5.57	6.22	-1.1167
	FGT2	-7.68	9.68	-1.26042
1999/2000	H	-3.57	3.43	-0.96078
	PG	-5.74	7.47	-1.30139
	FGT2	-7.94	11.54	-1.4534
2004/2005	H	-3.05	2.83	-0.92787
	PG	-4.1	5.72	-1.39512
	FGT2	-4.72	8.22	-1.74153
2008/2009	H	-3.45	2.25	-0.65217
	PG	-4.28	4.44	-1.03738
	FGT2	-4.92	6.52	-1.3252
2010/2011	H	-2.98	1.82	-0.61074
	PG	-3.94	4.02	-1.0203
	FGT2	-4.71	6.1	-1.29512

- Estimates for the years (1990/1991), (1995/1996), (1999/2000), (2004/2005), according to different indicators of poverty from: Hanaa Khair Al-Din and Heba Al-Leithi "The relationship between economic growth and distribution of income and reduction of Poverty in Egypt 1991 \ 1990 - 2005/2004 "Working Paper No. 115, The Egyptian Center for Economic Studies, Cairo, 2006, Supplement No. 3.
- Estimates for the years (2007/2008), (2010/2011) according to the different poverty indicators from the researcher's accounts according to the household income, spending and consumption surveys.

**According to the outputs of Table No(1), we extract the following results:**

**First:** For all measures of poverty - the incidence of poverty, the poverty gap, and the severity of poverty - the absolute

value of the elasticity of poverty indicators for average spending and poverty indicators for a Gini coefficient is greater than one over the period under study. Accordingly, poverty will decrease more than the growth in average spending if income distribution remains constant, and any increase in the degree of inequality in income distribution (with other factors remaining constant) will lead to increased poverty indicators at a greater rate.

**Second:** The results indicate that the three poverty indicators were more responsive to the growth in average spending during 1999/2000 compared to other years, while the lowest response was in 1990/1991, which indicates that the increase in average consumer spending during 1999/2000 It would have reduced all measures of poverty more than in other years of surveys, and the rate of reduction was the lowest in 1990/1991. On the other hand, the elasticity of the poverty measures of the inequity index (Gini coefficient) was also higher during 1999/2000, although the corresponding elasticity in 1990/1991 was close to it. While the elasticity with respect to the Gini index was lower in 1995/96, 2004/2005. This implicitly indicates that any relative change in the Gini coefficient would change the poverty measures in 1990/1991 and 1999/2000 at a relatively higher rate than what happened in 1995/96 and 2004/2005. This indicates an increase in the poverty measures response to changes in income distribution in 1990/91 and 1999/2000.

**Third:** For all periods of study, the elasticity of poverty for economic growth and to inequality in income distribution will increase with the increase in the rank of the poverty measure. In other words, the elasticity of poverty will increase as the measure becomes more sensitive to income transfers between the poor. One of the most important indications of this result is that economic growth can improve the situation of the poorest people when it is not accompanied by a rise in the degree of inequality in the distribution of income.

**Fourth:** The relative marginal substitution rate (MPRS) between growth and the degree of inequality indicates the rate of increase required in the average spending to offset the increase in the Gini index by 1% in order to maintain a stable level of poverty, and that growth will be more effective in reducing poverty at the lower values for this rate. The results also, indicate that the values of the relative marginal replacement rate (MPRS) decreased to less than the correct one in all study years except 1990/1991 in relation to the numerical index of poverty(H). Referring to any value of the income inequality, we will find that incomes must be increased at a lower rate (that is, MPRS <1) in order to maintain a stable level of poverty. However, if you focus on other poverty indicators (poverty gap, poverty severity), that is, focus on the conditions of the poor, we will find that the average spending should be increased at a rate greater than the increase in the Gini coefficient in order to maintain a constant level of poverty.

To underline this, a 1% increase in the Gini index would require growth in average spending ranging from 0.61% in 2010/2011 to 1.7% in 1990/91 if the numerical index of poverty(H) was focused, while those rates would range from 1.29% to 3.17% for the same two years when attention is

focused on the poverty intensity index. Accordingly, a certain level of economic growth combined with a higher level of income inequality can be sufficient to reduce poverty, but not enough to improve the situation of the poorest. This is the case when economic growth is sufficient to allow people closest to the poverty line to cross it. We conclude from this the need to distinguish between policies aimed at reducing poverty and those that seek to improve the situation of the poorest.

## CONCLUSION

This study examines some of the facts that have been settled in the light of many experimental studies in various countries of the world. It also analyzes the bi-directional relationship between growth and the degree of inequality in income distribution. In addition to addressing the role and relative weight of both growth and income distribution in poverty reduction at the theoretical and applied levels by addressing the relative contribution of both growth and inequality in income distribution to the evolution of poverty rate over the period under study, through relying on Kakwani (1997), by calculating the elasticity of poverty indicators for growth and the degree of inequality in income distribution.

The study found that there are conflicting trends of the effects of growth and inequality on poverty indicators. Thus, the extent of the decline in poverty indicators in Egypt for some periods would have been more significant if growth had been accompanied by a process of redistribution of income targeting the poorest individuals. The results also indicated that the effect of the growth component (expressed as expenditure) exceeded the income distribution component in determining the trend of changing poverty indicators, except for the sub-period (1990 / 1991-95 / 1996). The results of the study also indicated that growth is more effective in reducing the proportion of the poor (the numerical poverty index) compared to other higher-level indicators (poverty gap, poverty severity) in which distribution-related policies take precedence, that is, it is necessary to distinguish between policies that aim to reduce The number of the poor and those seeking to improve the conditions of the poorest of the poor.

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