

The Relationship Between Economic Growth and Income Inequality

Nasfi Fkili Wahiba

ResearchUnit "Enterprise Economy Environment"
HigherInstitute of management, University of Gabes, Tunisia.
Email: Nasfiwahiba@yahoo.fr

Malek El Weriemmi

ResearchUnit "Enterprise Economy Environment"
HigherInstitute of management, University of Gabes, Tunisia.
Email: Malek.el-weriemmi@laposte.net

ABSTRACT: The objective of this work is to study the nature of the relationship between income inequality and economic growth in Tunisia. To do this, we started with a review of the literature. Then we conducted an empirical study on the Tunisian case over the period 1984-2011. The main results show that economic growth and openness exchange constituted aggravating factors of inequalities and that these effects are accentuated with the accelerated process of trade liberalization in the country. However, human capital and financial development appears to have contributed to the alleviation of this problem. The second result shows that inequality had a negative effect on economic growth and that this effect appeared more after the acceleration of the process of opening exchange. This result can be explained by the fact that the country has reached an "unbearable" level of inequality. Similarly, it can be explained by the failure of redistribution policies.

Keywords: Inequality; growth; liberalization; Tunisia

JEL Classifications: F61; O40

1. Introduction

The first reference works, focusing on the link between the level of inequality and economic growth, are due to Kuznets. He had proposed a general law from the analysis of the historical evolution of inequality during the development process. The study was conducted on two industrial economies those of Germany and the United Kingdom. The Proposed law by Kuznets has structured debate and field analysis links between growth and inequality.

Later in the 90s, many studies were focused on the relationship of reverse causation from inequality to growth. In this regard most empirical research has shown a negative relationship. We are interested, as well, to the different approaches in order to specify the relationship between growth and inequality.

Kuznets had proved the hypothesis of a curve inverted U-shaped by linking the gross domestic product per capita to the level of inequality in income distribution. In this context, the unequal distribution of income seems endogenous to the development process. In fact, the first time, the development tends to increase inequality, but beyond a certain threshold, the trend is reversed, inequality stabilizes, then decrease until it reaches the lowest level that can be seen in the industrialized economies.

The inverted U curve shows that the process of economic development reflects a transition from an agrarian economy with low productivity to an industrial economy with high productivity. In this context, the explanation Kuznets results of a dual economy model characterized by the presence of both agricultural and industrial sectors. According to this explanation, the evolution of inequality is attributed to the reduction in the share of the agricultural sector, designed as the traditional low-productivity sector in the economy and its replacement by the industrial sector. In this context, the

differential development of the sectors produces a movement of labor from low-productivity sectors to high-productivity sectors, this is reflected by an increase in income inequality.

Indeed, during the first phases of development, some members of the population are more likely to benefit than others, which leads to a clear trend towards increasing inequality between those who benefit and those who have not been. In addition, the onset of the economic development process can lead to side urbanization by capital accumulation, concentration of savings and an increase in the overall level of education which benefits only a part of population. However, following the Kuznets hypothesis, all mechanisms will be reversed after some time and the development gains will be shared by the entire population. In this context, a reduction in inequality would be considered.

Moreover, the advanced explanation by Kuznets concerning the pace in inverted U was based on technological change and its impact on the demand for capital and skilled labor. Also, advancing the hypothesis of inverted U curve, Kuznets showed that the level of development is a key factor in the evolution of individual income distribution. The latter seemed more unequal in developing countries than in developed countries.

Advanced by Kuznets hypothesis have been several empirical studies to analyze the relationship between economic growth and inequality. They were in fact considered laws to some economists, although they are also judged very simple by others who believe that the evolution of inequality, as a phenomenon, is much more complicated than suggested by the theory of inverted-U curve.

Since the 60s to the early 90s, many studies have focused on the study of the causal relationship from growth to inequality in line with studies of Kuznets. So Kravis (1960) confirmed that the increase in income inequality is inevitable in the first stages of development seen a minority of the population benefits. While with continued growth and the creation of new sources of employment, the general equality of distribution may improve and may actually reduce disparities. Besides the confirmation of the hypothesis of an inverted U, Kravis was the same opinion as Kuznets for the great disparities between developed countries and other developing.

On the same basis, Stiglitz (1969) showed that taking into account the heterogeneity of income and wealth has to justify that inequality increases during the first phases of development and then decreases when the turning point is reached. Ahluwalia (1976) conducted a study of sixty countries, which he shared populations into three groups starting with 20% richest, then 40% poorest and finally 20% median. Through this process, Ahluwalia suggested that the most-robust part of the Kuznets curve was the right one because inequality has tended to decrease with economic development.

Later, following the approach of Kuznets Cromwell (1977) emphasized the dualistic nature of the economy consists of a modern capitalist sector and other traditional in order to confirm the inverted U curve. In this context, inequality is increasing at reversal point when the modern sector will be able to absorb 40% of the labor force and eventually decrease with attenuation of dualism.

Similarly, Papanek and Kyn (1986) Eusufzai (1997) and later Treillet (1999) demonstrated the Kuznets hypothesis. Indeed, Treillet concluded that Latin America has reaching the point of inflection of the curve assuming that reducing inequality will be with the development of the economy. This hypothesis has been validated by Lee (2006).

Frazer (2006) conducted a cross-country comparison on the evolution of inequality in income distribution within each. In the case of Korea, it has proved the hypothesis of the inverted U curve. Thus, it is noted that many studies dealing with the relationship between income inequality and economic growth have come to corroborate the Kuznets curve, designed among development economists almost as a law.

However, other studies have questioned the validity of the curve, suggesting that even if the inverted U-shape seems to be valid for several developed economies, this is not the case for the less developed economies where the hypothesis is largely unconfirmed. At this point, Li, Squire and Zou (1998) confirmed, from the introduction of the temporal dimension, the non-significance of the Kuznets hypothesis. The authors suggested that the increase in inequality was inevitable in the final stages of economic development, thus giving the appearance of a U-shaped curve and not the reverse as stated Kuznets. This same argument was advanced by Deininger and Squire (1996-1998).

The hypothesis of an inverted U-curve between growth and inequality was likewise challenged by the work of Bowman (1997) has focused on a group of countries. Indeed, in Japan as in Greece the initial phases of development did not affect the level of inequality. For the author, the rapid

development of South Korea and Taiwan was not accompanied by an increase in income inequality. Instead, it has decreased in Taiwan and stabilized in South Korea. Concerning Brazil, Bowman (1997) found a steady increase in inequality despite the passing of the threshold inflection on the Kuznets curve, which was about \$ 1,200 per capita.

Thus, the Kuznets curve seems insufficient to explain the link between growth and inequality. This conclusion was advanced even by Randolph and Lott (1993), Mbaku (1997), Barro (1999) ... The latter said that the Kuznets curve neglects the impact of other important factors in the distribution of income. Barro took into account new technologies, designed as a relevant variable that can affect the mode of evolution of inequality.

On that basis, Barro found that although the Kuznets curve has a very solid empirical verification, there is no relationship between per capita income and variation of inequality. In addition, Higgins and Williamson (1999) tried to introduce other variables related to demographic transitions that can clutter the labor market and lead, therefore, serious disparities.

It thus appears that the consideration of other new variables to the explanation of the growth-inequality relationship challenged the hypothesis of inverted U curve. So if one takes into consideration the effect of demographic variables, human capital or dualism, as was the case with the work of Barro (1999), Higgins and Williamson (1999) and Bourguignon and Morrisson (1998), the Kuznets hypothesis is challenged. It was even contested by Li, Squire and Zoo (1998).

Moreover, many empirical studies, such as Bourguignon and Verdier (2000) confirms that the process of development of a country is not limited to the rate of growth, but to the nature of growth as equal or not. The study by Mah (2001) did not confirm the Kuznets curve, showing that the level of economic development does not explain variation in inequality in Korea for the period 1975-1995.

Faced with this rejection of the hypothesis of the Kuznets curve inverted U, many theoretical models in the recent literature on growth provide new explanations for the growth-inequality relationship up to demonstrate the existence of the opposite direction of causality.

2. Impact of Inequality on Economic Growth

In this context, Person and Tabellini (1994) conducted a study on the relationship between inequality and growth in the case of 56 countries, nine of which are developed during the post-war period. They concluded that an increase of 0.07 in the share of income of the top 20% of the population reduces the average annual growth rate. Similarly, Alesina and Rodrik (1994) concluded, in a study of 170 countries for a period from 1960 to 1985, that there is a negative impact of inequality on growth in per capita income. The authors suggested that an increase in the Gini coefficient has caused a decline in average per capita growth rate of 0.8 percentage points.

However, and contrary to these studies and those of Banerjee and Duflo (2000) who concluded that inequality has a negative impact on growth, Forbes (2000) has identified a positive relationship between inequality and growth. But this study has been the subject of much criticism as the relatively limited number of observations. At this level, it is important to note that the argument advanced by Forbes was later validated by Chambers (2005), suggesting that long-term growth affects positively inequality.

Recently, Lopez (2006) assured that before 1990, the growth was not accompanied by an increase in inequality and it was only after that date that the relationship became positive. However, it should be noted that these empirical studies differ in the reference periods during which inequality is expected to act on growth. Indeed, studies of Barro and those of Forbes were concentrated over shorter periods than others.

Moreover, several studies have attempted to provide a micro-economic foundation for the effect of inequality on economic growth. The arguments are of two kinds, the first is based on the market imperfection and the second is based on the concept of local externality.

Indeed, the first set of theoretical models was focused on the accumulation of capital in the presence of imperfect capital markets. This imperfection is reflected in the credit rationing which accords with the idea that only individuals who already have a high wealth can receive a loan. Which negatively affects economic growth, since, by minimizing the chance of having credit growth will not be as it should be. Thus, the imperfection of the credit market affects the distribution of income which will be different to that made in the case where there is no discrimination in the granting of credit. It

appears that the distribution of productive capital is a function of the initial wealth that affects not only the future distribution of income and wealth, but also the rate of economic growth.

Banerjee and Newman (1993) have sought to promote a relationship between the choice of occupation and the development process with the presence of an imperfect credit market. In this context, the occupation requiring a high level of investment is undoubtedly devoted to the wealthiest of the population. The model of Banerjee and Newman was developed by Lloyd and Bernhardt (2000) assumed that individuals differ in their entrepreneurial efficiencies and their inherited wealth. The authors have studied the evolution of the distribution of wealth and income with the development process. They were able to demonstrate a relationship inverted U, describing at the initial stage, wealth is the primary determinant of occupation. So these are the richest agents who can invest capital and benefit from the exploitation of the best markets, and it is only in the last phase of economic development there will be few individuals constrained by their wealth. From the outset, income inequality first increases with the onset of the development process, then stabilizes and eventually diminish. This is consistent with the theory of Kuznets.

In summary, there are many theoretical models based on the assumption of imperfect credit markets that provide an explanation for the negative relationship between inequality to growth. Indeed, it is the imperfection of the credit market, which is at the origin of this relationship; this issue has been the subject of several works such as Aghion and Bolton (1997) and Piketty (1997).

On the other hand, Murphy, Shleifer and Vishny (1989) showed the effect of income distribution on the process of industrialization through the role of the composition of the local demand. Thus, a policy of redistribution by transferring income from rich to poor promotes industrialization and growth by expanding the size of domestic markets. Accordingly, an equitable distribution homogenized domestic demand and increased production.

Another microeconomic argument, no less important that has been advanced to explain the negative impact exerted inequality on growth concerns the mechanisms of local externalities. Thus an initial differentiation between two groups of family leads to a geographical stratification explains the significant inequalities in the distribution of human capital in the long term. These inequalities will therefore persist for generations.

In this context, Benabou (1994) attempted to explain the persistence of inequalities in education and income by stratification. Thus, people with less social capital, given families, schools and neighborhoods in which they live, are those who have difficulty to accumulate and develop their human capital and thus access to jobs. These effects can lead to major long-term implications. Benabou (1996) showed that the egalitarian society with an accessible education for all is a long-term benefit for economic growth. This benefit is guaranteed, in fact, through education as a key factor in economic growth. These local externality and population distribution mechanisms were likewise explored by Durlauf (1994 and 1996).

It appears that the decrease in the rate of economic growth due to the unequal distribution of income is explained by:

- Regional disparities and strengthening of social stratification.
- The capital market imperfection that reduces investment opportunities and therefore growth.
- Increased poverty requires the adoption of policies of income redistribution that ultimately increase taxes and then distortions.
- Political instability which reinforces uncertainty about investment and thus negatively affect growth.

These explanations are central concerns of economists to identify the nature of the inequality-growth relationship. The next section will attempt to examine this relationship in the case of Tunisia.

3. Empirical Study: the Case of Tunisia

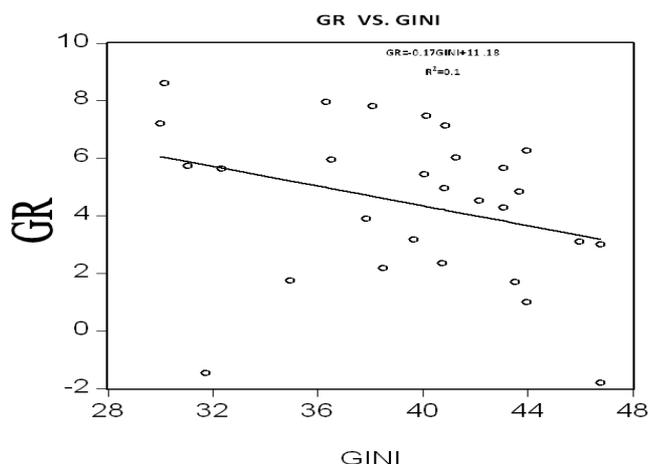
To study the relationship between inequality and economic growth in a context of trade liberalization in the Tunisian case we will use in the first place, the graphical approach and, second, an econometric analysis.

3. 1. Graphic approach

3.1.1. Growth-inequality link

The trend lines and equations are presented in the following graphs:

Figure 1. Inequality and growth

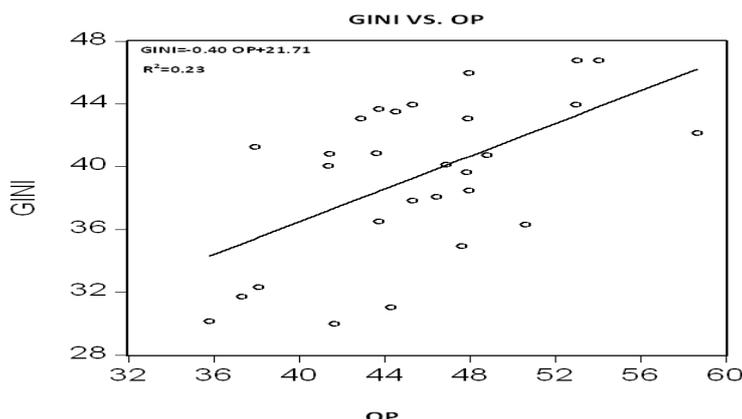


It is clear from this graph that the effect of inequality on economic growth is negative. The sign of the slope of the line shows the negative effect of inequality on growth.

3.1.2. Inequality-trade openness link

The link between trade openness and inequality is presented in the following graph:

Figure 2. Opening and inequality



The graph allows us to detect a positive relationship between openness and inequality appears to be aggravated by a market orientation based on international trade.

3. 2. Econometric analysis test

3. 2.1. Model specification

Econometrically, we tried to analyze the relationship between growth and inequality by focusing on two-way causality while emphasizing the role of the opening exchanges of the country.

The starting point is the estimation of the following model:

$$GINI = C + \alpha GR + \beta OP + \delta FR + \theta M2 + \sigma HK$$

GINI:Gini index of inequality of wage distribution between branches of economic activity.

GR: Annual growth rate of gross domestic product.

OP: Share of exports in gross domestic product.

FR: Fertility rates.

M2:M2 money supply divided by GDP

HK: Enrollment rates at the secondary level.

Thus we calculate the index of wage inequality between different branches of economic activity. We rely on data to the National Social Security Fund and the World Bank. The calculation of inequality was based on Gini index defined as follows:

$$G(x) = 1 + \frac{1}{n} - \frac{2}{n^2} \frac{1}{X} [X_1 + 2X_2 + \dots + nX_n] \text{ avec } X_1 > X_2 > \dots > X_n$$

Then, in the second group of regressions we choose as the dependent variable the rate of economic growth.

3. 2.2. Study period

The Tunisian case study will cover the period 1984-2011. This period is divided into two sub-periods: 1984-1995 and 1996-2011. We opted for this division to see if the relationship between the variables changed after the accelerated opening exchange of the Tunisian economy. We announce at this level that in 1995, Tunisia has joined the World Trade Organization. This membership was the final stage of trade liberalization in the country, a process that has started with the policy of export promotion before being accelerated with the implementation of the structural adjustment program and the signing of free trade agreements with the European Community.

3. 2. 3. Stationarity of variables

To check the stationarity of variables, we conducted the unit root tests. The results are summarized in the following table 1, which shows that the variables are stationary at 1% significant level.

Table 1. UnitRootTests

Series	Statistic	Probability*
GR	-4.24	0.0003
OP	-5.97	00000
GINI	-5.18	00000
M2	-4.02	0.0009
HK	-4.75	0.0001
FR	-3.31	0.0032

*probabilities are recomputed assuming asymptotic normality

3.2.4. Effect of growth on inequality

The following table 2 summarizes the regressions obtained by taking as the dependent variable GINI index.

Table 2. Dependent variable: GINI

Variables	(1)	(2)	(3)
C	52.22 (12.74)	38.77 (4.55)	58.82 (7.07)
GR	1.6 (2.05)	0.02 (0.29)	0.25 (2.73)
OP	1.2 (2.02)	0.01 (0.13)	0.39 (5.99)
FR	0.36 (5.25)	0.30 (2.45)	0.15 (2.34)
M2	-0.87 (-6.21)	-0.15 (-1.1)	-1.19 (-4.13)
HK	-0.19 (-3.23)	-0.34 (-2.58)	-0.24 (-3.44)
R ²	0.96	0.89	0.94

Regression (1) corresponding to the total period shows that economic growth, openness and fertility rates positively affect the GINI index. This means that these variables increase inequality. It is therefore easy to conclude that economic growth led by exports was accompanied by rising inequality in the country. Moreover, the positive coefficient on fertility can be explained by the fact that the rate is higher among the poor classes. Regarding the other two variables, negative signs of their coefficients show that financial development reflected by M2, and human capital, as reflected by Hk, seem to have contributed to counteract the negative effects of growth and openness exchange on inequality.

The regression results (2) and (3) seem to confirm the first result as the values of coefficients for growth and openness are higher after the acceleration of the process of trade liberalization even in the specification (2) these coefficients are insignificant.

3.2.5. Effect of inequality on growth

Taking as endogenous variable annual growth rate of GDP, the results for the periods 1984-2011, 1984-1995 and 1996-2011 are presented, respectively, in the following table 3:

Table 3. Dependent variable: GR

Variables	(1)	(2)	(3)
C	-45.49 (-3.03)	-35.87 (-1.83)	-72.11 (-3.73)
GINI	-1.05 (-3.44)	1.24 (3.85)	-1.79 (-4.03)
OP	0.38 (2.48)	0.71 (2.57)	0.38 (3.5)
FR	-0.73 (-4.34)	-0.71 (-2.17)	-1.09 (-5.66)
M2	0.7 (3.7)	0.56 (2.78)	1.06 (3)
HK	0.14 (2.08)	0.45 (2.22)	0.21 (2.3)
R ²	0.5	0.79	0.81

From the first regression, openness to trade, financial development and human capital have positive effects on economic growth. However, the negative sign of the coefficient on the Gini index reflects a negative effect of inequality on economic growth. The division of the total period into two sub-periods is accompanied by a change of sign in the second specification. This means that inequality had a positive effect on economic growth during this period. Then, this effect became negative in the second sub-period. At this level, we can conclude that there is a threshold effect. This result can be explained by the fact that the Tunisian economy has reached a level of inequality "unbearable" that hinders economic growth.

4. Conclusion

To study the relationship between inequality and economic growth in Tunisia in the context of trade liberalization, we conducted two approaches. The first is graph and the second is econometric. In order to detect the role of openness to trade of the country we divided the total period into two sub-periods according to the acceleration of trade liberalization of economy. Thus, through the graphical approach we were able to demonstrate the existence of a negative relationship between growth and openness to trade, on the one hand, and inequality on the other. This means that it's an obstacle to economic growth and that openness to trade has been a factor in the deterioration of the state of inequality in the country.

The econometric analysis is based on two specifications. In the first we have chosen as the dependent variable GINI index measuring inequality while in the second dependent variable is the rate of economic growth. According to the first group of regressions that economic growth and openness to trade have had positive effects on inequality. Dividing the period into two sub-periods is accompanied by an increase in the values of coefficients for said variables suggesting that the growth led by exports has become more depleting. The other two variables, namely financial development and human capital have a positive effect on inequality.

The results obtained in the second group of regressions, where the dependent variable is the rate of economic growth shows that openness to trade, financial development and human capital have positive effects on economic growth. Regarding inequality, the negative sign of the Gini coefficient reflects a negative effect of this variable on economic growth. Dividing the period into two sub-periods is accompanied by a change in the sign of the coefficient in the first sub-period so that it becomes negative for the second sub-period corresponds with the acceleration of commercial economic liberalization process. This result can be explained by the fact that the country has reached a level of inequality slowing economic growth.

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