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THE CAUSALITY BETWEEN INCOME INEQUALITY AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM THE MIDDLE EAST AND NORTH AFRICA REGION

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ABSTRACT

This paper explores the causality problem between income inequality and economic growth for 9 countries of Middle East and North Africa (MENA) region for the period ranging from 1960 to 2011. In this study, we applied the cointegration techniques, that means the Granger causality tests (in the long-run and short-run). The results of this paper indicate that the Granger causality in the long-run exist for example in Tunisia, Iran, and Morocco. Moreover, the Granger causality in the short-run exist in many other countries such as Mauritania, Jordan and Algeria.

Keywords: Income inequality, Economic growth, Causality and cointegration

Jel Classification: I3; O4; C32

INTRODUCTION

Economic growth is considered to be a powerful force for reducing income inequality and then reducing poverty. In recent years, many empirical studies have attempted to examine the relationship between income inequality and economic growth. Firstly, it should be noted that poverty is measured by income, so there is a great connection between these two terms. Indeed, poverty reduction requires increasing the incomes of poor agents so that they exceed a certain threshold. In this context, many works have been developed to explore the complex relationship between income inequality and economic growth. According to some economists, the evolution of the poverty rate is the result of the evolution of average income and changes in income distribution. In fact, this analysis of the interactions that constitute what Bourguignon. (2003) means: The triangle Growth, Inequality and Poverty. The primary objective of this economist was to investigate

the foundations development strategies. Is that they are based on growth, poverty and / or inequality? In his article, he explained that the answer can be expressed in two steps: First, the rapid elimination of absolute poverty is a significant objective for development. Then, to quickly reduce absolute poverty, countries must follow appropriate policies for growth and income distribution.

Finally, Bourguignon. (2003) stated that poverty reduction (which is a development strategy), in a given country at a given time, is determined entirely by the rate of growth of average income of the population and the change in income distribution. Refers to many empirical researches, this study used causality and cointegration techniques and improved data on income inequality to assess the possible steady-state relationship between economic growth and income inequality for 9 countries of MENA region over the period of 1960-2011. In this paper, we will present a theoretical literature of the impact of income inequality on economic growth. Then we will present the empirical part in which we study the cointegration between growth and inequality.

Review of the Literature on the Relationship between Income Inequality and Economic Growth

The major economic problem in the world is the fight against poverty. To do this, it is necessary to take into account two aspects: economic growth and income inequality. There must be policy targets for effective redistribution of wealth in order to promote growth. This encourages the state to invest more in different sectors of education, health, infrastructure, etc.. It allows to stimulate growth and to slow down poverty. Economic research on the study of the relationship between income inequality and growth have always held an important place in research developing economy. However, they are contradictions in economic thinking. Some economists suggest that unequal distribution of income stimulates economic growth. While others say that income inequality hampers growth and contributes to increase poverty. However, Bourguignon (2003) argue that reducing inequality causes the reduction of poverty. According to Deininger and Squire (1996), to reduce poverty and promote growth, it is necessary that public authorities reinforce their efforts to distribute the income with an egalitarian manner. In this context, Piketty and Saez (2003) suggest that countries with a large number of poor and unequal distribution of income cannot benefit from strong economic growth. In contrast, countries that are characterized by an equal distribution of income and a good proportion of the rich population can profit from advanced economy. Atkinson. (2002) explains the importance of income distribution for two reasons. The first one is to explain how the level of inequality has an impact on economic growth. The second expresses that the convergence towards more egalitarian countries promotes growth.

In addition, Kuznets (1955), known by the famous inverted-U, connects the national income per capita and the inequality. He says that the increase in productivity in the modern sector without redistribution in favor of the rural sector led to a more unequal distribution of income.

The Kuznets hypothesis postulates that an increase in inequality during the first period is followed by a decline since the late nineteenth or early twentieth century. This double movement is related to the fact that if there is a gap between average household incomes in the two sectors (rural and modern), the transfer of labor from one sector to another is sufficient to reduce inequality. In contrast, Deininger and Squire (1996) have criticized the Kuznets hypothesis stating that to achieve a high level of growth, we must consider an equal distribution of income.

Some researchers have suggested that the growth stimulation leads to the generation of employment and thus reduce unemployment Todaro (2003), it reduces the wage differentials between households Galor and Zeira (1996). A high level of income allows the state to allocate more tax in different estates: health, education and social protection ... This favors the poor to invest more in human capital Perotti (1993).

Barro (2000) concluded that the effect of income inequality on growth can be positive or negative depending on the level of economic development of the country. Income inequality in poor countries retards economic growth, while income inequality in rich countries stimulates growth. Using panel data, he showed that the correlation between inequality and growth is negative in the initial phase of economic development. This correlation can be positive during the stable phase of development. Among economists that showed a positive relationship between income inequality and growth are cited: Bourguignon. (2003), Aghion. and Howitt. (1996), Forbes (2000). Economists who said the negative relationship are Perotti (1993), Alesina and Perotti (1996). Some researches show that there is a negative causal relationship between the initial level of inequality and the rate of long-run growth. Alesina and Rodrik. (1994) argue that initial inequalities are strongly related to growth rate, that is to say, if initial inequality is low it can accelerate growth and this contribute to slow down poverty.

According to Piketty and Saez (2003), the poor suffer from several problems due to credit market imperfections. In this context, the effect of credit market imperfections cause a phenomenon called "moral hazard". It gives a false perception about the debtors creditors. The financial organisms must provide guarantees to secure their transactions, in this case we speak about the phenomenon of “anti-selection”. For Piketty and Saez (2003) countries with a high level of poverty rate and high degree of income inequality have a greater impact on economic growth than countries with low poverty rates and low degree of inequality.

Empirical investigation: Variables and data

The approach consists of investigating empirically the causality between income inequality and economic growth in some MENA countries. Unit root tests are first used to establish the degree of integration of the variables and then the cointegration techniques are used to test the existence of a co-evolution between inequality and growth proxies in the long-run.

In this study, we are chose four indicators of income inequality. The first one represent a traditional proxy of income inequality, it's the *Gini index*. This index measure the level of inequality in the distribution of the income in the society. In fact, if the coefficient has a minimum value of 0 we talk about perfect equality. Besides, when it has a maximum value of 1 we are in the case of perfect inequality, Second, we have the *openness rate (Trade)*. In fact , it is the sum of exports and imports of goods and services as a % of GDP. The third indicator of income inequality is *the secondary school enrolment rate (School)*, refers to Benhabib and Spiegel (1994) this indicator represent a good proxy of the human capital. Finally, the fourth indicator is used to measure the physical. We means the *gross fixed capital formation (GFCF)* as a % of GDP. Concerning the economic growth, the standard literature on the ties between economic growth and income inequality generally uses the growth rate of GDP per capita. The data sources are the Word Development Indicators (WDI) of the World Bank. (2011), and all variables are expressed in national currencies. The time span of the variables is 1960-2011. The study focus on only 9 countries because of the non availability of data.

Methodology

The aim of this paper is to resolve the causality issue between income inequality and economic growth. First, we have to check whether each variable is stationary or not. In other words, it's necessary to establish the degree of integration (the stationarity) of the series. One these tests are carried out, we focus on the non-stationary variables. For these variables, we say that a co-evolution between income inequality and economic growth indicators in the long-run may exist. And we have to test the cointegration between them. Such a test provides evidence of existence of a stable long-run equilibrium relationship between different proxies of inequality and economic growth. But, if the long run relationship between these indicators is absent, the causality tests are limited to short-run test of causality.

Unit Root Testing

This test consists to detect the non-stationary variables and then apply the cointegration test on these variables. If the variable is stationary, it called integrated I(0). Besides, the non-stationary variable is integrated I(1). To start, we use the technique of augmented Dickey-Fuller (ADF) to identify the order of integration of each variable. We apply this test on the remainders of the equation of equilibrium. In the table 1, we find the different indicators of income inequality and the proxy of economic growth expressed in their natural logarithm. The results of unit root tests are presented in level and in first difference.

Table-1. Unit root tests for the variables in levels and first differences with only a constant Augmented Dickey-Fuller (ADF), § Null hypothesis: the variable contains a unit root

Variables in level :

Countries •	LGDP per capita	LGini	LGFCF	LTrade	LSCHOOL
Algeria	-1.946*	-1.333*	-1.541*	-2.030*	-6.218
Egypt	-0.856*	-1.647*	-1.713*	-2.048*	-3.896
Iran	-2.427*	-0.901*	-1.824*	-2.310*	-2.414*
Israel	-2.437*	-2.031*	-2.144*	-3.841	-2.269*
Jordan	-2.209*	-2.047*	-2.674*	-3.793	-0.834*
Morocco	0.185*	-1.033*	-1.550*	-0.885*	-2.217*
Mauritania	-2.838*	-2.601*	-3.721	-2.367*	-2.229*
Tunisia	-1.269*	-2.152*	-1.125*	-1.522*	-0.144*
Turkey	0.395*	1.172*	-2.292*	-1.957*	-2.259*

Variables in first difference :

Countries •	DLGDP per capita	DLGini	LGFCF	LTrade	LSCHOOL
Algeria	-2.597*	-6.769	-5.477	-8.204	-2.568*
Egypt	-4.140	-1.830*	-5.372	-6.180	-5.278
Iran	-3.510	-2.642*	-4.347	-2.389*	-1.845*
Israel	-4.053	-4.992	-4.517	-6.791	-3.326
Jordan	-2.999	-5.436	-6.303	-3.709	-2.346*
Mauritania	-7.745	-4.466	-6.167	-6.278	-5.122
Morocco	-10.830	-8.554	-5.928	-8.341	-1.827*
Tunisia	-6.840	-3.979	-4.759	-6.356	-3.402
Turkey	-7.146	-9.135	-5.861	-7.060	1.344*

(*) The variable is non stationary; rejection of the null hypothesis

§ The order of the lag in the Dickey-Fuller regression is the minimum number ensuring that the residuals are white noise.

• The different sample periods are as follows: Algeria 1965-2011; Egypt 1962-2011; Iran 1967-2009; Israel 1962-2011; Jordan 1978-2009; Mauritania 1964-2011; Morocco 1962-2011; Tunisia 1962-2011; Turkey 1963-2011

The results show that all the variables in level are integrated I(1) except for Algeria and Egypt where the variable *School* is stationary since the unit root hypothesis is strongly rejected. In

addition to this, we note that for Jordan and Israel the variable *Trade* is I(0) and for Mauritania the variable *GFCF* is also stationary. When the tests are carried out on the first difference, the hypothesis of unit root is rejected in the case of some countries such as Iran, Egypt , Jordan, Morocco and Turkey.

Cointegration Testing

The notion of cointegration has been introduced by Granger (1988), then the cointegration tests were appeared with the *VAR* approach established by Johanson. (1988). The cointegration tests consist to identify the stationarity of the residue of two linear combinations. If the cointegration is demonstrated, so a long-run relationship of equilibrium exist between the two series. In other words, if the residue is stationary we use an error correction model (ECM) to test the causality between the two series. However, if the variables are not cointegrated we test the causality in the short-run based on *bVAR*. In this paragraph we will study the cointegration tests between the different indicators of income inequality and the economic growth. The computations are based on the Johanson procedure trace statistic and the null hypothesis (H_0) is that there is no cointegration vector; the alternative one (H_1) is that there is one cointegrating vector.

The Johanson tests are based on the likelihood ratio or the so-called trace statistic (Johanson., 1988). The cointegration analysis is made using a bivariate vector auto-regressive model *(bVAR)* for different period spanning 1960 to 2011.The statistic of the tests are carried out in the table 2 with an optimal lag determined according to the Akaike information criterion (AIC). In addition, using this lag length, the residuals in each of the VAR equations were tested for the normality distribution and for the absence of serial correlation.

Table-2. Johanson cointegration tests *Trace statistic* $-T\sum_{i=r+1}^{p} Ln\ (1-\lambda_i)$

[§]Null hypothesis r=0, alternative hypothesis r=1

Countries	Variables	Hypotheses H0	H1	Trace	Critical value 5%
Algeria (1965 – 2011)	GDP and Gini	r= 0	r≥1	15.38	15.49
		r≤1	r≥2	1.43	3.84
	GDP and GFCF	r= 0	r≥1	5.01	15.49
		r≤1	r≥2	1.12	3.84
	GDP and Trade	r= 0	r≥1	14.53	15.49
		r≤1	r≥2	2.11	3.84
	GDP and School	–		–	–
Egypt (1962 – 2011)	GDP and Gini	r= 0	r≥1	9.63	15.49
		r≤1	r≥2	0.10	3.84
	GDP and GFCF	r= 0	r≥1	5.24	15.49
		r≤1	r≥2	0.30	3.84
	GDP and Trade	r= 0	r≥1	10.90	15.49
		r≤1	r≥2	0.75	3.84

	GDP and School	_	_	_
Iran (1967 – 2009)	GDP and Gini	r= 0 r≥1 r≤1 r≥2	7.63 3.02	15.49 3.84
	GDP and GFCF*	r= 0 r≥1 r≤1 r≥2	28.96 2.46	15.49 3.84
	GDP and Trade	r= 0 r≥1 r≤1 r≥2	12.44 2.82	15.49 3.84
	GDP and School	r= 0 r≥1 r≤1 r≥2	10.79 0.92	15.49 3.84
Israel (1962 – 2011)	GDP and Gini**	r= 0 r≥1 r≤1 r≥2	16.67 3.84	15.49 3.84
	GDP and GFCF	r= 0 r≥1 r≤1 r≥2	14.70 2.72	15.49 3.84
	GDP and Trade	_	_	_
	GDP and School	r= 0 r≥1 r≤1 r≥2	6.22 1.93	15.49 3.84
Jordan (1978 – 2011)	GDP and Gini	r= 0 r≥1 r≤1 r≥2	6.77 1.43	15.49 3.84
	GDP and GFCF	r= 0 r≥1 r≤1 r≥2	14.44 2.91	15.49 3.84
	GDP and Trade	_	_	_
	GDP and School	r= 0 r≥1 r≤1 r≥2	25.12 1.63	15.49 3.84
Mauritania (1964 – 2011)	GDP and Gini	r= 0 r≥1 r≤1 r≥2	6.32 4.15	15.49 3.84
	GDP and GFCF	_	_	_
	GDP and Trade	r= 0 r≥1 r≤1 r≥2	4.41 4.91	15.49 3.84
	GDP and School	r= 0 r≥1 r≤1 r≥2	5.70 1.34	15.49 3.84
Morocco (1962 – 2011)	GDP and Gini	r= 0 r≥1 r≤1 r≥2	6.84 1.94	15.49 3.84
	GDP and GFCF	_	_	_
	GDP and Trade*	r= 0 r≥1 r≤1 r≥2	23.70 0.32	15.49 3.84
	GDP and School	r= 0 r≥1 r≤1 r≥2	12.13 4.80	15.49 3.84
Tunisia (1963 – 2011)	GDP and Gini	r= 0 r≥1 r≤1 r≥2	7.64 0.28	15.49 3.84
	GDP and GFCF*	r= 0 r≥1 r≤1 r≥2	17.56 0.64	15.49 3.84
	GDPand Trade	r= 0 r≥1 r≤1 r≥2	8.01 1.31	15.49 3.84
	GDP and School	r= 0 r≥1	10.48	15.49

		r≤1	r≥2	3.40	3.84
Turkey (1962 – 2011)	GDP and Gini*	r= 0	r≥1	19.14	15.49
		r≤1	r≥2	0.008	3.84
	GDP and GFCF	r= 0	r≥1	8.94	15.49
		r≤1	r≥2	1.06	3.84
	GDP and Trade	r= 0	r≥1	10.76	15.49
		r≤1	r≥2	0.16	3.84
	GDP and School	r= 0	r≥1	4.15	15.49
		r≤1	r≥2	0.93	3.84

(*) indicates the presence of one relationship of cointegration between the variables at 5% significance level

(**)indicates the presence of two relationships of cointegration between the variables at 5% significance level

§ r is the number of cointegration vectors

The tests carried out according to the Johanson procedure show less cases of cointegration, as it is expected. The hypothesis of non-cointegration is rejected for the *Gini* index for two countries: Israel and Turkey. With the variable *GFCF*, there are also two cases of cointegration with GDP per capita: Iran and Tunisia. Finally, with the third indicator of income inequality *Trade*, the hypothesis of non-cointegration is rejected in the case of Morocco. For the remaining countries (Algeria, Egypt, Jordan and Mauritania) and for the different proxies of income inequality, the hypothesis of the absence of coinegration cannot be rejected. Such an outcome rejects, in these countries, any stable relationship between income inequality indicators and economic growth.

For the countries where cointegration is detected (Iran, Israel, Morocco, Tunisia and Turkey), this means that a long-run relationship between income inequality indicators and growth exist. In other words, the variables are in a long-run equilibrium state. Consequently, the short-run dynamics of the variables are seen as fluctuations around this equilibrium. And the Error Correction Model (ECM) indicates how a system adjusts to converge to its long-run equilibrium state. In fact, the speed of adjustment is indicated by the magnitudes of the coefficients of α vectors. We interpret the effect of the error correction term βX_{t-1} on economic indicator by explaining the sign of βX_{t-1} itself and the sign of the adjustment coefficient. We note that α_2 represent the adjustment coefficient of the income inequality indicators and α_2 is the adjustment coefficient of growth.

Table-3. The adjustment coefficients and the error correction term

Countries	The adjustment coefficient		The error correction term
	Vector α		$\beta X_{t-1}\beta X_{t-1}=y_{t-1}-\beta_1(Gini)_{t-1}-\beta_2$
	α_1	α_2	
Iran	0.167	0.079	$y_{t-1} + 3.347\ (Gfcf)_{t-1} - 1$
(Gfcf)	(2.649)*	(2.448)**	(-4.965)*
Israël	0.015	0.001	$y_{t-1} + 33.103(Gini)_{t-1} - 1$
(Gini)	(2.577)*	(0.666)	(-2.722)*
Morocco	0.530	-0.115	$y_{t-1} + 1.359\ (Trade)_{t-1} - 1$
(Trade)	(4.028)*	(-2.150)**	(13.292)*
Tunisia	-0.007	-0.003	$y_{t-1} - 26.274\ (Gfcf)_{t-1} - 1$
(Gfcf)	(-2.532)**	(-2.249)**	(3.413)*
Turkey	-0.195	0.069	$y_{t-1} - 3.512\ (Gini)_{t-1} - 1$
(Gini)	(-1.527)	(1.707)***	(7.355)*

The numbers in parentheses are t-statistics

(*) (**) (***) indicate that the variables are significant at respectively 1%, 5% et 10%.

According to table 3, in the cases of Iran, Israel and Morocco α_1 and the error correction term are positives and significant, this means that the effect of income inequality on long-run growth is positive. However, for Tunisia, α_1 and the error correction term are negatives and significant, so we have the same conclusion; the effect on growth is positive. Moreover, α_1 is negative and non-significant in the case of Turkey, which excludes any effect of inequality on long-run growth. For Iran and Tunisia, the effect of growth (α_2) on income inequality is positive. In contrast, for Morocco and Turkey the effect on inequality is negative. And there is no effect on inequality in the case of Israel. To check the robustness of these results, one has to see the dynamic interaction between the cointegrated variables in the long-run and how each one is causing the other. To achieve that aim, we should use the Granger causality tests.

Granger Causality Tests

According to Granger (1988), if two variables are cointegrated, then one should test for Granger causation in at least one direction. The dynamic interaction between the cointegrated variables is summarized in two tests: the first one is a test of weak exogeneity and the second is a test of exogeneity of the dynamic terms.

- *Test of weak exogeneity*: A variable is said to be weakly exogenous if the t-statistic of the error correction term is less than its critical value, in other words, the error correction term is statistically insignificant in its relevant equation. Consequently, the variable is not adjusting to the long-run equilibrium path. t_i: H_0: $\alpha_i = 0$, $i=1,2$

Where α_i are the adjustment coefficients in the ECM (for i=1,2) and t_i are tests of weak exogeneity of economic growth and income inequality for i=1,2, respectively.

- *Test of exogeneity of dynamic terms*: There tests are simply considered as Granger causality tests, where the null hypothesis is that income inequality (economic growth) does not cause economic growth (income inequality). Formally :F_1: $H_0 : \sigma_{12}(L) = 0$

  F_2: $H_0 : \sigma_{21}(L) = 0$

  Where F_i with i = 1,2 are the F-statistics of the tested hypotheses.

Table-4. Results of Granger causality tests according to the Johanson procedure

Null Hypothesis				
	INQ does not Granger-cause GDP		*GDP does not Granger-cause INQ*	
Countries	$t_1: \alpha_1 = 0$	$F_1: \gamma_{12} = 0$	$t_2: \alpha_2 = 0$	$F_2: \gamma_{21} = 0$
Granger causality between Fbcf and PIB				
Iran	(2,649)*	3,478*	(2,448)*	9,045*
Granger causality between Gini and PIB				
Israel	(2,577)*	0,627	(0,666)	1,205
Granger causality between Ouv and PIB				
Morocco	(4,028)*	9,792*	(-2,150)*	2,335
Granger causality between Fbcf and PIB				
Tunisia	(-2,532)*	3,600*	(-2,249)*	2,146
Granger causality between Gini and PIB				
Turkey	(-1,527)	0,546	(1,707)*	6,032*

(*) Significant at least at 10%

According to table 4, the results of the tests using the Johanson procedure for the determination of the cointegrating vectors. The results show that for Israel the causality tests are in favor of a unidirectional causality between income inequality and economic growth. However, for Turkey, the statistical significance of F- and t-statistics at the 5% level show that the causation is going in other direction. In other words, the causality tests are in favor of a reverse causation running from economic growth to the income inequality. In addition, we note that for Iran, Morocco and Tunisia the evidence is in favor of a bidirectional causality between the growth rate of GDP per capita and the proxies of income inequality. Indeed, we conclude that in Iran, Morocco and Tunisia t_1 and F_1 statistics are both significant, and in Iran and Turkey t_2 and F_2 statistics are also significant. That means that real growth has two effects on income inequality: The first one is coming from the lagged dynamic terms and the second from the error correction term. According to the first effect, each short-term change in the economic growth is responsible to the future change in the growth rate of income inequality indicators. For the second effect, given the significance of the error correction term in the second VAR equation, real growth exert an influence on income inequality

through the error correction term. This means that inequality is adjusting to the previous period disequilibrium between the growth rate of GDP per capita and income inequality.

3-4: Short-run Granger Causality: Tests based on first-differenced VARs

Table-5. Causality tests based on first-differenced *bVAR* framework[§]

Countries and variables	Null hypothesis Inc Inq ≠> Growth	F(n,k) Growth ≠> Inc Inq
Algeria		
(GDP , Gini)	0.435	0.210
(GDP , GFCF)	1.442	0.854
(GDP , Trade)	1.001	0.664
(GDP , School)	0.331	0.008
Egypt.		
(GDP , Gini)	0.526	0.052
(GDP , GFCF)	14.565*	0.025
(GDP , Trade)	4.625*	1.063
(GDP , School)	0.630	1.536
Jordan		
(GDP , Gini)	0.185	0.032
(GDP , GFCF)	0.740	0.027
(GDP , Trade)	1.705	0.236
(GDP , School)	2.506	1.131
Iran		
(GDP , Gini)	0.489	1.004
(GDP , Trade)	0.617	0.029
(GDP , School)	0.317	0.360
Israel		
(GDP , GFCF)	5.525*	3.441*
(GDP , Trade)	0.216	6.114*
(GDP , School)	1.523	0.364
Mauritania		
(GDP , Gini)	0.277	0.407
(GDP , FBCF)	0.119	0.017
(GDP , Ouv)	1.204	1.454
(GDP , School)	2.172	8.596*
Morocco		
(GDP , Gini)	4.555*	2.142
(GDP , GFCF)	5.719*	2.562
(GDP , School)	2.203	0.556
Tunisia		
(GDP , Gini)	1.587	0.602
(GDP , Trade)	0.051	1.444
(GDP , School)	0.826	2.947*
Turkey		
(GDP , GFCF)	0.980	0.588
(GDP , Trade)	2.726	2.997*
(GDP , School)	0.825	1.252

All estimates are achieved using first differences of integrated variables

§ The order of the lag is determined using the Akaike information criterion (AIC) on the unrestricted bVAR, (*) The Fischer statistics are significant at the 5% level.

We remember that according to the table 2, there are 5 countries where cointegration is detected. For the remaining countries, we applied the causality tests using the first differenced VARs. The evidence presented is not far from the results obtained from the ECMs. The causation turns out to be bidirectional in the case of Israel. Indeed, in Mauritania, Tunisia and Turkey the evidence is in favor of a reverse causation going from economic growth to income inequality, with at least one inequality proxy at 5% level. That is, not only inequality shows to Granger-cause growth in the short-run (cases of Egypt and Morocco), but also the real growth appears to Granger-cause the inequality too.

CONCLUSION

This study has examined empirically the causality between income inequality and economic growth in a bivariate VAR structure for a sample covering 9 countries of MENA region over the period 1960-2011. Johanson cointegration analysis provides that income inequality does not seem to affect positively the long-run economic growth. Indeed, the results of this paper clearly indicate that a strong evidence exist in favor of a reverse causation running from growth to inequality for 4 countries. For countries where inequality and economic indicators are not cointegrated, Granger causality tests were carried out with first-differenced VARs to check the causality problem in the short-run. The results display that an evidence was found of bidirectional causality and causality from growth to inequality. The empirical evidence presented above has important implications for the conduct economic policies in these countries. Indeed, despite the results of the study, development strategies in the MENA region must take into consideration the fact that fighting the poverty to decrease income inequality is still a priority.

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