Nexus Between Income Inequality And Economic Growth: Case Of The Republic Of North Macedonia

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Abstract

Controversial evidence approach regarding the relationship between income inequality and economic growth highlights the need for investigating such nexus in the case of the Republic of North Macedonia by utilizing quarterly time series data for time spin 2000-2018. In this regard, the main purpose of the paper indicates the testing of the long-run effects of income inequality on the economic growth, accomplished through the employment of Vector Error Correction Model, while Granger causality test is performed in order to determine the direction of such nexus. Further, empirical findings reveal the existence of a long-run negative significant relationship between income inequality and economic growth in the Republic of North Macedonia. Finally, empirical findings of short-run and long-run dynamics regarding the nexus between income inequality and economic growth in the Republic of North Macedonia concerns its current and future strategies and its contribution to the existing literature rather than solving the debate.

Introduction

Nexus among income inequality and economic growth does not represent a preliminary issue in the economic literature. In this regard, many scholars and economist have attempted to answer the reason for those two variables by analyzing empirically their relationship in both developed and developing countries.

Lately, there exists a high debate regarding the relationship between income inequality and economic growth on theoretical and empirical aspects, concerning two major schools of economic thoughts. Advocates of neoliberal school suggest that it promotes market fundamentalism and free allocation of resources in the economy, thus suggesting a positive nexus among income inequality and economic growth. In addition, such results are due to the greater tendency of wealthy people to save compared to those with precarious income. In this direction,

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investment and technological progress are stimulated, thus also underlining the Kuznets's curve principle through the inverted - U nexus of income inequality and economic growth. On the other hand, Keynesian supporters see it as an advocate of government intervention for regulating market imperfections and full use of the available labor force.

In addition, in literature there exist the Environmental Kuznets Curve hypothesis which suggests the presence of a U- shaped relationship between economic growth and environmental pollution. This hypothesis claim that with economic growth, the environmental degradation increases, reaches its peak then starting to decline, while the economic growth after this point will start to rise. In this regard, Koksal et al. (2020) in their study investigate the relationship between environmental quality and business/economic activities, through Environmental Kuznets Curve (EKC) hypothesis and their results indicate the existence of the inverted U - shaped nexus among environmental pollution and economic activity.

According to their perspective, based on the past three decades of data and empirical evidence, it suggests a significant increase in income inequality at the national and global level. Poverty and inequality reduction represent one of the most controversial questions among policymakers, concerned whether to deal with the distribution or growth itself will help in reducing poverty? Although there is a strong dispute claiming growth to be good for the poor, growth with redistribution provides greater outcomes in the economy.

Lately, scholars have been debating income distribution as a significant determinant of poverty reduction in developing countries, although the empirical results of the recent studies have documented controversial results regarding the relationship between income inequality and economic growth in developing countries. Thus, the main objective of this paper is to empirically investigate the relationship between economic growth and income inequality in the Republic of North Macedonia for the time period 2000 q1 – 2018 q4 in the long run, through the Vector Error Correction Model technique. In addition, the Granger Causality test has been employed for determining the direction of the nexus among income inequality and economic growth of the country.

The paper structure is as follows: the first section conveys the introduction part, in the second part it is outlaid the relevant literature review of the relationship between economic growth and income inequality, the third section deals with the data and model specification, the

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next section discusses the empirical findings and the last section reveals the conclusions and recommendations of such nexus for the case of the Republic of North Macedonia.

Literature Review

So far, there exist controversial empirical findings regarding the relationship between economic growth and income inequality in developing and developed countries. Such results have attracted the attention of many scholars and policymakers focusing on income distribution policies. In this regard, the main objective of this paper is to analyze the relationship of the income inequality and economic growth in the short run and long run in the Republic of North Macedonia for the last two decades as well as to determine the direction of such nexus.

In addition, the last three decades represent the period when income inequality has been increased globally. Moreover, although a negative relationship is found among income inequality and economic growth in cross-country analysis (Perroti, 1996), some empirical estimations have suggested a positive nexus among income inequality and economic growth (Li & Zou, 1998; Forbes, 2000). In addition, Partridge (1997) found that when income inequality is measured with the income per share it shows a negative relationship with the economic growth, while o positive relationship is determined when measured by GINI index.

Further, Forbes (2000) suggest that a significant negative bias in the inequality – growth nexus is caused by omitted variables and determines a positive effect of inequality on growth by utilizing Fixed effects model. By using a larger sample of countries, Barro (2000) suggests a positive relationship between income inequality and economic growth in developed countries while a negative relationship is seen in developing countries.

On their paper, Ostry et al (2014) include 173 countries, for a time period 1960 – 2010, indicating a negative relationship between income inequality and economic growth. Further, similar results associating negative impact of income inequality on growth are indicated by Cingano (2014) OECD study, as well as by Berg and Ostry, 2011 -IMF study.

Finally, this research is accomplished in order to investigate the impact of income inequality on economic growth in the Republic of North Macedonia for the time spin 2000q1 – 2018q4, through VECM technique. In addition, the Granger Causality test is performed to determine the direction of this nexus, while the Impulse Response Function determines the response of growth when a shock is given to the income inequality.

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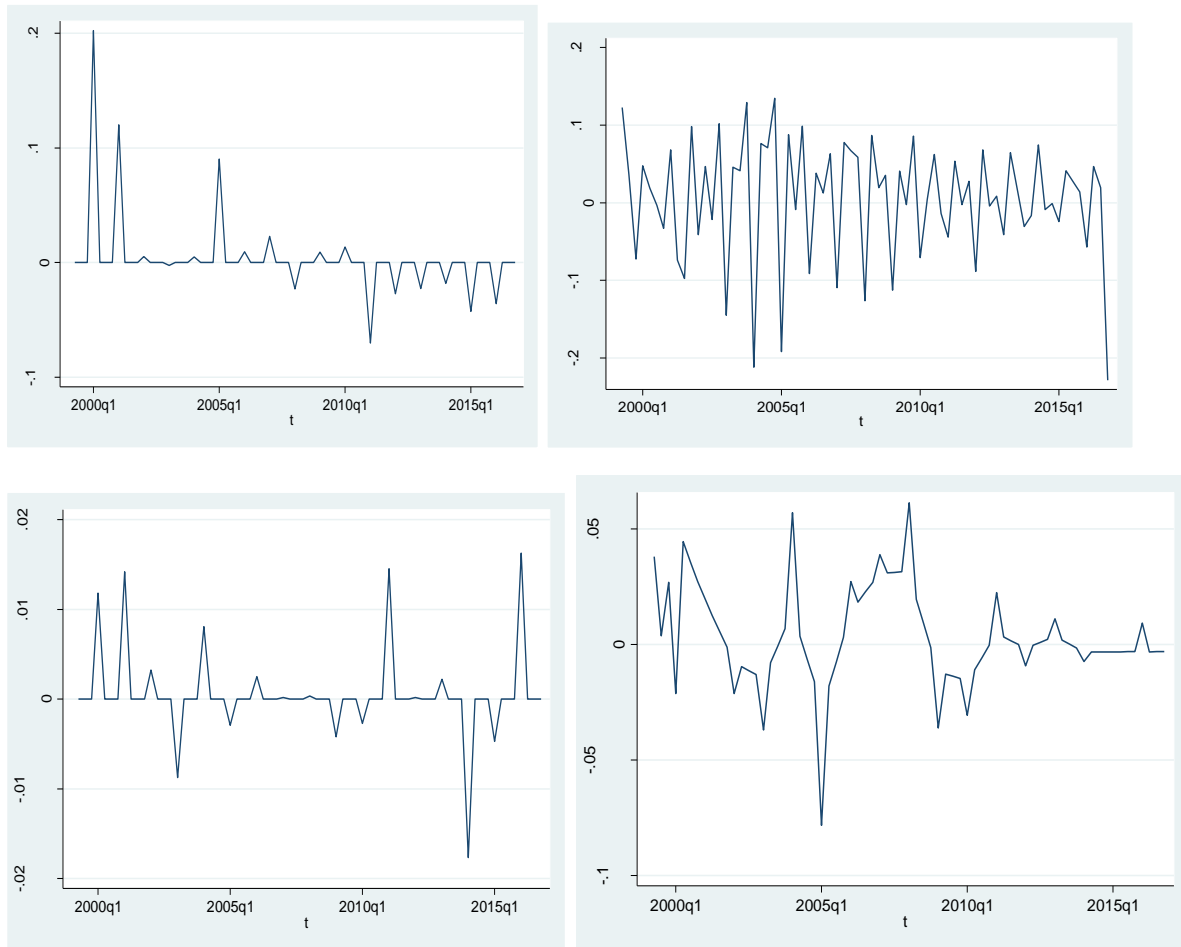226

Data and Research Methodology

Concerning the main aim of determining the impact of income inequality on the economic growth in the Republic of North Macedonia for the time period 2000q1 – 2018q4 as well as the direction of such nexus, the following basic model has been established:

$$Y = [\ln rGDP\,; \ln gini\,;\, ln\ school;\ ln\ gfcf]\ (1)$$

This empirical analysis has incorporated secondary data referring to the time spin 2000q1 – 2018q4,utilizing the sources of National Bank of Republic of North Macedonia. In addition, variables have been transformed into their logarithmic form. In addition, for determining the effects of income inequality this paper uses GINI index.

The following graphs indicate the differenced variables: GINI index, real GDP growth rate, secondary school enrollments and Gross Fixed Capital Formation % of GDP.

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Graph 1. Differenced Variables

Source: Author's Calculations

Further, pre-estimation tests have been conducted such as lag selection and unit root test. Moreover, for the lag selection, three main criteria have been used such as AIC, SBIC and HQIC, while for determining whether time series contain unit root or not, Augmented Dickey-Fuller test has been performed.

For determining the long run nexus between income inequality and economic growth, VECM has been conducted, thus determining the short-run and long-run effects by introducing the lost information in the differencing process. In addition, the Johansen test for co-integration has been performed to determine whether there exists at least one co-integrating vector among these variables, suggesting the existence of a long-run relationship between income inequality and economic growth.

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Finally, in order to determine the direction of the relationship between income inequality and economic growth, Granger Causality test has been utilized as well as the Impulse Response Function approach has been used to analyze the response of real GDP growth rate to a given shock to income inequality and vice a versa. Moreover, some post estimation tests have been conducted to check model adequateness, validity and fitness such as stability test of VECM, Lagrange-multiplier test and Jarque – Bera test.

Empirical Findings

The following table displays a brief illustration of the descriptive statistics of the dependent and independent variables included in the model.

Table 1. Descriptive Statistics

	ln rGDP	ln gini	ln school	ln gcfc
mean	11.31376	3.664638	4.398027	3.09561
minimum	9.384042	3.12222	4.372712	2.903946
maximum	11.61263	3.985231	4.411506	3.258447
std. dev.	.2853549	1308204	.0091842	.0876676
skewness	-4.331256	-1.490556	-1.009779	-.3600564
kurtosis	30.08288	6.999494	4.166492	2.230058
variance	.0814274	.017114	.0000844	.0076856
observations	72	72	72	72

Source: Author's Calculations

Further, data has been investigated for their unit root, thus it has been analyzed if the time series have unit root or not, thus if they are stationary or not. In this regard, three main criteria have been used in order to determine firstly the lag number: AIC, SBIC and HQIC. The following table presents the resultsregarding the number of the lag included in the analysis which according to the Akaike information criteria which is suitable for the number of observations in this empirical analysis is set to be four.

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Table 2. Lag Selection Criteria

LAG	LL	LR	AIC	HQIC	SBIC
0	384.681		-11.1965	-11.1448	-11.0659
1	530.768	292.18	-15.0226	-14.7639	-14.3698*
2	554.205	46.874	-15.2413	-14.7757*	-14.0663
3	565.761	23.112	-15.1106	-14.4381	-13.4133
4	586.569	41.616*	**-15.252***	-14.3726	-13.0325

Source: Author's Calculations

Augmented Dickey Fuller test was performed in order to check the stationarity of the time series, and its results are presented in Table3.

Table 3. Augmented Dickey Fuller Test

	VARIABLE	Augmented Dickey Fuller	COMMENT
Level	ln rGDP	-1.476 (-2.916)	H_0
	ln gini	-2.993 (-2.916)	H_0
	ln school	-3.114 (-2.916)	H_0
	ln gfcf	-2.631 (-2.916)	H_0
First difference	ln rGDP	-3.710 (-2.917)	H_1
	ln gini	-3.587 (-2.917)	H_1
	ln school	-3.449 (-2.917)	H_1
	ln gfcf	-3.454 (-2.917)	H_1
Notes: † numbers in brackets represent lag length in ADF test			

Source: Author's Calculations

Moreover, results claim that the null hypothesis of unit root is accepted, thus all variables contain unit root in their level, or are not stationary in their level. Further, the null hypothesis of unit root is tested for their first difference, supporting the rejection of the null hypothesis for every variable, indicating that they are all stationary in their first difference.

Further, Johansen – Jusilius co-integration test has been conducted in order to investigate the existence of a long-run relationship between income inequality and economic growth for the

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case of the Republic of North Macedonia for the last two decades. Basically, non-stationary data lead to spurious empirical results, thus as such cannot be utilized in empirical models. In this context, Engle and Granger (1987) claim that two or more non-stationary series can be co-integrated if a linear combination of two or more non-stationary series is stationary, where their stationary linear combination is met in the long run nexus. Results of the Johansen test for co-integration of the model are presented in the Table 4.

Table 4. Johansen Co-integration Test

Null hypothesis	Alternative hypothesis	λ- trace	95 % critical value
r = 0	r > 0	75.6332	47.21
r ≤ 1	r > 1	**26.4935***	**29.68**
r ≤ 2	r > 2	12.4895	15.41

Source: Author's Calculations

Johansen co-integration test results indicate at least one co-integrating vector exists in the model among the variables at I(1) from the trace test, thus rejecting the null hypothesis that there does not exist co-integration vector while accepting the alternative hypothesis that there exists a long-run relationship between income inequality and economic growth.

Following the results of co-integration, Vector Error Correction model has been employed to determine the long-run dynamic effects of income inequality on the economic growth of the Republic of North Macedonia for the time period 2000q1 – 2018q4. Finally, the revealed results of the VECM are presented in the Table 5.

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Table 5. Results of Vector Error Correction Model

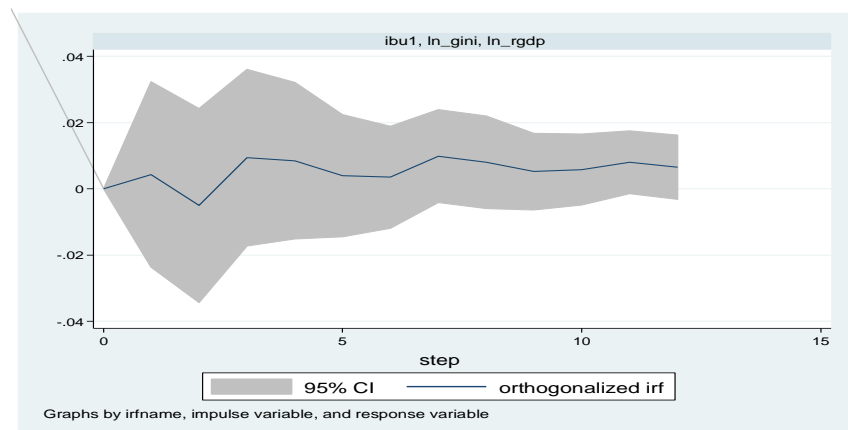| Variables	β	α	z	P>|z|	P>chi2
Δ ln rGDP	1.000	-.6778686	-1.84	0.0000	0.0657
Δ ln gini	-0.665737 (0.000) *	.0928102	3.39	(0.066) ***	0.0007
Δ ln school	2.31018 (0.000) *	-.0232447	-3.64	(0.001) *	0.0003
Δ ln gfcf	0.107985 (0.016) **	-.1237053	-5.50	(0.000) *	0.0000

Notes: **β** represents the co-integrating vector and **α** represents the adjustment parameter vector; 1.000 implies that the co-integrating vector is normalized with respect to the variable. Brackets are p values for probabilities for **β** and **α**.

Source: Author's Calculations

Co-integration model is normalized with respect to real GDP rate. β coefficients are indicating the negative and significant long-run effect of income inequality on the economic growth of the Republic of North Macedonia for the time spin 2000q1 – 2018q4.

The following graph illustrates the results of Impulse Response Function, used to determine how real GDP growth rate will respond to a given shock on the income inequality, holding constant the rest of the variables.

Graph 2. Impulse Response Function

Source: Author's Calculations

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When a shock is applied to GINI index, real GDP peak value is reached on the seventh quarter, while its lowest value is seen during the second quarter. Moreover, the linear positive response of real GDP growth rate can be experienced through the rest of the period.

Finally, causal relationship between income inequality and economic growth is determined through Granger Causality test, in order to check the direction of the nexus between income inequality and economic growth in the Republic of North Macedonia.

Table 6. Granger Causality Test

		INDEPENDENT VARIABLES (lags)			
		ln rGDP	ln gini	ln school	ln gfcf
DEPENDENT VARIABLES (equation)	**ln rGDP**		2.9281 (0.570)	20.95 **(0.000)**	2.373 (0.668)
	ln gini	12.025 **(0.017)**		3.3226 (0.505)	12.606 **(0.013)**
	ln school	1.6528 (0.799)	6.841 (0.145)		1.5447 (0.819)
	ln gfcf	8.5184 **(0.074)**	2.8678 (0.580)	2.2485 (0.690)	

Source: Author's Calculations

Table 6 presents the results from Granger Causality test, indicating the existence of a unidirectional causality between real GDP growth rate and GINI index, running from income inequality to real GDP, thus the null hypothesis of GINI index does not Granger cause real GDP growth rate can be rejected and accepted the alternative hypothesis.

Finally, some post estimation tests were conducted in order to check the validity, stability and fitness of the model such as VECM stability test and Lagrange-multiplier test. (see Appendix I)

Conclusions

Having into consideration the importance of the income distribution for the economic growth of a developing country, this paper tries to empirically investigate the relationship among Income inequality and economic growth in the case of a small open economy such as Republic of North Macedonia utilizing time series for the period 2000 q1 – 2018 q4. To my best knowledge, this is the first paper that uses the econometric approach of Vector error Correction model in

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order to determine the long run and short-run dynamic effects of income inequality on the country's economic growth. Further, VECM results reveal a negative and significant long-run relationship between income inequality and economic growth, in line with many other authors' findings when GINI index is used as income inequality indicator. In addition, having into consideration the existing polemics whether the economic growth will itself resolve the issue of income distribution or if the policymakers should be concerned specifically with the income inequality, Granger causality test has been performed in order to check the direction of the causal relationship among the variables. Moreover, the results of the Granger Causality test indicate a unidirectional causal relationship between income inequality and economic growth, running from income inequality and economic growth in the case of the Republic of North Macedonia. In addition, the Impulse Response Function has been applied in order to analyze how the real GDP growth rate will respond to a given shock of income inequality.
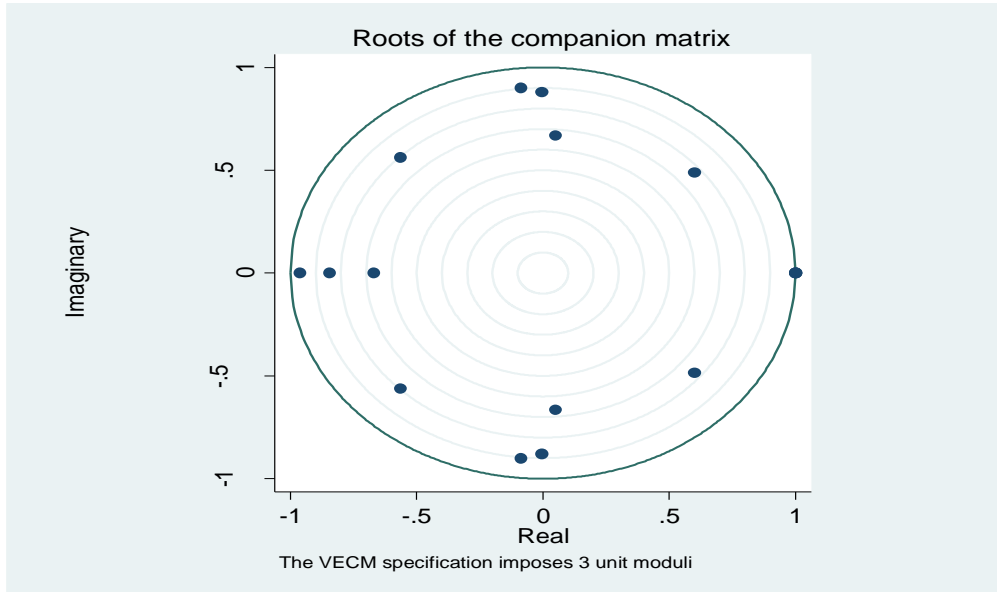
Having into consideration such results of the negative long-run effects of income inequality on the economic growth in the case of Republic of North Macedonia, such empirical findings of short-run and long-run dynamic effects regarding the nexus between income inequality and economic growth in the Republic of North Macedonia concerns its current and future strategies and policies as well as its contribution to the existing literature rather than solving the existing debate on the nexus among income inequality and economic growth in developing countries.

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References

Barro, (2000). Inequality and Growth in a Panel of Countries, Journal of Economic Growth https://doi.org/10.1023/A:1009850119329

Berg and Ostry (2011). Inequality and Unsustainable Growth: Two Sides of the Same Coin?, IMF Staff Discussion Note 11/08.

Berg, Ostry, and Zettelmeyer (2012). What Makes Growth Sustained?,*Journal of Development Economics*, 98(2): 149–166.

Cingano, (2014). Trends in Income Inequality and its Impact on Economic Growth, OECD Social, Employment and Migration Working Papers, No. 163, OECD Publishing. http://dx.doi.org/10.1787/5jxrjncwxv6j-en

Dickey and Fuller (1981). Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica, 49, pp.1057-1072.

Forbes, (2000). A Reassessment of the Relationship between Inequality and Growth. American Economic Review, 90 (4): 869-887.

Li and Zou, (1998). Income Inequality Is Not Harmful for Growth: Theory and Evidence, CEMA Working Papers 74, China Economics and Management Academy, Central University of Finance and Economics.

Köksal, C., Işik, M., & Katircioğlu, S. (2020). The role of shadow economies in ecological footprint quality: empirical evidence from Turkey. Environmental Science and Pollution Research, pp.1-10.

Kuznets, (1995). Economic Growth and Income Inequality. Amer. Econ. Rev. 45(1), 1-28

Ostry, Berg and Tsangarides (2014), Redistribution, Inequality, and Growth, IMF Staff Discussion Note 14/02.

Pagano, (2004). An empirical investigation of the relationship between inequality and growth. Bank of Italy Temi di Discussione. 536

Partridge, (1997). Is inequality harmful for growth? Comment. Amer. Econ. Rev. 87(5), 1019-1032.

Perotti, (1996). Growth, income distribution, and democracy: What the data say. J Econ Growth 1, 149–187; doi:10.1007/BF00138861

Sala-i-Martin and Pinkovskiy, (2009). Parametric Estimations of the World Distribution of Income. NBER Working Paper No. 15433

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Appendix I

Graph 1 VECM Stability Test

Source: Author's Calculations

Table 1 Lagrange-Multiplier Test

lag	chi2	Prob > chi2
1	8.5846	0.92953
2	9.5406	0.88950

Source: Author's Calculations

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