

DOES INCOME INEQUALITY PROMOTE ECONOMIC GROWTH?

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Abstract

We derive a model in which we show that economic growth is directly affected by a change in marginal propensity to consume. We apply the vector error correction model, results from which show that Gini coefficient – a measure of income inequality – negatively affects marginal propensity to consume. Therefore, we concluded that a rise in income inequality would negatively affect marginal propensity to consume and thereby economic growth in the long-term and the short-term both. The short-term effect will show up with a one-period lag.

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1. INTRODUCTION

There has been debate on whether income inequality promotes or retards economic growth. Additionally, there have been several theoretical and empirical studies on this issue with mixed results. A study by Shin (2012) found that higher income inequality can retard growth in early stage of economic development but promote economic growth in a near steady state.

His conclusion also indicates that income redistribution through high income taxes does not always reduce income inequality. Mo (2003) maintains that there are two channels – transfer and human capital channels – through which income inequality affects economic growth. He finds that the most important channel is the transfer channel through which income inequality first affects productivity and thereby economic growth, which accounts for more than 55% of its overall total effect. However, he also realized that the effects of income inequality on economic growth are much more complicated.

Panizza (2002) applies both standard fixed effects and generalized method of moments (GMM) estimations on U.S. cross-state panel data to assess the relationship between income inequality and growth. His finding fails to establish a positive relationship between the two variables. However, it does find some evidence supporting a negative relationship between the two variables.

Using meta-analysis, Dominisis, et al (2008) describe, identify and analyze the variation in outcomes of empirical studies and find that estimation methods, data quality and sample coverage systematically affect the results. However, their results do not indicate any relationship between income inequality and economic growth in one direction or the other; rather they suggest that researches be increasingly focused on determining the impact of income inequality on economic growth using data on either single-country at the regional level or a set of countries with similarity in economic, social and institutional characteristics.

Li and Zou (2002), in their study, find that income inequality may theoretically lead to greater economic growth if public consumption enters the utility function.

Similarly, a study by Knowles (2005) found a significant negative correlation between consistently measured inequality of expenditure data and economic growth for a sample of developing countries.

Braun, et al (2019) examine the relationship between income inequality and economic growth at various levels of financial development and find that income inequality reduces growth in economies with low levels of financial development but the effect is weak in economies with more developed financial system.

A study by Breunig and Majeed (2020) replicates previous results showing a negative impact of inequality on growth accounting for both inequality and poverty and find a negative effect of inequality on growth mainly concentrated amongst countries with high poverty.

Another study by Gutierrez-Romero (2021) using data for 27 manufacturing industries across 88 countries over the period, 1981-2015 show that, countries that have industries more dependent on financial markets experienced lower long-run growth in real output, employment and real wages that were *a priori* more unequal compared to more egalitarian.

Similarly, Min and Rao (2023) derive a closed-form relationship between a minimum income threshold (target), changes in the Gini index and average national income required to meet this target, independent of the form of income distribution. They develop a generalized form of redistribution and validate it against historical

changes in inequality in India and Rwanda. Their finding suggests that meeting this target would require unprecedented rates of both growth and inequality reduction.

Although the existing body of research on this issue has offered mixed results, but none has explained, at least to our knowledge, the economic linkage between income inequality and economic growth. Therefore, our study will make significant contributions to the field in several respects. First, we use the general equilibrium condition for the goods market to derive a relationship between the MPC (marginal propensity to consume) and the Gini coefficient – a measure of income inequality. A rise (fall) in MPC must lead to an increase (decrease) in the value of the income multiplier. A change in income multiplier then brings about a change in economic growth. Therefore, we show a theoretical channel through which income inequality affects economic growth. Second, we use the VECM (vector error correction model) to determine both the long-term and the short-term effect of changes in Gini coefficient (income inequality) on MPC and thereby economic growth.

Our study is organized as follows. We have laid out our model starting from the general equilibrium condition in section-2, mentioned the data sources in section-3, laid out our empirical analyses and findings in section-4, concluded our findings in section-5, offered policy prescription in section-6, and finally clearly stated the limitations of this study in section-7.

2. THE MODEL

We start with the general equilibrium model as follows:

$$Y = C + I + G + NX \quad (1)$$

where Y is the aggregate supply, C is personal consumption expenditure, I is the gross private domestic investment, G is the government consumption expenditure and gross domestic private investment, and NX is the net exports, that is, exports minus imports. Total differentiation of the above identity yields the following:

$$\partial Y = \partial C + \partial I + \partial G + \partial NX \quad (2)$$

Multiplying and dividing the first term on the right hand side by $\frac{\partial C}{\partial Y}$ yields,

$$\partial Y = \frac{\partial C}{\partial Y} \partial Y + \partial I + \partial G + \partial NX \quad (3)$$

Since the marginal propensity to consume (MPC) equals $\frac{\partial C}{\partial Y}$ equation-3 can be rewritten as,

$$\partial Y = MPC \cdot \partial Y + \partial I + \partial G + \partial NX \quad (4)$$

Dividing both sides of equation-4 by ∂Y yields,

$$\frac{\partial Y}{\partial Y} = MPC + \frac{\partial I}{\partial Y} + \frac{\partial G}{\partial Y} + \frac{\partial NX}{\partial Y} \quad (5)$$

Equation-5 can be rewritten as,

$$1 = MPC + \frac{\partial(I+G+NX)}{\partial Y} \quad (6)$$

Rearranging the terms in equation-6 yields,

$$\partial y = \frac{\partial(I+G+NX)}{1-MPC} \quad (7)$$

Equation-7 clearly shows that, all else being equal, as MPC increases, ∂y increases, meaning that an increase in the marginal propensity to consume promotes economic growth. Currently, since low-income households tend to spend a greater percentage of their disposable income than do high-income households, a rise in income inequality is expected to lower a nation's overall marginal propensity to consume and thereby its economic growth. To see if that is the case, we propose the following regression equation:

$$MPC = a + bGini \quad (8)$$

where, MPC is the marginal propensity to consume, $Gini$ is a measure of income inequality, and a and b are regression coefficients. If the coefficient b turns out to be negative and statistically significant, then it can be concluded that a rise in income inequality (Gini coefficient) lowers a nation's marginal propensity to consume and thereby negatively affects the nation's economic growth.

3. THE DATA

Data on US GDP and consumption is collected from the Economic Report of the President website (<https://www.govinfo.gov/content/pkg/ERP-2022/pdf/ERP-2022.pdf>) and that on Gini coefficient from Statista website (<https://www.statista.com/statistics/219643/gini-coefficient-for-us-individuals-families-and-households/>). The data covers the period from 1990 to 2020.

4. EMPIRICAL ANALYSIS

Since our purpose here is to determine the short- and long-term relationship between the two variables in equation-8 and since both must be integrated of the same order for them to be in a long-term relationship, we conducted the Dickey-Fuller test on the two variables and obtained the following results:

Variable	t-statistic	Critical Value at 5%	Stationary?
GINI	-3.135229 <	-2.971851	Yes
MPC	-4.700773 >	-2.967767	Yes

The test results show that both variables are stationary. We then conducted lag selection test before conducting the Johansen (1990) cointegration test with the following results.

Lag Selection						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	80.28073	NA	6.53E-06	-6.262458	-6.164948	-6.235413
1	95.35270	26.52668*	2.70E-06	-7.148216	-6.855686*	-7.067081
2	100.1912	7.741523	2.55e-06	-7.215292	-6.727742	-7.080067*
3	105.2544	7.291019	2.39e-06*	-7.300349*	-6.617779	-7.111033*

* It indicates the lag order selected by the criterion.

Since a majority of criteria selected a lag length of 1 or 3, we conducted the Johansen cointegration test with one-to-three lag, which produced the following trace and Eigenvalue statistics:

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.464730	19.22503	15.49471	0.0131
At most 1	0.108134	2.975430	3.841665	0.0845

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized	Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.464730	16.24960	14.26460	0.0240
At most 1	0.108134	2.975430	3.841465	0.0845

The trace statistics of **19.22503** against the hypothesis of no cointegrating vector are **19.22503**, which is greater than the 5% critical value of **15.49471**. Similarly, the Max-Eigen statistic of **16.24960** against the hypothesis of no cointegrating vector is greater than its 5% critical value of **14.26460**.

Since both tests reject the hypothesis of no cointegrating vector, we proceed toward estimating both the long-run and the short-run equations by applying vector error correction method and obtained the following results:

Long-Run Equation:

$$MPC_{t-1} = 4.118679 - 7.202605GINI_{t-1} \quad (9)$$

$$t\text{-value} = (-1.68424)$$

Short-Run Equation:

$$\begin{aligned} \Delta MPC_t = & -1.046943ECT_{t-1} + 0.468766\Delta MPC_{t-1} + 0.087196\Delta MPC_{t-2} + 0.134441\Delta MPC_{t-3} \\ & (-3.48464) \quad (1.66389) \quad (0.52217) \quad (1.04668) \\ & -17.52906\Delta GINI_{t-1} - 7.471492\Delta GINI_{t-2} - 14.60571\Delta GINI_{t-3} + 0.068833 \\ & (-1.99789) \quad (-0.76824) \quad (-1.66427) \quad (1.14501) \end{aligned} \quad (10)$$

$$R\text{-squared} = 0.534926 \quad \text{Adj. R-squared} = 0.354064 \quad F\text{-statistic} = 2.957651$$

In the long-run equation, the coefficient associated with the variable GINI is negative and statistically significant at the 10% significance level indicating that a rise in income inequality lowers the marginal propensity to consume and thereby negatively affects economic growth in the long run. In the short-run equation, on the other hand, the coefficient associated with the variable, $\Delta GINI_{t-1}$ turns out to be negative and significant at the 5% level indicating that a rise in income inequality lowers the marginal propensity to consume and thereby negatively affecting economic growth in the short-run with a one-period lag. To test the robustness of the above findings, we traced the impulse responses of the MPC (marginal propensity to consume) to a one standard deviation shock to the Gini coefficient, which produced the following result:

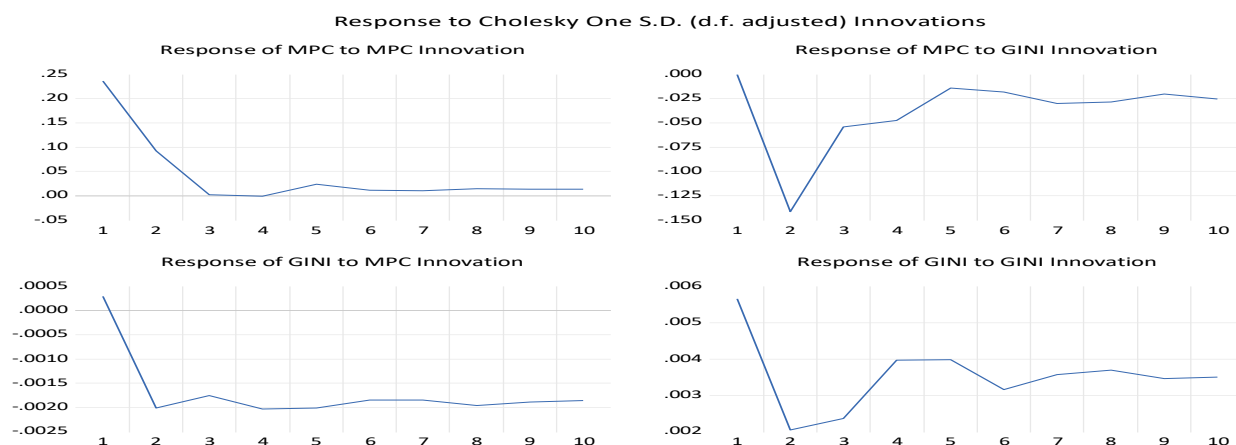


Figure 1: Response to Cholesky One Standard Deviation (degree of freedom adjusted) Innovations

The impulse response function at the top-right corner of the diagram below clearly indicates that increase in the Gini coefficient (a measure of income inequality) has a sharp negative impact on the MPC (marginal propensity to consume, a driver of economic growth) in the second period, although this effect becomes weaker in subsequent periods, it still has a negative impact.

5. SUMMARY AND CONCLUSION

In this study we derived a model in which economic growth is shown to be directly affected by a change in the MPC (marginal propensity to consume). This is logical, because any rise (fall) in the marginal propensity to consume raises (lowers) the value of the income multiplier and thereby enhances (lowers) the rate of economic growth. Then we applied the vector error correction model to determine how the Gini coefficient – a measure of income inequality – affects the MPC. We found that, in both the short-run and the long-run equations with MPC as the dependent variable, the coefficients associated with the independent variable GINI are negative and statistically significant. We further tested the robustness of this finding by tracing the impulse responses of the MPC of one standard deviation innovation in the GINI. We found the effect of innovation in GINI to have a sharp negative impact in the second period and a weak but still negative impact in subsequent periods on MPC. Therefore, we concluded that any rise in the Gini coefficient (income inequality) would negatively affect the marginal propensity to consume and thereby economic growth in both the short run and the long run. The short-term effect will, however, manifest itself with a one-period lag.

6. POLICY RECOMMENDATION

Findings of this study imply that, in order to promote economic growth, government policy should be directed toward narrowing the income gap rather than widening it.

7. LIMITATION OF THE STUDY

This finding is based on the empirical analysis of US data over the period of 1990–2020, and therefore cannot be generalized to a global context. To draw a general inference, a panel VECM model must be applied to data from multiple countries and over a longer period of time.

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