INCOME DISTRIBUTION DETERMINANTS AND INEQUALITY – INTERNATIONAL COMPARISON

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Abstract
This study shows the relationship between income distribution and other relevant economic variables and their impact on income distribution. Panel data analysis is used to study 200 world economies and identify main income determinants. Using such a large panel to study income distribution and inequality of household income make empirical results of this study significant. Paper results show there is a large discrepancy of income distribution measured by household consumption for different classes (income deciles). Inflation, unemployment, export, labour force, population and unemployment however are the main determinants between income distribution dynamics according to the result of this study.

Keywords: income distribution, inequality, Gini, panel analysis

JEL Classification: D31, E24, E6, O15

Introduction

This study addresses the issue of determinants of income distribution and inequality in all the major economies in the world. Paper main objective is to show how the distribution of income and the distribution of wealth affect to all the major macroeconomic variables. The importance of this paper lies in the fact that major world economies are studied and conclusions about the link between income distribution and its potential impact on important macroeconomic variables is compared over a large panel of countries. Many economists are studying the topic of income distribution and its determinants. However, few examine this problem in a global view.

One of the most important and most cited papers in the field is the work of Robert Perottia (1996). His paper investigates the relationship between income distribution, democratic institutions, and growth. His empirical study look into the properties and reliability of the income distribution data, the robustness of the link between income distribution and growth estimated so far, and particular channels through which income distribution affects growth. Next more cited article is Afonso et al. (2008), studying the determinants of income distribution and efficiency of public spending. They examine the impact of public spending, education, and institutions on income distribution in advanced economies. They also assess

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the efficiency of public spending in redistributing income by using Data Envelopment Analysis nonparametric approach. They results show public policies significantly affect income distribution, through social spending, and indirectly through high quality education/human capital, and sound economic institutions.

The greatest contribution of this paper refers to a holistic view of the world. In this paper authors look at the problem of the determination of income distribution and the distribution of wealth in a number of economies and reach a conclusion about the impact of income distribution on macroeconomic variables. There is a very large and extensive literature on the distribution of income and its correlation with growth. Research connected to this topic has been intensive from the 60's to the 80's of the 20th century, to all economists. However, in the 80's fewer and fewer economists are engaged in the study of economic growth and the variables that affect it; also, there is fewer economist that studies problem of income distribution. After the 2000th, there is increased interest from economists for economic growth, and they begin to write more on this issue. However, today there are still theoretical and empirical evidence that are mixed, inconsistent and do not provide the same results. The most common cross-sectional regressions examine the problem of inequality of distribution and show a negative correlation between income and economic growth while panel analysis show a model with a constant and steady performance. Including Barro (2000), who in his analysis shows that the relationship between income distribution, economic variables and economic growth as such is insignificant, taking the rich and poor countries together. There is the problem of studying the connection between the long and short term, with which it dealt Forbes (2000), whose conclusion is that in the long run, the correlation is negative, while, in the short and medium term, this relationship is positive. The biggest reason for the problems related to the study of rich and poor countries and inconsistent results from this study is the effect of the use of false indicators. The most common indicator used in these studies is the GINI coefficient, which has many disadvantages. As one of the biggest drawbacks of this indicator represents measuring problem, the Gini coefficient shows the relative and not absolute wealth. Because of, panel data analysis is used here to show the relationships between the distribution of income per household and macroeconomic variables, and not calculated Gini coefficient. The problem dealt with in this paper, is related to the distribution of income. The primary inquiry of this paper is whether the inequality that exists or does not exist in certain countries in the distribution of income among households has an impact on economic growth and economic variables. However, the particular problems of this study relate to the fact that this work will seek to determine whether there is an inequality in the distribution of income among households in all major economies of the world. Another side of the goals of this research is to compare the developed and underdeveloped countries, by inequalities in income distribution and possible impacts on economic growth.

This study is based on data for the 200 most important economies of the world, analysing the distribution of income in years 2000 and 2005 comparing it with macroeconomic variables in the same periods.

The rest of the article is structured as follows: First, the existent literature on income distribution determinants and inequalities is given in section 2. Description of the methods of research, procedures and data collection used in the study are presented in section 3. The results of the analysis are then discussed. Finally, implications, limitations, and directions for future research are offered.

1. Literature review

On the subject of income distribution and inequality, there is a large body of literature. Determinants of income distribution and their impact on the economy and economic growth are seen from different viewpoints.

Authors Galor and Zeira (1993) deal with the Macroeconomy and the income distribution. Their paper explores the theoretical linkage between income distribution and macroeconomics, through investment in human capital. They explore how income and wealth distribution are related to long-run macroeconomic issues, economic growth and sectorial adjustment. Their findings show that the distribution of wealth can significantly affect aggregate economic activity, both in the short and the long run.

Afonso et al. (2008), studying the determinants of income distribution and efficiency of public spending. In the paper they survey the impact of public spending, education, and institutions on income distribution in advanced economies. They also assess the efficiency of public spending in redistributing income by using Data Envelopment Analysis nonparametric approach. They see that public policies significantly affect income distribution, through the social spending channel and indirectly by means of high quality education/human capital, and by sound economic institutions.

Okidi and others (2004), wrote a paper entitled “Understanding the determinants of income inequality in Uganda." Their article is interesting because Uganda in the last period of ten years experienced gradual and sustained growth and poverty decline. Benefits of growth, however, are not being distributed equally. This study provides insights into deepening understanding of the determinants of income inequality in Uganda. Decompositions by subgroups revealed that household characteristics are influential components of overall inequality, a finding also supported by the results based on the regression analysis.

Perdiz and others (2010) wrote about World’s Growth and Inequalities. This article focuses on the relevance of the choice of measure (or meaning) of inequality. In the short term, economic growth may be accompanied by the simultaneous rise of some aspects of inequality and fall of other ones. In the long term, economic growth will hardly cause a robust increase in inequality because inequality has reached historic highs.

Wan and others (2006), wrote about inequality –growth nexus in the short and long run: Empirical evidence from China. They argue that the conventional approach of data averaging is problematic for exploring the growth-inequality nexus. He introduces the polynomial inverse lag framework so that the impacts of inequality on investment, education, and ultimately on growth can be measured at precisely defined time lags.

Kookshin (1997) wrote about trends in and determinants of income distribution in Korea. He observes that disagreeing with the official statistics, the size distribution of income in Korea has not improved steadily since the late 1970s but deteriorated worst ever in the late 1980s. High rise of real estate price, which causes prevalent sense of relative deprivation, is also a major root of worsened income distribution in the 1980s.

Alejos (2003) observe contribution of the determinants of income inequality in Guatemala. Their study decomposes income inequality in Guatemala in factors related to human capital, ethnic and gender discrimination, the occupational structure, and non-labour income. Article results show a significant variation between the determinants at national level, and different socio-economic group Agriculture and livestock workers show as most

heterogeneous group. The role of education as one of the main determinants of income inequality is persistent over the observed sample.

Income inequality and economic growth: enhancing or the retarding impact is studied by Mekenbayeva and others (2011). They examine the relationship between income inequality and economic growth in developed and developing countries. The analysis is performed using panel data model for nine countries for 1980-2009 period. As an indicator of income inequality, GINI index is considered, and real GDP per capita is used for exhibiting economic progress in the countries under study.

Odedokun and others (2001) worked on determinants of income inequality and its effects on economic growth, evidence from African countries. The paper empirically investigates, in the context of African countries, the determinants of income distribution and inequality, the effect of inequality on economic growth and the channels through which inequality affects growth.

Campana et al. (2006) have written a book on the general distribution of income, which looks very notion of income distribution, its role and impact on economic growth and other determinants of income distribution. Another book called Modelling Income Distributions and Lorenz Curves by Chotikapanich (2006), Is a collection of papers, giving great contributions to the study of personal income distribution and inequality measures.

Roine and others (2009) wrote about long-run determinants of inequality. They analyse determinants of income inequality using a newly assembled of 16 countries over the twentieth century. They find high economic growth disproportionately increases the top percentile income share at the expense of the rest of the top decile.

Gobbin and others (2004) worked on income inequality data in growth empirics: from cross-sections to time series. In their opinion, researchers studying income inequality have to look for suitable data. Although most researches just draw on some ready-made dataset, obtaining reliable data is not that straightforward but possibly troublesome. Their findings highlight some of the pitfalls in the use of inequality data. Knowledge also has a considerable impact on income distribution in small open economies according to the study of Čepar and Bonjec (2012). Oil prices transfer shocks on the economic policy alter the income distribution as well, see Semko (2013). Minimum wage impact on the income distribution is studied in Blažević (2013). Future studies on income distribution and inequality should address the issue of long memory in inequality and income dynamics, see Škare and Stjepanović (2013). Society impact on the income distribution is rather important as well and must be also investigated as advanced by Sharma (2013).

All papers dealing with this issue can be divided into two categories. In the first category would belong all those works that deal with themes of inequality in income distribution and the study of individual determinants of income distribution in a given country. In the second category would belong those works that examine the impact of income distribution in one of the macroeconomic variables, such as public spending, government spending, human capital and other important factors. From these facts, there is a need to write such a work, which will incorporate the inequality the distribution of income in all countries, and the impact on all the major macroeconomic variables, the same in all countries. Large number of variables observed for a large panel of countries contributes to the overall topic of this paper.

2. Data and Methodology

The target data for this study consisted of two hundred economies across the globe, with data on household's classes (deciles) based on their consumption. Data on household consumption are used to determine the distribution of income and detailed explanation of household wealth. Later, they are compared with the ten most important economic variables (see table A11) of each country and for the following years; (2000) and (2005).

In this paper, panel data analysis technique is used. Data sources are the International Monetary Fund and IFS Canback Global Income Distribution Database (C-GIDD). The data set covers 210 countries, 692 subdivisions (states, provinces) and 1020 major cities from 1997 until 2017. In this paper, main economic forces in nations economy, such as import, export, GDP, investment spending, government spending are examined. The importance of a particular indicator and potential impact on household consumption is examined. Using panel analysis, one must decide for one of two models of choice within the panel analysis, such as Fixed or Random effect. For the purpose of choice between the two, Hausman test under the null hypothesis of random effects vs. the alternative the fixed effects is used. The Hausman test examines if the individual effects are uncorrelated with other regressors. If individual effects show correlation with any other regressor, the random effect model violates a Gauss-Markov assumption and is no longer Best Linear Unbiased Estimate (BLUE). It is because individual effects are parts of the error term in a random effect model. Therefore, if the null hypothesis is rejected, a fixed effect model is favoured over the random counterpart. In a fixed effect model, individual effects are parts of the intercept, and the correlation between the intercept and regressors does not violate any Gauss-Markov assumption; a fixed model is still BLUE. Hausman test results show Prob> chi2 = 0.0032 and given that the score is less than 0.05, the Fixed effect model fit the data well. For the list of variables see table A11.

After this step, diagnostics is applied to the data and the test for the presence of heteroskedasticity. The test results are shown in table no. 1. Prais-Winsten regression is used to solve the problem of heteroskedasticity.

Table no. 1: Heteroskedasticity test

Model
Modified Wald test for groupwise heteroskedasticity in fixed effect regression model H0: sigma(i)^2 = sigma^2 for all i chi2 (209) = 3.5e+31 Prob>chi2 = 0.0000

Source: Authors calculation

Prais-Winsten regression for a single household income (deciles) is calculated with regression results in table no. 2.

3. Resulta and Discussion

In table no. 2 and graph A1, several variables that have a substantial impact on household consumption are given. These variables are the CPI (Consumer Price Index), EXP (Export), EMP (Employment), LFORCE (Labour Force) and POP (Population). Looking at prices, there is a logical effect of the basket of goods in disposable income and household

consumption (see table A1 and A2). CPI represents a basket of goods purchased by the average households on which calculate the rate of inflation (see table A3). Given that directly determines the purchase of household, there is a more noticeable direct impact on the observed variable disposable income of households (see table A4). Export as variable necessary for household consumption in several deciles having significant effects on higher deciles with a larger household budget (see table A7 and A8). For households with smaller budgets, there is no influence of the export, because poorer households are not engaged in activities that are related to exports. Households with higher disposable income have a higher probability of participating in certain activities that affect exports as an important variable.

Table no. 2: Calculated regressions (best fit) by households income deciles

Best fit models
Model 1 = 154893 + 5367.76** CPI + 6.669 Emp – 14.492 Forex – 7.246 GDP_per_capita** + 85.386** Lforce – 1164.85** Unemployment
Model 2 = 752708** – 1315.66** CPI – 8.008** Forex + 81.814** Lforce + 26941.9** Population – 658.82** Unemployment
Model 3 = 605738 – 851.11* CPI – 4.606** Emp – 7.211* Exp + 65.65231** Lforce + 25177.14** Population
Model 4 = 157296 - 9.325** Exp + 3.954** GDP_per_capita + 43.999** Lforce + 24479.53** Population + 162.75* Unemployment
Model 5 = - 473817* + 1323.812** CPI + 4.551** GDP_per_capita + 2424.09** Population + 271.16** Unemployment
Model 6 = - 1.470083** + 244.962** CPI + 11.8579** Emp + 20595.32** Population + 214.05 Unemployment**
Model 7 = - 1.794680** + 2421.02** CPI + 12.262** Emp + 15.378** Exp – 21.575** Lforce + 13413.2** Population
Model 8 = - 89368 + 4.11** Emp + 14.67** Exp – 15.576** Lforce + 2242.296** Population + 157.556** Unemployment
Model 9 = 478466** + 0.699 Emp** – 5.804** Lforce – 2459.314** Population
Model 10 = - 259.536 – 350.54** CPI + 0.951* Emp

Source: Authors calculation
*Notes: **, * at 1% and 5% significance level*

The next variable that has a significant impact overall is employment (see table A6 and A9). Higher employment has a greater impact, and it increases household budget and smaller employment decreases household budget (see table A5).

Impact of the employment variable on the disposable income of households is expected (see table A10). The following two variables that are important for household consumption are the workforce and population.

The labour force and population directly affect employment and thus on household disposable income and household consumption. The impact of these three variables is pervasive throughout all classes regardless of the size of disposable income.

If we consider the variable CPI (Consumer Price Index), through all deciles of household consumption, we can see that in the case of percentage changes in household disposable income leads to very large changes in the CPI variables. However, it is necessary to point out that at extremely low and extremely high-income household consumption, negative impact of prices is present while for middle income consumption prices exhibit positive effects. In the case of other variables EXP, or Exports, the percentage change in the observed variables result in a slight change in the variables of export. The sign of these variables can also vary depending on the observed deciles. Next observed variable is EMP or employment. Employment always has a positive sign, and always has a positive effect on household consumption, regardless of the level or class to which the household belongs. However, the percentage change in household income causes a slight change in the employment. Labour force, has a negative impact on the income of consumers in the higher income deciles. We can also notice that the response of the variables in absolute terms on the change in the percentage of household disposable income is always the same in all deciles. As the last significant variable population appear in the model. Population always has a positive sign regardless of the income deciles, but also, we can see that there is a substantial change in response to the percentage change in household consumption.

Conclusions

The purpose of this study was to show the determinants of income distribution and inequality in all the major economies in the world. The main objective of this study was to show how the distribution of income and the distribution of wealth affect to all the major macroeconomic variables. Result of the study shows that regardless of the amount of disposable income or class, variables that have an impact on the distribution of income are always the same. From the research comes out that the most important variable are CPI, Employment, Labour force and Population. All of these variables, in theory, have the greatest impact, however now it is proven in this empirical study, on the basis of data for all major economies in the world, regardless of the class to which the household belongs, and regardless of the size of income. If we take into account relevant variables observed from the research results, we can see that these are all variables that have a direct impact on the distribution of income in economic theory.

So we have the CPI or Consumer Price Index, which in itself contains information about purchasing and preferences of purchase by the consumer. The growth or decline of this indicator is a direct indicator of inflation, and also directly affects the possibility of households purchase, and thus clearly affects income distribution. Next influential variable in the study is employment. Household's employment condition has a direct impact on linked disposable income since there exists a significant link between employment and inequality of income distribution. The next variable is the labour force. The variable itself represents the total available labour force in a particular market or a particular economy. Workforce as such also has a direct impact on employment but also on income distribution, increasing the labour force reduces potential income, while reducing manpower growth of potential households' income is expected. Due to the direct connection between workforce and income, it appears statistically significant for all regression models used in the paper.

The above findings of this study have drawbacks that however do not invalidate empirical results found here. Having data on panel time series on multiple annual observations would have been much better, and the empirical results more robust. A further disadvantage of this research is that countries are not separated in connected groups. Much better comparison would be if countries were categorized according to some standard criteria, and then comparing them separately. Comparing household from individual countries that have the identical geographical features or the identical level of development, which belong to some international associations would make paper results more consistent.

With all these drawbacks, results of this paper demonstrate a direct link between several variables that affect household disposable income and thereby also on their spending. The impact of these variables proved to be a very large and equally distributed, regardless of the class of spending to which a certain household belongs. The impact of variables such as employment, population, CPI, both theoretical and practical, is proven. In future research, we need to increase the number of yearly observations for all countries, and also increase the number of countries under study. Countries should be grouped according to some mutual characteristics. In this way, comparing those countries that are geographically, historically or otherwise connected would draw conclusions for individual country's feature in the group.

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Appendix

Graph A1. Income inequality determinants
Source: Authors calculation

Table A1: Best fit model 1

Group variable: id		**Number of obs**	**417**
Time variable: Year		Number of groups	209
Panels:	correlated (balanced)	Obs per group: min	1
Autocorrelation:	no autocorrelation	avg	1.995.215
		max	2
Estimated covariances	= 21945	R-squared	0.9596
Estimated autocorrelations	= 0	Wald chi2(2)	171.71
Estimated coefficients	= 18	Prob > chi2	0.0000

Source: Authors calculation

Table A2: Best fit model 2

Group variable: id		Number of obs	417
Time variable: Year		Number of groups	209
Panels: correlated (balanced)		Obs per group: min	1
Autocorrelation: no autocorrelation		avg	1.995.215
		max	2
Estimated covariances	= 21945	R-squared	0.9818
Estimated autocorrelations	= 0	Wald chi2(2)	89.90
Estimated coefficients	= 18	Prob > chi2	0.0000

Source: Authors calculation

Table A3: Best fit model 3

Group variable: id		Number of obs	417
Time variable: Year		Number of groups	209
Panels: correlated (balanced)		Obs per group: min	1
Autocorrelation: no autocorrelation		avg	1.995.215
		max	2
Estimated covariances	= 21945	R-squared	0.9852
Estimated autocorrelations	= 0	Wald chi2(2)	246.16
Estimated coefficients	= 18	Prob > chi2	0.0000

Source: Authors calculation

Table A4: Best fit model 4

Group variable: id		Number of obs	417
Time variable: Year		Number of groups	209
Panels: correlated (balanced)		Obs per group: min	1
Autocorrelation: no autocorrelation		avg	1.995.215
		max	2
Estimated covariances	= 21945	R-squared	0.9894
Estimated autocorrelations	= 0	Wald chi2(2)	4.83
Estimated coefficients	= 18	Prob > chi2	0.0895

Source: Authors calculation

Table A5: Best fit model 5

Group variable: id		Number of obs	417
Time variable: Year		Number of groups	209
Panels: correlated (balanced)		Obs per group: min	1
Autocorrelation: no autocorrelation		avg	1.995.215
		max	2
Estimated covariances	= 21945	R-squared	0.9822
Estimated autocorrelations	= 0	Wald chi2(2)	9.62e+10
Estimated coefficients	= 18	Prob > chi2	0.0000

Source: Authors calculation

Table A6: Best fit model 6

Group variable: id		Number of obs	=	417
Time variable: Year		Number of groups	=	209
Panels: correlated (balanced)		Obs per group: min	=	1
Autocorrelation: no autocorrelation		avg	=	1.995.215
		max	=	2
Estimated covariances	= 21945	R-squared	=	0.9254
Estimated autocorrelations	= 0	Wald chi2(2)	=	14.55
Estimated coefficients	= 18	Prob > chi2	=	0.0007

Source: Authors calculation

Table A7: Best fit model 7

Group variable: id		Number of obs	=	417
Time variable: Year		Number of groups	=	209
Panels: correlated (balanced)		Obs per group: min	=	1
Autocorrelation: no autocorrelation		avg	=	1.995.215
		max	=	2
Estimated covariances	= 21945	R-squared	=	0.7888
Estimated autocorrelations	= 0	Wald chi2(2)	=	7.81
Estimated coefficients	= 18	Prob > chi2	=	0.0201

Source: Authors calculation

Table A8: Calculated Best fit model 8

Group variable: id		Number of obs	=	417
Time variable: Year		Number of groups	=	209
Panels: correlated (balanced)		Obs per group: min	=	1
Autocorrelation: no autocorrelation		avg	=	1.995.215
		max	=	2
Estimated covariances	= 21945	R-squared	=	0.9116
Estimated autocorrelations	= 0	Wald chi2(2)	=	1113.06
Estimated coefficients	= 18	Prob > chi2	=	0.0000

Source: Authors calculation

Table A9: Best fit model 9

Group variable: id		Number of obs	=	417
Time variable: Year		Number of groups	=	209
Panels: correlated (balanced)		Obs per group: min	=	1
Autocorrelation: no autocorrelation		avg	=	1.995.215
		max	=	2
Estimated covariances	= 21945	R-squared	=	0.9682
Estimated autocorrelations	= 0	Wald chi2(2)	=	1.44e+12
Estimated coefficients	= 18	Prob > chi2	=	0.0000

Source: Authors calculation

Table A10: Best fit model 10

Group variable: id		Number of obs	=	417
Time variable: Year		Number of groups	=	209
Panels: correlated (balanced)		Obs per group: min	=	1
Autocorrelation: no autocorrelation		avg	=	1.995.215
		max	=	2
Estimated covariances	= 21945	R-squared	=	0.9911
Estimated autocorrelations	= 0	Wald chi2(2)	=	45.43
Estimated coefficients	= 18	Prob > chi2	=	0.0000

Source: Authors calculation

Table A11: Variable lists and description

Variable	Details
HH	Household Consumption
CPI	Consumer price index
EMP	Employment
EXP	Export
FOREX	Foreign exchange
GDP	Gross domestic product
GDP_PER_CAPITA	Gross domestic product per capita
GOVCON	Government consumption
GFCF	Gross fixed capital formation
FINCONS	Final consumption - Government + Household consumption
IMP	Import
Lforce	Labour force
Population	Population
Unemployment	Unemployment
Theilt	Theil-t index
GINI	Gini coefficent
Plato	Plato coefficent
Hoover	Hoover coefficent
Total	19

Source: Authors calculation