

ECONOMETRIC MODELS OF ASSESSING THE CONSEQUENCES OF INCOME INEQUALITY

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Abstract

It is considered necessary to select statistical indicators that maximally reflect the level of formation, content and nature of the factors of income stratification of the population, and group them according to the appropriate attribute. It should be noted that the highest quantitative correlation is observed between the average per capita income of the population and the subsistence minimum.

Keywords:

Quantitative correlation, income inequality, regression analysis, stimulating reproductive and social functions, households, hypothesis, STATISTICA analysis package, correlation analysis.

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INTRODUCTION

The standard and quality of life of the population is manifested, first of all, by the average per capita monetary income of the population (monthly), the monetary income at the real disposal of the population, the size and structure of the monetary income of the population. All the conducted studies have shown the socio-economic consequences of the decrease in the income of the population, the increase of stratification and inequality. In recent decades, the impact of income inequality on economic growth and its growth has been widely studied. Most studies using cross-sectional data have shown a negative relationship between income inequality and economic growth¹.


Economic growth is widely used as a measure of the economic potential and development of countries, and the influence of other phenomena on economic growth is an important issue in macroeconomics. In recent decades, income inequality has increased significantly in countries around the world. Economists have shown great interest in assessing the impact of income inequality on economic growth in order to provide the best solutions in times of crisis². The results of an empirical analysis conducted by Martinez on the basis of 94 income level (high, middle and low) countries between 1985 and 2017 show that there is a positive significant relationship between income inequality and economic growth for low-income countries in the long run.

However, there is a negative but not statistically significant relationship in high- and middle-income countries. In addition, when all countries in the sample are regressed together, no statistically significant relationship is found between income inequality and economic growth³.

¹José Javier Caloca Martinez. Income Inequality and Economic Growth. <https://www.researchgate.net/publication>.

²Piketty, T., and Goldhammer, A. 2015. *The Economics of Inequality*. Cambridge, Massachusetts; London, England: Harvard University Press. Retrieved May 16, 2020, from www.jstor.org/stable/j.ctvjnrk.

³José Javier Caloca Martinez. Income Inequality and Economic Growth. <https://www.researchgate.net/publication>.

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LITERATURE REVIEW

Lynch et al., based on the income inequality and health correlation hypothesis, income distribution has a strong effect on population mortality and health. Evidence for the hypothesis supports redistributive policies aimed at reducing income inequality. With some exceptions, including Wagstaff and van Doorslaer, Mellor and Milieu, Gravelle, Beckfield, and Jen et al., economists (Shmueli 2004; De Vogli et al. 2005; Ram 2006; Dorling et al. 2007; Babones 2008; Karlsson et al. 2009; Biggs et al. 2010; Idrovo et al. 2010). Much of the research on income inequality and mortality has focused on the community and individual levels, as discussed in several review articles.

Economists' analysis of the relationship between income inequality and mortality focuses on the population level for three reasons: first, an interest in understanding differences in health status at the population level; income inequality affects the entire population, not individual shares; and third, because a population-level approach allows us to consider social and environmental causes. Research findings show that increased income inequality can lead to increased birth rates and under-15 mortality for both sexes. This relationship lasts for women from birth to 15 years, and for men up to 50 years.

However, since the contribution of mortality under the age of 50 at birth to life expectancy is relatively small in developed countries, it was not possible to determine the effect of income inequality on life expectancy. However, these results show that there are effects of income inequality on the health and mortality of children and young and middle-aged men, and suggest that redistributive policies that reduce income inequality can reduce mortality among this population⁴. Mortality has steadily declined over time, but since the 1970s, income inequality has steadily increased in industrialized countries⁵.

Because per capita income in developed countries explains only a small part of life expectancy⁶, it has been hypothesized that income distribution can explain differences in mortality between rich countries⁷. This hypothesis of a link between income inequality and health is based on the idea that reducing the transition from rich to poor within population income inequality improves health at the population level, because at relatively low income levels the marginal increase in health is higher than marginal health at higher income levels.

Other independent variables in the sample reported higher statistical significance in explaining economic growth between countries than inequality. It has been found by researchers that the level of investment is positively related to economic growth in poor and developing countries, which confirms the neoclassical theory of Solow (1956), which is the basis of the models used.

⁴Roberta Torre & Mikko Myrskylä, 2011. "Income inequality and population health: a panel data analysis on 21 developed countries," MPIDR Working Papers WP-2011-006, Max Planck Institute for Demographic Research, Rostock, Germany.

⁵Subramanian, SV and I. Kawachi. 2004. "Income Inequality and Health: What We Have. "Learned So Far?" *Epidemiol Rev* 26(1): 78-91.

⁶Preston, SH 1975. "The Changing Relationship between Mortality and Level of Economic Development." *Population Studies* 29(2): 231-248.

⁷Rodgers, GB 1979. "Income and Inequality as Determinants of Mortality: An International Cross-Sectional Analysis." *Population Studies* 33(2): 343-351.

RESEARCH METHODOLOGY

Mechanisms that may be related to income inequality and population health are classified as follows ⁸:

- the personal income interpretation suggests that individual absolute income explains all the effects of the income distribution on health, and that the effects of income inequality on population health are simply the sum of the effects of personal income;
- the psychosocial interpretation states that human health is influenced by people's perception of their relative position in the social hierarchy, and that lower positions may be associated with less investment in human capital, lack of social cohesion, and feelings of insecurity;
- A non-material interpretation suggests that income inequality affects health mainly due to the lack of human resources and the lack of regular financing of social and environmental conditions.

Although most studies have found associations between income inequality and health outcomes, the nature and characteristics of the population-level association between income inequality and health have been understudied. For example, from a total of 26 cross-country studies, 15 studies supported the hypothesis of a link between income inequality and health, 5 reported mixed results, and the remaining 6 analyzes did not provide evidence for a link between income inequality and health ⁹.

Overall, the studies found that this hypothesis was most relevant for infant mortality, but less so for adult mortality. The wide variation in results can often be attributed to the method used, the quality of the data, and the study population. For example, some studies combine less-developed and developed countries or conduct only cross-sectional analyzes that do not fully capture country-specific characteristics such as social security systems. In addition, most of the individual-level research supporting the income-health inequality hypothesis was conducted after the mid-1990s.

This could be interpreted as evidence of changes in the relationship between income inequality and health over time, or as evidence of improved data quality and better methods that provide less biased results ¹⁰.

Most of the early studies that found a link between income inequality and health were based on cross-sectional analyzes without adjusting for potential confounding factors (eg, welfare systems, environmental factors). In a recent study, a cross-sectional analysis of 21 developed economies controlling for per capita income and educational attainment found that the Gini index was negatively associated with life expectancy at birth ¹¹.

A similar study using data from 126 countries also found a positive correlation between income inequality and mortality, particularly among men aged 15-29 ¹². Another cross-sectional study focusing on 75 countries found no association.

⁸Lynch, J., GD Smith, GA Kaplan, and JS House. 2000. "Income inequality and mortality: importance to health of individual income, psychosocial environment, or material conditions." *BMJ* 320(7243): 1200-1204.

⁹Lynch, J., GD Smith, S. Harper, M. Hillemeier, N. Ross, GA Kaplan, and M. Wolfson. 2004. "Is Income Inequality a Determinant of Population Health? Part 1. A Systematic Review." *The Milbank Quarterly* 82(1): 5-99.

¹⁰Judge, K. 1995. "Income distribution and life expectancy: a critical appraisal." *BMJ* 311(7015): 1282-1285.; Judge, K., J.-A. Mulligan, and M. Benzeval. 1998. "Income inequality and population health." *Social Science & Medicine* 46(4-5): 567-579.

¹¹De Vogli, R., R. Mistry, R. Gnesotto, and GA Cornia. 2005. "Has the relationship between income inequality and life expectancy disappeared? Evidence from Italy and above industrialized countries." *J Epidemiology and Community Health* 59(2): 158-162.

¹²Dorling, D., R. Mitchell, and J. Pearce. 2007. "The global impact of income inequality on health by age: an observational study." *BMJ* 335(7625): 873-.

In general, the following main shortcomings can be pointed out in cross-sectional analyses: use of simple two-dimensional methods without proper control; not taking into account the possibility of unobtrusive country diversity; income distribution measures that are often not internationally comparable .

ANALYSIS AND RESULTS

Based on statistical data, it should be noted that the share of income received in the form of wages is high in the income of the population, and the income from labor activity (income from hired workers and self-employment) constitutes a significant share of the total income of the population. This, in turn, makes it necessary to evaluate the factors affecting the average salary. The labor market, a special sector of the economy, is the most important component of the modern functioning market mechanism.

Currently, considering the size of the salary and the problem of determination, and assessing the current situation, we can clearly say that today's labor market is characterized by a decrease in the nominal and real wages of the population, low indicators of social standards, as well as arrears of wages by employers. which has a negative impact on the standard and quality of life of the population. Wage level production factors (working conditions and results, quality of labor activity), social (minimum wage, living wage), market (employment level, demand and supply of labor) and institutional (system of social partnership, state regulation) is formed ¹³by

Wages perform stimulating reproductive and social functions, which help to understand the whole nature of wages and the problems that arise in its improvement.

Table 1

Results of regression analysis¹⁴


	<i>b</i> -coefficient	Standard error of <i>b</i> -coefficient	<i>b</i>	<i>b</i> is the standard deviation of the regression coefficient or	<i>t</i> (70)	<i>p</i> - level of importance
Arbitrary variables			-22619.70	5589.22	-4,05	0.00
X2	0.12	0.04	285.9	96.18	2.97	0.00
X3	0.55	0.04	3.2	0.23	13.80	0.00
X4	-0.04	0.05	-0.1	0.10	-0.76	0.43
X5	0.48	0.05	0.1	0.01	9.94	0.00

Note : Multiple correlation coefficient $R = 0.96$; Determination coefficient $R^2 = 0.92$; corrected coefficient of determination $R^2 = 0.92$; $F(4,74) = 214,44$.

In the empirical analysis carried out by Grishanova, as factors affecting the average monthly salary of the population, X1 is the number of employed population in the economy ; X2 - population employment level; X3 – amount of established living minimum; X4 – average consumption costs per capita; X5 – GDP per capita; X6 – performance indicators of small enterprises; X7 – consumer price indices; X8 – price indices of industrial goods producers are

¹³ Grishanova I.A. Econometric analysis of the influence of social and economic factors on srednemesyachnuyu zarabotnuyu platu naseleniya Rossii. https://elibrary.ru/download/elibrary_36709838_9549115.

¹⁴ Grishanova I.A. Econometric analysis of the influence of social and economic factors on srednemesyachnuyu zarabotnuyu platu naseleniya Rossii. https://elibrary.ru/download/elibrary_36709838_9549115.

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obtained. As a result of the correlation analysis, it was determined that the influence of X1 - the number of employed people in the economy, X6 - performance indicators of small enterprises and X8 - price indices of industrial goods producers is not significant, and the factors were excluded from the model. As a result of the analysis, factors X2 (employment level), X3 (standard of living), X4 (average consumption expenditure per capita) and X5 (GNI per capita) were included in the multiple regression equation. Using the STATISTICA analysis package, a regression analysis was performed and the dependence of the average monthly salary on the selected factors was determined (Table 1).

The selection of factors on the basis of correlation analysis showed that the influence of all factors on the average monthly salary of the population is not statistically significant. In the analysis, influencing factors were identified and regression analysis was performed based on these factors (Table 2). The regression analysis showed that the positive effect of employment rate, living wage and GNI per capita on the average monthly salary of the population is highly statistically significant. The average monthly salary of the population increases with the growth of the employment level of the population, the living wage and GNP per capita. The highest predicted value of the average monthly salary is achieved only with the maximum values of the independent variables.

Table 2

Final regression analysis results¹⁵

	<i>b</i> -coefficient	Standard error of <i>b</i> -coefficient	<i>b</i>	<i>b</i> is the standard deviation of the regression coefficient error	<i>t</i> (70)	<i>p</i> - level of importance
Arbitrary variables			-21999.7	5514.65	-3,99	0.00
X2	0.11	0.04	264.1	96,60	2,88	0.00
X3	0.55	0.04	3.2	0.23	13.86	0.00
X5	0.46	0.04	0.1	0.01	10,87	0.00

Note : Multiple correlation coefficient $R = 0.96$; Determination coefficient $R^2 = 0.96$; corrected coefficient of determination $R^2 = 0.92$; $F(4,74) = 287.32$.

Thus, taking into account the high share of income in the form of wages in the structure of the population's income, influencing factors have different indicators, while it can be shown that some factors have a direct effect, while others have an indirect effect. Based on this, we identified direct (sources of income generation) and indirect influencing factors (labour market situation, inflation and consumer prices, working conditions of small and medium-sized enterprises) according to the nature of the impact. large enterprises, degree of monopolization of the economy, labor productivity, etc.).

Most of the research conducted to assess the quantitative relationship between various factors and the level of income of the population is based on the use of correlation and regression analysis for econometric modeling. To build an econometric model, the following conditions must be met: the presence of a sufficiently large set of observations, its uniformity, the accuracy of the input data.

¹⁵ Grishanova I.A. Econometric analysis of the influence of social and economic factors on srednemesyachnuyu zarobotnuyu platu naseleniya Rossii. https://elibrary.ru/download/elibrary_36709838_9549115.

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Personal income of households is one of the main components of national income. From the above apparently that of households of income, dividends, various social transfers, valuable papers or another financial from operations removable with interest revenues organize does. Current in the circumstances social directed the budget formation in the process social transfers too population of income significant part organize do it. Households income including real incomes or mostly in the literature personal at the disposal of income they live well-being increase material basis organize does.

From the above apparently as it is personal at the disposal of income formation level taxes and state budget expenses effect is enough. Because taxes by means of received total income decrease if observed, budget costs especially present in the circumstances social to the field in budget expenditures work right of weight high share personal at the disposal of income to increase effect is enough. Also social transfers too personal at the disposal of income in formation high to weight have is happening. Therefore, the fiscal¹⁶ instruments of regulation of the country's economy, taxes, state budget expenditures, are important in regulating the income of the population.

CONCLUSIONS


In general, the relationship between income inequality and economic growth is varied, based on the results of most scientific studies conducted in recent decades on the impact of income inequality on economic growth and its relationship. Empirical analysis shows that there is a significant positive relationship between income inequality and economic growth for low-income countries in the long run. However, in high- and middle-income countries there is a negative but not statistically significant association.

Income inequality can have negative consequences, as it increases the level of poverty and seriously affects the income of the population. Also, income inequality limits access to credit and reduces all investment and opportunities from which the poor can benefit. In addition, income inequality reduces access to education for certain segments of the population by limiting how they can contribute to society and the economy.

There are many ways to measure income inequality, and a common way to measure inequality is to divide the income distribution into quantiles and calculate the cumulative incomes within those segments, and you can also determine statistical measures of variance, such as the squared coefficient of variation and the relative standard deviation. Finally, there are the Gini coefficient, the Hoover index, the Theil index, and other indices that represent an effective way of calculating income inequality.

Traditionally, fiscal policy mechanisms have been used primarily to manage inequality. On the one hand, the mechanism of tax policy. on the other hand, methods of public expenditure, transfers, financing of certain types of activities, and thirdly, social production and social benefits are used to alleviate inequality.

¹⁶ Khojiev J.D. A mechanism for reducing the level of differentiation in real incomes of the population. https://iqtisodiyot.tsue.uz/sites/default/files/maqolalar/44_Khojiyev_J.pdf.

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