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INEQUALITY OF INCOME DISTRIBUTION: A COMPARATIVE ANALYSIS FOR DEVELOPED AND DEVELOPING ECONOMIES

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Abstract

This study examines the changes in income distribution across selected countries from 2015 to 2022, with a focus on the significant impact of the Covid-19 pandemic (2020-2021) on global income distribution. The data used in this analysis was sourced from the World Inequality Database, specifically looking at household income adjusted for after-tax earnings. Each household's income was allocated among adults aged 20 and older. The data were organized into ten income groups, creating ten distinct income levels for comparison. The study includes ten countries comprising five developed countries, namely; France, Germany, Netherlands, Italy, and the United Kingdom and five developing countries, namely; Czechia, Hungary, Romania, Greece and Turkiye. The analysis spans the eight-year period from 2015 to 2022. All countries implemented various social programs to support those people most affected by the Covid-19 pandemic. Developed countries generally succeeded in protecting and restoring their pre-pandemic income distribution. In contrast, developing countries faced challenges with their social programs. Although the developing countries were successful in increasing their overall national income, they struggled to restore their pre-pandemic income distribution. An income

transfer occurred from the bottom 20% and the middle 60% to the top 20% in these developing nations. By 2022, the average income per capita for the bottom 10% in developing countries was \$9,500 while the top 10% was \$141,000 resulting in a 14.8-fold difference. In developed countries, these figures were \$25,700 for the bottom 10% and \$160,400 for the top 10%, yielding a 6.2-fold difference.

Keywords: Income Distribution, Income Deciles, Income Inequality, Developed Countries, Developing Countries

JEL Codes: D3, O15, E64

1. Introduction

Income inequality has long been a critical issue in both developed and developing countries, and that significantly impacts social stability and economic growth. The Covid-19 pandemic, which began in late 2019 and escalated globally in 2020, has worsened the problem by disrupting economies and deepening existing inequalities. In response, governments around the world have implemented various social policies and programs aimed at mitigating the pandemic's economic impact, protecting vulnerable populations, and maintaining equitable income distribution. This study seeks to analyze changes in income distribution in selected countries between 2015 and 2022, with a specific focus on the effects of the Covid-19 pandemic. The study hypothesizes that the pandemic has disrupted income distribution with varying degrees of recovery success observed across different countries. By obtaining income data from the World Inequality Database, the study compares changes in income distribution between five developed countries, namely; France, Germany, Netherlands, Italy, and the United Kingdom and five developing countries, namely; Czechia, Hungary, Romania, Greece and Turkiye. The analysis covers an eight-year period capturing the pre-pandemic, pandemic, and post-pandemic eras. Through this comparative approach, the study aims to light on the effectiveness of social policies in mitigating income inequality and the resilience of different economies in restoring equitable income distribution. The following section reviews the related literature. Then, the dataset and related analysis and findings are presented. The final section covers the concluding remarks.

2. Literature Review

In their research Qian & Fan (2020) examine the economic impact of Covid-19 in mainland China using data from March-April 2020. They find that income losses are mitigated by factors like level of education, family economic status, and state-sector employment. Those in harder-hit regions or families face greater income declines. The study concludes that Covid-19 exacerbates existing inequalities and creates new disparities recommending public policies to support vulnerable and marginalized populations for recovery.

Han et al. (2020) examine the economic impact of Covid-19 on U.S. income and poverty using high-frequency data from the Basic Monthly Current Population Survey (CPS). They validate these timely income measures against historical data and find that government policies at the pandemic's onset effectively countered income loss, reducing poverty and increasing incomes at lower percentiles across various demographics. Simulations show that the poverty reduction can be fully attributed to increased government assistance such as unemployment benefits and economic impact payments. However, the distribution of unemployment insurance varied by state, with some states initially failing to reach many unemployed residents.

Qian and Fan (2020) examined the economic impact in Mainland China, discovering that education, family economic status, and state employment helped mitigate income losses. They concluded that Covid-19 exacerbated existing inequalities and recommended public policies to support vulnerable populations during recovery.

Wildman (2021) investigates the link between income inequality and Covid-19 outcomes in OECD countries using cross-sectional regression and the Gini coefficient. The study finds that a 1% increase in income inequality corresponds to a 4% rise in Covid-19 cases and a 5% rise in deaths per million. The research indicates that higher income inequality worsens Covid-19 outcomes due to socioeconomic disadvantages, highlighting the need to address these disparities.

Alon et al. (2023) analyzed why emerging markets faced more severe macroeconomic impacts than advanced countries using a model that considered factors like lockdown measures and healthcare capacity. They found that a high share of employment in socially interactive jobs and limited public transfers

forced vulnerable households to work during the pandemic. Conversely, low-income countries fared better due to younger populations and larger agricultural sectors.

Bayar et al. (2023) analyze the economic and social costs of Türkiye's modest growth during the pandemic, despite a global output contraction of 3.5% in 2020. They use TurkStat's 2017 data to estimate 2020 income and living conditions based on changes in sectoral output and employment. Their findings emphasize the need for substantial fiscal support such as short-term working allowances and direct cash assistance to mitigate pandemic-related losses and improve income distribution.

Petrakos et al. (2023) analyze the impact of the 2007–2009 Great Recession and the Covid-19 pandemic on income inequality and poverty in Greece. They find that both crises worsened inequality and poverty with growth disproportionately benefiting the wealthy. Inequality rises with unemployment and decreases with a higher share of wages in total income, stressing the importance of labor market regulations. Pre-election periods temporarily reduce inequality, mainly benefiting the middle-income bracket due to political budget cycles. Using EU - SILC data they conclude that the country's response to the shock was harmful for disadvantaged groups.

Acevedo et al. (2024) studied inequality in Latin America during Covid-19 and found a 2% rise in inequality from 2019 to 2020 influenced by gender, location, and sector. Government transfers helped reduce disparities in some areas, although employment declines increased overall inequality.

The current literature reviewing the effects of Covid-19 pandemic on the income distribution of various countries generally states that the income distribution is distorted by the Covid-19 and low-income and unemployed groups are negatively affected most. However, the literature has yet to cover the distorted income distribution among the groups of developing and developed countries. Hence, this study intends to fulfill this deficiency of the literature. Table 1 below summarizes the current literature about the income distribution.

Table 1: Summary of most recent literature

Study	Countries	Dataset	Period Covered	Methodology	Results
Arndt et al. (2020)	South Africa	Input Output tables	2019	Social Accounting Matrix	Covid-19 had negative implications for the factor distribution of income in South Africa.
Baena-Diez et al. (2020)	Spain - Barcelona	Family Available Income per capita	2020	Spearman rho	Covid-19 incidence in Barcelona's districts inversely correlated with mean income highlighting the need for targeted health strategies in the most deprived areas.
Carta, F & De Philippis, M (2021)	Italy	Labor Force Survey	2020	Simulations	Italy introduced social insurance benefits to compensate for income losses.
Clark et al. (2021)	France, Germany, Italy, Spain	COME-HERE data	2020-2021	Generalized Lorenz Curves	Covid-19 income-support policies have prioritized assistance for lower-income groups over equal compensation across all income levels.
Shen et al. (2021)	China	City-level income data from CEIC	2019-2020	Distribution dynamics	Regional income inequality increased in cities with long-lasting stringent social distancing policies during COVID-19, but disappeared in cities with shorter policies.
Wildman (2021)	OECD Countries	ECDC, World Bank	2020	Cross-sectional regressions	Countries with high level of income inequality have performed significantly worse when dealing with Covid 19.
Li et al. (2022)	Australia	Longitudinal Labor Force Survey, Survey of Income and Housing, Administrative Payroll Data	2020	Decomposition	The results support that the effectiveness of temporary policy measures both in maintaining living standards and avoiding increases in income inequality.
Astariata, C.&vAlcidi, C. (2022)	Denmark, Estonia, Greece, Ireland, Italy and Portugal	EU Labor Force Survey	2020	Transition Matrices	Employee income mobility increased during the Covid-19 compared to the 2019 pre-pandemic period and the financial crises with a notable worsening for women, young workers, and those without higher education.
Su et al. (2022)	74 Countries	World Bank, Global Burden of Disease	2020	Cox Proportional Hazards regressions	Countries with more unequal income distribution carried a higher burden.
Alon et al. (2023)	World	Penn World Tables, ILO Statistical Database	2019-2020	Calibration model	Emerging economies suffered more from Covid-19.
Oyenubi (2023)	South Africa	National Income Dynamic Study	2020	Decomposition	They found that polarisation was stronger in vulnerable groups.
Bayar et al. (2023)	Turkiye	Income and living conditions survey	2020	Gini coefficient	The short run working allowance policy played an important role to improve the income distribution.
Acevedo et al. (2024)	26 Latin American Countries	Household and Employment Surveys	1992-2020	Panel regression	Covid-19 caused a rise in unemployment and an increase in inequality.

3. Data and Analysis

3.1. Dataset

In this study, the data obtained from the World Inequality Database examines the income distribution of various countries from 2015 to 2022. The post-tax household income data for the age of 20 or more is used. This dataset offers a clearer picture of the actual income available to households after taxation. The analysis focuses on income distribution in ten different countries; five developed countries, namely; France, Germany, Netherlands, Italy and the United Kingdom and five developing countries, namely; Czechia, Greece, Hungary, Romania and Turkiye. An accurate and complete representation of disposable income, the household income is distributed among the adult population, defined as individuals aged 20 and older. This approach enables us to categorize household income into deciles, that is ten equal income groups used in this study. Then, the shares of total income are computed that each decile receives. That provides an easily observable view of income distribution across different segments of the population. Determining the impact of the pandemic on income distribution by solely examining the Gini coefficient is challenging. To gain an easy understanding, this paper analyzed income distribution among 10% deciles. Later, the three main income groups are defined as the bottom 20%, the middle 60%, and the top 20%. This categorization allowed us to observe shifts in income among these groups and determine the effects of the pandemic.

Table 2 below shows the data statistics. There are 80 observations for each country. Min, max, mean, median, standard deviation, skewness and kurtosis values of each data set can be viewed on Table 2.

Table 2: Data statistics

	Country	# Obs	Min	Max	Mean	Median	SD	Skewness	Kurtosis
Developing Countries	Czechia	80	14.513	115.047	44.250	40.015	23.939	1.50	2.02
	Hungary	80	8.695	111.691	33.217	27.496	23.865	1.96	3.47
	Romania	80	4.214	140.274	37.608	27.787	33.549	1.84	2.85
	Greece	80	6.726	117.688	36.782	30.256	26.213	1.71	2.58
	Turkiye	80	5.983	220.064	41.775	23.477	55.239	2.49	4.84
Developed Countries	United Kingdom	80	23.981	149.191	52.953	42.243	31.538	2.01	3.23
	Netherlands	80	35.489	205.946	72.746	59.953	41.450	1.93	3.07
	Germany	80	23.381	196.801	62.647	49.029	43.305	2.06	3.46
	France	80	24.047	141.331	57.835	49.961	30.582	1.54	1.89
	Italy	80	4.114	157.140	47.065	36.462	34.769	1.81	2.78

The dataset is first tested for normality. The normality test results are presented below on Table 3. Shapiro-Wilk test, Anderson-Darling test and Jarque-Bera normality test are run for each country. The p values of all datasets are less than the critical values of 0.05. Therefore, it is concluded that the distribution of income deciles for all countries are not consistent with normal distribution as expected. Figure 1 and Figure 2 visiolize the income distribution of all countries. As the income deciles get higher from bottom 10% to top 10%, the observations divert from the normality line.

Table 3: Results of normality tests

Normality Tests	Czechia	Hungary	Romania	Greece	Türkiye	U. Kingdom	Netherlands	Germany	France	Italy
Shapiro-Wilk Test										
W	0.83797047	0.75686698	0.76978347	0.7959806	0.55247175	0.71162462	0.74031415	0.70618177	0.81627389	0.77514679
p-value	6.5256E-08	3.4725E-10	7.3451E-10	3.6683E-09	3.0864E-14	3.0502E-11	1.3804E-10	2.3172E-11	1.4002E-08	1.0107E-09
alpha	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Anderson-Darling Test										
A2	3.96289817	6.406839	5.9592207	5.27158345	14.6163534	8.03900332	6.94894027	8.10474285	4.37316994	5.93192515
p-value	5.8892E-10	7.2504E-16	8.6177E-15	3.92E-13	5.3609E-35	9.2986E-20	3.6546E-17	6.495E-20	5.9035E-11	1.0024E-14
alpha	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Jarque-Bera Test										
J-B-critical	5.99146455	5.99146455	5.99146455	5.99146455	5.99146455	5.99146455	5.99146455	5.99146455	5.99146455	5.99146455
DF	2	2	2	2	2	2	2	2	2	2
p-value	2.0215E-09	0	5.107E-15	6.7024E-13	0	0	1.1102E-16	0	2.1586E-09	1.5654E-14
alpha	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05

Figure 1: Normality Tests of Developing Countries

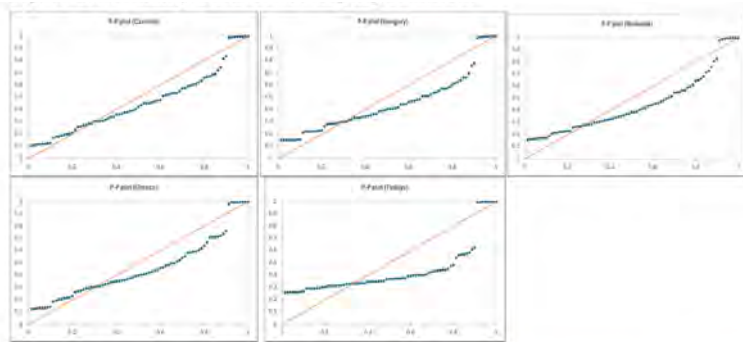
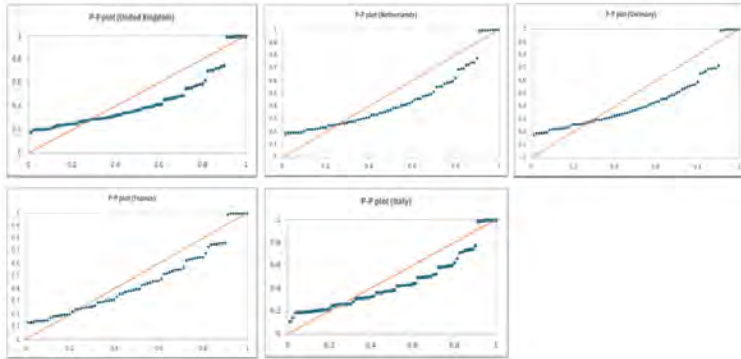


Figure 2: Normality Tests of Developed Countries



3.2. Analysis

Table 4 below presents the income groups by 10% deciles for five developing countries under investigation in this study. In the period of 2015-2022, Czechia increased its average income from \$39,913 in 2015 to \$46,768 in 2022 representing a total of 17.18% and an annual average of 2.15% increase. Hungary increased its average income from \$28,765 in 2015 to \$37,070 in 2022 representing a total of 37.07% and an annual average of 4.63% increase. Romania increased its average income from \$31,324 in 2015 to \$42,684 in 2022 representing a total of 36.27% and an annual average of 4.53% increase. Greece increased its average income from \$35,834 in 2015 to \$40,119 in 2022 representing a total of 11.96% and an annual average of 1.49% increase. Turkiye increased its average income from \$38,408 in 2015 to \$46,407 in 2022 representing a total of 20.83% and an annual average of 2.60% increase.

Table 4: Income Groups (10% Decile) – Developing Countries
(Czechia, Hungary, Romania, Greece, Türkiye)

Income Groups	Czechia															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%
1 (Bottom 10%)	14.513	3,64	14.906	3,73	15.477	3,88	16.150	4,05	16.810	4,21	16.794	4,21	15.572	3,90	16.042	4,02
2	21.338	5,35	22.550	5,65	23.645	5,92	24.482	6,13	24.789	6,21	24.172	6,06	22.410	5,61	23.091	5,79
3	26.963	6,76	29.020	7,27	30.725	7,70	31.973	8,01	32.065	8,03	30.872	7,73	28.711	7,19	29.587	7,41
4	29.811	7,47	32.181	8,06	34.594	8,67	36.114	9,05	36.678	9,19	34.395	8,62	31.994	8,02	32.959	8,26
5	33.423	8,37	35.589	8,92	38.432	9,63	40.418	10,13	41.261	10,34	37.627	9,43	35.767	8,96	36.845	9,23
6	37.570	9,41	39.613	9,92	42.808	10,73	44.964	11,27	46.058	11,54	41.740	10,46	41.367	10,36	42.601	10,67
7	41.228	10,33	42.228	10,58	46.346	11,61	48.726	12,21	50.126	12,64	45.440	11,39	47.146	11,91	48.539	12,16
8	45.507	11,40	46.390	11,62	50.485	12,65	52.687	13,20	54.392	13,62	49.448	12,39	54.039	13,54	55.639	13,94
9	50.745	12,71	51.543	12,91	56.051	14,04	58.273	14,60	59.800	14,98	54.909	13,76	65.423	16,39	67.331	16,87
10 (Top 10%)	98.037	24,56	97.222	24,36	104.483	26,18	105.227	26,36	107.541	26,97	100.284	25,13	112.132	28,09	115.047	28,82
Average	39.913		41.124		44.305		45.901		46.961		43.568		45.456		46.768	

Income Groups	Hungary															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%
1 (Bottom 10%)	8.695	3,02	8.896	2,92	8.867	2,82	8.781	2,63	9.050	2,57	8.870	2,66	8.872	2,46	9.110	2,46
2	14.184	4,93	15.156	4,98	15.093	4,81	14.955	4,48	15.685	4,45	14.962	4,49	14.966	4,14	15.367	4,15
3	18.145	6,31	19.402	6,37	19.584	6,24	19.686	5,90	20.574	5,84	19.622	5,88	20.274	5,51	20.821	5,62
4	20.738	7,21	21.618	7,10	22.083	7,03	22.942	6,87	24.009	6,82	22.865	6,86	23.600	6,62	24.197	6,53
5	22.936	7,97	23.689	7,78	24.954	7,95	26.393	7,91	27.613	7,84	26.271	7,88	27.380	7,58	28.120	7,59
6	24.850	8,64	26.787	8,80	27.905	8,89	29.903	8,96	31.360	8,90	29.793	8,94	31.433	8,70	32.284	8,71
7	27.642	9,61	29.841	9,80	30.781	9,81	33.876	10,15	35.990	10,10	33.793	10,13	35.423	9,81	36.381	9,81
8	31.820	11,06	33.760	11,20	34.533	11,00	37.550	11,25	39.270	11,18	37.388	11,21	40.696	11,27	41.794	11,27
9	37.261	12,95	38.243	12,56	40.060	12,76	43.105	12,82	45.388	12,88	43.048	12,91	49.609	13,73	50.939	13,74
10 (Top 10%)	81.377	28,29	87.023	28,59	90.047	28,69	96.516	28,82	103.656	29,42	96.830	29,04	109.036	30,18	111.691	30,13
Average	28.765		30.441		31.391		33.371		35.230		33.344		36.125		37.070	

Income Groups	Romania															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%
1 (Bottom 10%)	4.214	1,35	4.586	1,42	4.894	1,38	5.177	1,38	5.857	1,43	5.684	1,45	5.661	1,37	5.836	1,37
2	8.397	2,68	10.640	3,30	11.189	3,16	11.255	2,99	12.799	3,12	12.203	3,11	12.156	2,94	12.531	2,94
3	13.057	4,17	16.050	4,97	16.933	4,78	16.685	4,44	18.794	4,58	17.870	4,56	17.905	4,32	18.457	4,32
4	16.887	5,39	20.213	6,26	21.227	5,99	20.639	5,49	23.141	5,64	21.998	5,61	22.233	5,37	22.918	5,37
5	20.356	6,50	24.080	7,46	25.292	7,14	24.839	6,61	27.827	6,79	26.406	6,74	26.916	6,50	27.746	6,50
6	24.571	7,84	28.220	8,75	30.877	8,72	30.684	8,16	33.885	8,27	32.067	8,18	33.253	8,03	34.278	8,03
7	29.368	9,38	32.702	10,14	35.942	10,15	37.356	9,94	41.449	10,11	39.193	10,00	41.730	10,08	43.015	10,08
8	35.259	11,26	38.053	11,79	41.706	11,78	45.702	12,16	49.908	12,17	47.108	12,02	51.677	12,48	53.269	12,48
9	43.209	13,79	45.061	13,97	50.460	14,25	56.431	15,01	60.921	14,86	57.699	14,72	66.469	16,05	68.516	16,05
10 (Top 10%)	117.923	37,65	103.049	31,94	115.576	32,64	127.130	33,82	135.397	33,03	131.635	33,59	136.103	32,87	140.274	32,86
Average	31.324		32.265		35.410		37.590		40.998		39.186		41.410		42.684	

Income Groups	Greece															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%
1 (Bottom 10%)	6.726	1,88	7.088	1,98	7.539	2,07	7.823	2,11	7.797	2,07	7.740	2,28	8.295	2,21	8.894	2,22
2	13.281	3,71	14.066	3,94	15.119	4,14	16.155	4,35	16.351	4,35	14.987	4,42	16.264	4,34	17.449	4,35
3	20.171	5,63	20.891	5,85	21.798	5,97	22.748	6,13	23.252	6,18	21.038	6,21	22.693	6,06	24.351	6,07
4	23.447	6,54	23.952	6,71	25.024	6,86	26.076	7,02	26.435	7,03	23.910	7,05	25.531	6,82	27.397	6,83
5	26.808	7,48	27.162	7,61	27.941	7,66	28.986	7,81	29.574	7,86	26.722	7,88	28.461	7,60	30.542	7,61
6	30.420	8,49	31.062	8,70	31.695	8,68	32.774	8,83	33.316	8,86	30.093	8,88	32.053	8,56	34.394	8,57
7	35.474	9,90	35.749	10,01	36.496	10,00	37.522	10,10	38.151	10,14	34.426	10,16	36.677	9,79	39.355	9,81
8	42.209	11,78	42.319	11,85	42.872	11,75	43.809	11,80	44.560	11,85	40.205	11,86	43.029	11,49	46.164	11,51
9	51.427	14,35	51.266	14,36	51.578	14,13	51.958	13,99	53.257	14,16	48.030	14,17	51.219	13,68	54.952	13,70
10 (Top 10%)	108.377	30,24	103.516	28,99	104.933	28,75	103.482	27,87	103.424	27,50	91.843	27,09	110.307	29,45	117.688	29,34
Average	35.834		35.707		36.499		37.133		37.612		33.899		37.453		40.119	

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Dilek Teker, Suar Teker, Halit Güzelsoy

Income Groups	Türkiye															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%
1 (Bottom 10%)	5.983	1.56	6.379	1.56	6.530	1.53	6.387	1.56	6.811	1.70	6.670	1.66	7.670	1.72	7.989	1.72
2	12.121	3.16	11.568	2.83	11.879	2.78	11.505	2.81	12.066	3.01	11.599	2.89	13.340	2.99	13.894	2.99
3	15.188	3.95	15.347	3.76	16.044	3.75	15.322	3.74	15.770	3.93	15.077	3.76	17.311	3.88	18.029	3.88
4	15.811	4.12	17.853	4.37	18.561	4.34	17.858	4.36	18.372	4.58	17.540	4.37	20.090	4.51	20.923	4.51
5	18.405	4.79	20.498	5.02	21.122	4.94	20.355	4.97	20.908	5.21	20.143	5.02	22.911	5.14	23.862	5.14
6	23.482	6.11	23.935	5.86	24.588	5.75	23.796	5.81	24.236	6.04	23.472	5.85	26.638	5.98	27.744	5.98
7	27.195	7.08	28.003	6.85	28.768	6.73	27.818	6.79	28.169	7.02	27.467	6.84	31.097	6.98	32.387	6.98
8	31.759	8.27	34.142	8.36	35.121	8.22	33.826	8.25	34.227	8.54	33.352	8.31	37.937	8.51	39.511	8.51
9	47.613	12.40	52.070	12.75	53.316	12.47	51.437	12.55	51.228	12.77	50.342	12.54	57.294	12.86	59.671	12.86
10 (Top 10%)	186.524	48.56	198.726	48.65	211.458	49.48	201.567	49.18	189.224	47.19	195.817	48.77	211.298	47.42	220.064	47.42
Average	38.408		40.852		42.739		40.987		40.101		40.148		44.559		46.407	

Table 5 shows the average income per decile for the same developing countries. In the period of 2015-2022, the average income in these developing countries increased from \$34,849 in 2015 to \$42,610 in 2022 depicting a total of 22.27% and an annual average of 2.78% increase.

Pre-Covid years in between 2015 and 2019, the average income for each decile consistently increased. The strongest effect of Covid badly hit the level of incomes for all deciles except the top 10% in 2020. The recovery for the bottom deciles was moderate but did not look successful while the top 10% decile increased average income and income share strongly after the Covid era for the years 2021 and 2022.

When the percentage deciles are examined for the developing countries, the top 10% decile takes around 33% of the total income while the bottom 10% takes only 2.25% on the average. On the other hand, the most income transfer happened from middle income deciles to higher income deciles and this effect looks stronger after the Covid-19. The bottom 2., 3., 4., 5., and 6th deciles lost their shares of income for the advantage of 7., 8, and 9th decile. The bottom 10% decile could barely protect its share of income.

*Table 5: Average Income (10% Decile) – Developing Countries
(Czechia, Hungary, Romania, Greece, Türkiye)*

Income Groups	AVERAGE INCOME OF DEVELOPING COUNTRIES Czechia Hungary Romania Greece Türkiye															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%
1 (Bottom 10%)	8.026	2.30	8.371	2.32	8.661	2.28	8.864	2.27	9.265	2.31	9.151	2.41	9.214	2.25	9.574	2.25
2	13.864	3.98	14.796	4.10	15.385	4.04	15.670	4.02	16.338	4.07	15.584	4.10	15.827	3.86	16.466	3.86
3	18.705	5.37	20.142	5.58	21.017	5.52	21.283	5.46	22.091	5.50	20.896	5.49	21.379	5.21	22.249	5.22
4	21.339	6.12	23.163	6.42	24.298	6.38	24.726	6.34	25.727	6.40	24.142	6.35	24.682	6.02	25.679	6.03
5	24.386	7.00	26.203	7.26	27.548	7.24	28.198	7.23	29.437	7.33	27.434	7.21	28.287	6.90	29.423	6.91
6	28.179	8.09	29.923	8.29	31.575	8.29	32.424	8.31	33.771	8.40	31.433	8.27	32.949	8.04	34.260	8.04
7	32.181	9.23	33.704	9.34	35.667	9.37	37.059	9.50	38.697	9.63	36.064	9.48	38.415	9.37	39.935	9.37
8	37.311	10.71	38.933	10.79	40.943	10.76	42.715	10.95	44.489	11.07	41.500	10.91	45.475	11.09	47.275	11.09
9	46.051	13.21	47.637	13.20	50.293	13.21	52.241	13.40	54.119	13.47	50.806	13.36	58.003	14.15	60.282	14.15
10 (Top 10%)	118.447	33.99	117.907	32.68	125.299	32.91	126.784	32.51	127.868	31.82	123.282	32.42	135.775	33.12	140.953	33.08
Average	34.849		36.078		38.069		38.996		40.180		38.029		41.001		42.610	

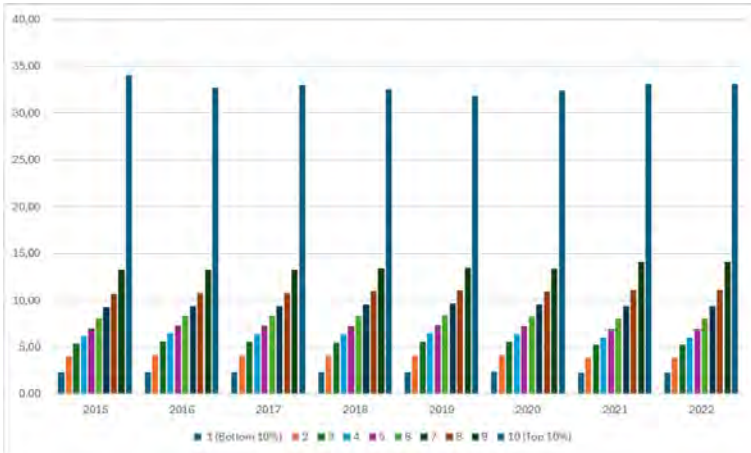


Table 6 below presents the income groups by 10% deciles for five developed countries under investigation in this study. In the period of 2015-2022, United Kingdom increased its average income from \$52,717 in 2015 to \$54,148 in 2022 representing a total of 2.71% and an annual average of 0.34% increase. Netherland increased its average income from \$70,127 in 2015 to \$77,632 in 2022 representing a total of 10.70% and an annual average of 1.34% increase. Germany increased its average income from \$60,630 in 2015 to \$64,298 in 2022 representing a total of 6.05% and an annual average of 0.76% increase. France increased its average income from \$57,156 in 2015 to \$59,479 in 2022 representing a total of 4.06% and an annual average of 0.51% increase. Italy increased its average income from \$45,557 in 2015 to \$49,320 in 2022 representing a total of 8.31% and an annual average of 1.04% increase.

Table 7 shows the average income per deciles for the same developing countries. In the period of 2015-2022, the average income in these developed countries increased from \$57,237 in 2015 to \$60,975 in 2022 depicting a total of 6.53% and an annual average of 0.82% increase.

When the percentage deciles are examined for the developed countries, the top 10% decile takes around 26% of the total income while the bottom 10% takes only 4% on the average. The income distribution over the whole research period

**INEQUALITY OF INCOME DISTRIBUTION:
A COMPARATIVE ANALYSIS FOR DE-VELOPED AND DEVELOPING ECONOMIES**
Dilek Teker, Suar Teker, Halit Güzelsoy

showed almost no changes. Therefore, the social programs put in use during the Covid-19 era maintained the existing income shares in the developed countries.

*Table 6: Income Groups (10% Decile) – Developed Countries
(United Kingdom, Netherlands, Germany, France, Italy)*

Income Groups	United Kingdom															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%
1 (Bottom 10%)	26.528	5.03	26.651	5.01	27.091	4.98	26.961	4.89	26.836	4.93	23.981	5.02	27.498	5.30	28.744	5.31
2	30.367	5.76	31.075	5.84	31.498	5.79	31.578	5.73	30.618	5.62	26.929	5.64	30.887	5.96	32.288	5.96
3	34.329	6.51	34.181	6.42	35.544	6.53	35.590	6.46	33.887	6.22	29.495	6.18	33.646	6.49	35.173	6.50
4	36.588	6.94	37.348	7.02	38.829	7.14	38.393	6.97	36.813	6.76	31.870	6.68	36.032	6.95	37.664	6.96
5	39.997	7.59	40.528	7.62	41.480	7.62	42.295	7.68	41.066	7.54	35.643	7.47	40.368	7.78	42.191	7.79
6	43.840	8.32	44.473	8.36	46.012	8.46	46.053	8.36	45.130	8.29	39.175	8.21	44.364	8.55	46.267	8.56
7	49.557	9.40	50.122	9.42	52.091	9.57	51.603	9.37	50.800	9.33	44.147	9.25	49.756	9.59	51.998	9.60
8	56.778	10.77	57.168	10.70	59.812	10.99	59.133	10.73	58.523	10.75	50.976	10.68	57.550	11.10	60.138	11.11
9	69.513	13.19	69.719	13.10	73.696	13.54	71.549	12.99	71.699	13.17	62.692	13.14	69.887	13.48	73.013	13.48
10 (Top 10%)	139.677	26.50	140.792	26.46	138.086	25.38	147.778	26.82	149.191	27.40	132.363	27.73	128.653	24.81	133.906	24.73
Average	52.717		53.206		54.414		55.093		54.456		47.727		51.864		54.148	

Income Groups	Netherlands															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%
1 (Bottom 10%)	35.489	5.06	36.438	5.23	36.708	5.03	37.065	4.97	37.128	5.09	37.116	5.32	37.155	4.99	38.765	4.99
2	40.629	5.79	40.845	5.87	41.782	5.73	42.489	5.70	42.449	5.82	40.819	5.86	40.853	5.48	42.629	5.49
3	44.589	6.36	44.859	6.44	46.215	6.33	47.252	6.34	47.005	6.45	45.178	6.48	45.808	6.15	47.784	6.16
4	48.651	6.94	48.813	7.01	50.907	6.98	52.306	7.02	51.616	7.08	49.589	7.11	50.541	6.78	52.711	6.79
5	55.142	7.86	54.724	7.86	56.958	7.81	58.351	7.83	57.635	7.90	55.302	7.99	56.730	7.62	59.162	7.62
6	61.089	8.71	60.745	8.72	63.257	8.67	64.654	8.68	63.939	8.77	61.429	8.81	63.196	8.48	65.910	8.49
7	68.581	9.78	67.970	9.76	70.684	9.69	72.392	9.72	71.418	9.79	68.451	9.82	71.115	9.55	74.161	9.55
8	78.187	11.15	77.905	11.19	80.771	11.07	82.897	11.13	81.491	11.18	78.105	11.21	81.933	11.00	85.420	11.00
9	93.496	13.33	93.803	13.47	97.683	13.39	99.601	13.37	97.381	13.35	92.973	13.34	99.608	13.37	103.824	13.37
10 (Top 10%)	175.419	25.01	170.222	24.45	184.596	25.30	188.030	25.24	179.155	24.57	168.083	24.11	197.974	26.58	205.946	26.53
Average	70.127		69.632		72.956		74.504		72.922		69.705		74.491		77.632	

Income Groups	Germany															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%
1 (Bottom 10%)	23.381	3.86	24.849	4.01	25.156	3.97	25.438	3.98	25.722	4.05	26.089	4.30	29.871	4.76	30.694	4.77
2	29.215	4.82	30.212	4.88	31.153	4.92	31.688	4.96	30.512	4.80	30.513	5.02	34.948	5.57	35.510	5.58
3	33.913	5.59	35.188	5.68	36.454	5.76	37.219	5.83	35.195	5.54	34.894	5.74	39.433	6.28	40.933	6.30
4	38.490	6.35	39.476	6.37	40.813	6.44	41.630	6.52	39.478	6.21	38.425	6.33	42.632	6.79	43.854	6.82
5	44.343	7.31	45.798	7.39	46.338	7.32	47.294	7.41	45.103	7.09	43.254	7.12	47.903	7.63	49.311	7.67
6	49.998	8.25	51.351	8.29	52.727	8.32	53.738	8.42	51.226	8.06	48.747	8.03	54.426	8.67	55.925	8.70
7	57.587	9.50	58.422	9.43	60.245	9.51	61.292	9.60	58.673	9.23	55.427	9.13	61.540	9.80	63.352	9.85
8	66.086	10.90	67.174	10.84	69.018	10.90	69.863	10.94	68.069	10.71	64.040	10.94	70.359	11.21	72.726	11.26
9	80.400	13.26	81.897	13.22	84.138	13.28	84.384	13.22	84.948	13.36	80.035	13.18	84.946	13.59	87.336	13.58
10 (Top 10%)	182.884	30.16	185.209	29.89	187.386	29.58	185.986	29.13	196.801	30.96	185.975	30.62	161.802	25.77	163.638	25.45
Average	60.630		61.958		63.343		63.853		63.573		60.740		62.786		64.298	

Income Groups	France															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%	Inc. \$	%
1 (Bottom 10%)	24.207	4.24	24.949	4.34	25.622	4.37	25.936	4.38	26.107	4.42	24.047	4.48	25.658	4.43	26.344	4.43
2	30.204	5.28	30.771	5.36	31.506	5.38	31.859	5.38	31.986	5.41	29.047	5.41	30.994	5.35	31.822	5.35
3	36.114	6.32	36.362	6.33	37.479	6.40	37.890	6.40	37.997	6.43	34.509	6.42	36.780	6.35	37.762	6.35
4	41.276	7.22	41.677	7.26	42.426	7.24	42.864	7.24	42.970	7.27	39.027	7.26	41.559	7.17	42.669	7.17
5	46.640	8.16	47.158	8.21	48.161	8.22	48.879	8.25	49.194	8.32	45.029	8.38	48.724	8.41	50.026	8.41
6	53.066	9.21	53.743	9.31	53.975	9.21	54.752	9.24	54.764	9.26	49.896	9.29	53.651	9.26	55.084	9.26
7	59.294	10.37	59.533	10.37	60.953	10.40	61.756	10.43	61.672	10.43	56.166	10.45	60.244	10.40	61.853	10.40
8	68.171	11.93	68.081	11.85	68.984	11.77	69.581	11.75	69.568	11.77	63.285	11.78	67.469	11.65	69.271	11.65
9	78.207	13.68	78.422	13.65	79.222	13.52	79.351	13.40	79.230	13.40	72.086	13.42	76.583	13.22	78.628	13.22
10 (Top 10%)	134.778	23.58	134.657	23.45	137.643	23.49	139.452	23.55	137.688	23.29	124.191	23.11	137.655	23.76	141.331	23.76
Average	57.156		57.435		58.598		59.236		59.118		53.728		57.932		59.479	

Income Groups	Italy															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%
1 (Bottom 10%)	16.243	3.57	16.719	3.58	16.686	3.50	16.578	3.42	16.867	3.50	18.162	4.19	10.079	2.14	4.114	0.83
2	18.182	3.99	18.802	4.02	19.145	4.01	19.059	3.93	19.279	4.00	20.519	4.73	17.147	3.64	16.890	3.42
3	23.986	5.27	24.564	5.25	24.615	5.16	24.743	5.11	24.792	5.14	23.172	5.35	24.053	5.10	25.116	5.09
4	30.148	6.62	30.126	6.44	30.361	6.36	30.758	6.35	30.734	6.37	27.262	6.29	29.960	6.36	31.363	6.36
5	34.727	7.62	34.696	7.42	35.247	7.41	35.827	7.39	35.763	7.41	31.704	7.31	34.904	7.41	36.634	7.43
6	40.377	8.86	40.259	8.61	40.550	8.50	41.099	8.48	40.987	8.50	36.291	8.37	40.185	8.53	42.190	8.55
7	46.861	10.29	46.416	9.92	46.744	9.80	47.368	9.77	47.189	9.78	41.761	9.63	46.501	9.87	48.900	9.91
8	54.443	11.95	54.387	11.63	54.813	11.49	55.894	11.53	55.668	11.54	49.240	11.36	55.191	11.71	58.089	11.78
9	66.589	14.62	67.136	14.36	68.118	14.28	69.547	14.35	69.164	14.34	61.084	14.09	68.918	14.62	72.768	14.75
10 (Top 10%)	124.017	27.22	134.465	28.76	140.732	29.50	143.727	29.66	141.907	29.42	124.262	28.67	144.394	30.64	157.140	31.86
Average	45.557		46.757		47.711		48.460		48.235		43.346		47.133		49.320	

Table 7: Average Income (10% Decile) – Developed Countries (United Kingdom, Netherlands, Germany, France, Italy)

Income Groups	AVERAGE INCOME OF DEVELOPED COUNTRIES United Kingdom - Netherlands - Germany - France - Italy															
	2015		2016		2017		2018		2019		2020		2021		2022	
	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%	Inc.\$	%
1 (Bottom 10%)	25.169	4.40	25.921	4.48	26.253	4.42	26.396	4.38	26.532	4.45	25.879	4.70	26.052	4.43	25.732	4.22
2	29.719	5.19	30.341	5.25	31.017	5.22	31.335	5.20	30.969	5.19	29.566	5.37	30.966	5.26	31.908	5.23
3	34.586	6.04	35.031	6.06	36.061	6.07	36.539	6.07	35.775	6.00	33.449	6.08	35.944	6.11	37.274	6.11
4	39.031	6.82	39.488	6.83	40.667	6.85	41.190	6.84	40.322	6.76	37.235	6.76	40.145	6.82	41.653	6.83
5	44.170	7.72	44.581	7.71	45.657	7.69	46.529	7.73	45.752	7.67	42.186	7.66	45.726	7.77	47.465	7.78
6	48.594	8.66	49.914	8.64	51.304	8.64	52.059	8.64	51.209	8.58	47.108	8.56	51.164	8.70	53.095	8.71
7	56.376	9.85	56.492	9.77	58.145	9.79	58.882	9.78	57.950	9.71	53.190	9.66	57.831	9.83	60.053	9.85
8	64.733	11.31	64.943	11.24	66.680	11.22	67.474	11.20	66.664	11.17	61.129	11.10	66.500	11.30	69.069	11.33
9	77.641	13.56	78.195	13.53	80.571	13.56	80.886	13.43	80.484	13.49	73.774	13.40	79.989	13.59	83.114	13.63
10 (Top 10%)	151.355	26.44	153.069	26.48	157.689	26.54	161.003	26.73	160.948	26.98	146.975	26.70	154.096	26.19	160.392	26.30
Average	57.237		57.798		59.404		60.229		59.661		55.049		58.841		60.975	

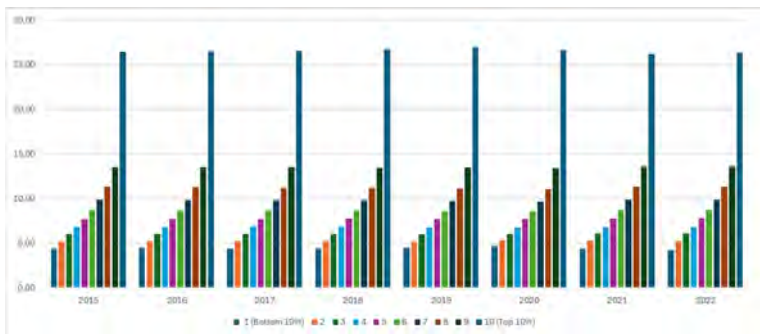


Table 8 shows the income distributions by grouped deciles for the developing countries. The bottom 2 groups form “Bottom 20%”, from bottom 3 to 8 groups form “Middle 60%”, and top 2 groups form “Top 20%” groups. By grouping deciles this way, the income transfers between main social groups can be better visualized. The top 20% in Czechia had 58% share of income in 2015 and then its income share increased to 60%. The increased share of the top 20% is transferred from middle 60% and bottom 20%. Moreover, the income transfer from the bottom 20% was higher than that of middle 60%. Top20/Bottom20

ratio was 4,15 in 2015 and this ratio increased to 4,66 in 2022. Top20/Middle60 ratio was 2,08 in 2025 and this ratio increased to 2,22 in 2022.

The top 20% in Hungary had 62% share of income in 2015 and then its income share increased to 66%. The increased share of the top 20% is transferred from middle 60% and bottom 20%. Moreover, the income transfer from the bottom 20% was higher than that of middle 60%. Top20/Bottom20 ratio was 5,19 in 2015 and this ratio increased to 6,64 in 2022. Top20/Middle60 ratio was 2,44 in 2025 and this ratio increased to 2,66 in 2022.

The top 20% in Romania had 73% share of income in 2015 and then its income share decreased to 51%. The decreased share of top 20% is transferred to middle 60% and bottom 20%. Moreover, the income transfer from the top 20% to bottom 20% was higher than that of middle 60%. Top20/Bottom20 ratio was 12,78 in 2015 and this ratio decreased to 11,37 in 2022. Top20/Middle60 ratio was 3,47 in 2025 and this ratio decreased to 3,14 in 2022.

The top 20% in Greece had 80% share of income in 2015 and then its income share decreased to 71%. The decreased share of top 20% is transferred to middle 60% and bottom 20%. Moreover, the income transfer from the top 20% to bottom 20% was higher than that of middle 60%. Top20/Bottom20 ratio was 7,99 in 2015 and this ratio decreased to 6,55 in 2022. Top20/Middle60 ratio was 2,69 in 2025 and this ratio decreased to 2,56 in 2022.

The top 20% in Turkiye had 79,05% share of income in 2015 and then its income shares slightly decreased to 78,65%. The income transferred from top 20% to middle 60% and bottom 20% look to be distributed evenly. Top20/Bottom20 ratio was 12,93 in 2015 and this ratio decreased to 12,78 in 2022. Top20/Middle60 ratio was 5,33 in 2025 and this ratio decreased to 5,17 in 2022.

Table 9 shows the average income distributions by grouped deciles for the developing countries. It is viewed that top 20% is slightly better off over the research period in the expense of mostly bottom 20% and middle 60%.

Table 8: Income for Grouped Deciles – Developing Countries

Grouped Deciles	Czechia															
	2015	2016		2017		2018		2019		2020		2021		2022		
Bottom %20	17.925	14,00	18.728	14,34	19.561	13,93	20.316	14,05	20.800	14,06	20.483	14,84	18.991	12,87	19.566	12,89
Middle %60	35.750	27,92	37.503	28,71	40.565	28,89	42.480	29,39	43.429	29,35	39.920	28,93	39.837	26,99	41.028	27,03
Top %20	74.391	58,09	74.383	56,95	80.267	57,17	81.750	56,56	83.720	56,59	77.597	56,23	88.778	60,15	91.189	60,08
Top20/Bottom20	4,15		3,97		4,10		4,02		4,03		3,79		4,67		4,66	
Top20/Middle60	2,08		1,98		1,98		1,92		1,93		1,94		2,23		2,22	
Middle60/Bottom20	1,99		2,00		2,07		2,09		2,09		1,95		2,10		2,10	

Grouped Deciles	Hungary															
	2015	2016		2017		2018		2019		2020		2021		2022		
Bottom %20	11.439	12,03	12.026	11,97	11.980	11,56	11.868	10,78	12.368	10,60	11.916	10,82	11.919	9,85	12.239	9,86
Middle %60	24.355	25,61	25.849	25,72	26.640	25,70	28.391	25,79	29.753	25,51	28.289	25,68	29.794	24,62	30.600	24,65
Top %20	59.319	62,37	62.633	62,32	65.054	62,75	69.810	63,42	74.522	63,89	69.939	63,50	79.323	65,54	81.315	65,50
Top20/Bottom20	5,19		5,21		5,43		5,88		6,03		5,87		6,66		6,64	
Top20/Middle60	2,44		2,42		2,44		2,46		2,50		2,47		2,66		2,66	
Middle60/Bottom20	2,13		2,15		2,22		2,39		2,41		2,37		2,50		2,50	

Grouped Deciles	Romania															
	2015	2016		2017		2018		2019		2020		2021		2022		
Bottom %20	6.306	5,73	7.613	7,03	8.042	6,72	8.216	6,35	9.328	6,66	8.943	6,66	8.909	6,25	9.183	6,25
Middle %60	23.250	21,11	26.553	24,54	28.663	23,94	29.317	22,67	32.501	23,22	30.774	22,90	32.286	22,66	33.280	22,66
Top %20	80.566	73,16	74.055	68,43	83.018	69,34	91.780	70,97	98.159	70,12	94.667	70,45	101.286	71,09	104.995	71,09
Top20/Bottom20	12,78		9,73		10,32		11,17		10,52		10,59		11,37		11,37	
Top20/Middle60	3,47		2,79		2,90		3,13		3,02		3,08		3,14		3,14	
Middle60/Bottom20	3,69		3,49		3,56		3,57		3,48		3,44		3,62		3,62	

Grouped Deciles	Greece															
	2015	2016		2017		2018		2019		2020		2021		2022		
Bottom %20	10.003	8,36	10.577	8,95	11.329	9,40	11.989	9,85	12.074	9,82	11.363	10,26	12.280	9,87	13.171	9,89
Middle %60	29.755	24,87	30.189	25,55	30.971	25,69	31.986	26,28	32.548	26,47	29.399	26,56	31.407	25,24	33.701	25,30
Top %20	79.902	66,77	77.391	65,50	78.255	64,91	77.720	63,86	78.341	63,71	69.937	63,18	80.763	64,90	86.320	64,81
Top20/Bottom20	7,99		7,32		6,91		6,48		6,49		6,15		6,58		6,55	
Top20/Middle60	2,69		2,56		2,53		2,43		2,41		2,38		2,57		2,56	
Middle60/Bottom20	2,97		2,85		2,73		2,67		2,70		2,59		2,56		2,56	

Grouped Deciles	Turkey															
	2015	2016		2017		2018		2019		2020		2021		2022		
Bottom %20	9.052	6,11	8.973	5,69	9.205	5,56	8.946	5,64	9.439	6,16	9.134	5,89	10.505	6,15	10.941	6,15
Middle %60	21.973	14,84	23.296	14,78	24.034	14,51	23.162	14,60	23.614	15,41	22.842	14,73	25.997	15,22	27.076	15,22
Top %20	117.069	79,05	125.398	79,53	132.387	79,93	126.502	79,76	120.226	78,44	123.079	79,38	134.296	78,63	139.868	78,63
Top20/Bottom20	12,93		13,97		14,38		14,14		12,74		13,47		12,78		12,78	
Top20/Middle60	5,33		5,38		5,51		5,46		5,09		5,39		5,17		5,17	
Middle60/Bottom20	2,43		2,60		2,61		2,59		2,50		2,50		2,47		2,47	

Table 9: Average Income for Grouped Deciles – Developing Countries

Grouped Deciles	AVERAGE INCOME OF DEVELOPING COUNTRIES Czechia - Hungary - Romania - Greece - Turkey															
	2015	2016		2017		2018		2019		2020		2021		2022		
Bottom %20	10.945	9,10	11.593	9,41	12.023	9,25	12.267	9,23	12.802	9,40	12.368	9,54	12.521	8,86	13.020	8,87
Middle %60	27.017	22,47	28.678	23,31	30.175	23,21	31.068	23,39	32.369	23,77	30.245	23,33	31.864	22,56	33.137	22,58
Top %20	82.249	68,42	82.772	67,28	87.796	67,54	89.513	67,38	90.994	66,83	87.044	67,13	96.889	68,58	100.617	68,55
Top20/Bottom20	7,51		7,15		7,30		7,30		7,11		7,04		7,74		7,73	
Top20/Middle60	3,04		2,89		2,91		2,88		2,81		2,88		3,04		3,04	
Middle60/Bottom20	2,47		2,48		2,51		2,53		2,53		2,45		2,54		2,55	

Table 10 shows the income distributions by grouped deciles for the developed countries. The bottom 2 groups form “Bottom 20%”, from bottom 3 to 8 groups form “Middle 60%”, and top 2 groups form “Top 20%” groups.

The top 20% in United Kingdom had 59% share of income in 2015 and then its income share decreased to 58%. The bottom 20% increased its share from 16,11% in 2015 to 16,99% in 2022 while the middle 60% gained a slight income share from the top 20%. Top20/Bottom20 ratio was 3,68 in 2015 and this ratio decreased to 3,39 in 2022. Top20/Middle60 ratio was 2,40 in 2025 and this ratio decreased to 2,27 in 2022.

The top 20% in Netherland had 58% share of income in 2015 and then its income share increased to 60%. The bottom 20% lost its share from 16,41% in 2015 to 15,67% in 2022 while the middle 60% lost its share from 25,60% in 2015 to 24,71% in 2022. Top20/Bottom20 ratio was 3,53 in 2015 and this ratio decreased to 3,81 in 2022. Top20/Middle60 ratio was 2,26 in 2025 and this ratio decreased to 2,41 in 2022.

The top 20% in Germany had 64% share of income in 2015 and then its income share decreased to 59%. The bottom 20% increased its share from 12,74% in 2015 to 15,63% in 2022 while the middle 60% gained an income share of 23,46% in 2025 and it increased to 25,46% in 2022. Top20/Bottom20 ratio was 5,01 in 2015 and this ratio decreased to 3,77 in 2022. Top20/Middle60 ratio was 2,72 in 2025 and this ratio decreased to 2,31 in 2022.

The top 20% in France had 57,75% share of income in 2015 and then its income shares slightly decreased to 57,33%. The bottom 20% increased its share from 14,75% in 2015 to 15,16% in 2022. Top20/Bottom20 ratio was 3,91 in 2015 and this ratio decreased to 3,78 in 2022. Top20/Middle60 ratio was 2,10 in 2025 and this ratio decreased to 2,08 in 2022.

The top 20% in Italy had 63% share of income in 2015 and then its income share increased to 69%. The bottom 20% lost its share from 11,40% in 2015 to 6,33% in 2022 while the middle 60% could maintain its share around 25%. Top20/Bottom20 ratio was 5,54 in 2015 and this ratio increased to 10,95 in 2022. Top20/Middle60 ratio was 2,48 in 2025 and this ratio increased to 2,85 in 2022.

Table 11 shows the average income distributions by grouped deciles for the developed countries. It is viewed that the top 20% and middle 60% are slightly better off over the research period in the expense of bottom 20%.

Table 10: Income for Grouped Deciles – Developed Countries

Grouped Deciles	United Kingdom															
	2015	2016	2017	2018	2019	2020	2021	2022								
Bottom %20	28.447	16,11	28.863	16,21	29.295	16,20	29.270	15,87	28.727	15,65	25.455	15,76	29.192	16,96	30.516	16,99
Middle %60	43.515	24,65	43.970	24,69	45.628	25,23	45.511	24,67	44.370	24,17	38.551	23,87	43.619	25,35	45.588	25,39
Top %20	104.595	59,24	105.255	59,10	105.891	58,56	109.664	59,46	110.445	60,17	97.527	60,38	99.270	57,69	103.460	57,62
Top20/Bottom20	3,68		3,65		3,61		3,75		3,84		3,83		3,40		3,39	
Top20/Middle60	2,40		2,39		2,32		2,41		2,49		2,53		2,28		2,27	
Middle60/Bottom20	1,53		1,52		1,56		1,55		1,54		1,51		1,49		1,49	

Grouped Deciles	Netherlands															
	2015	2016	2017	2018	2019	2020	2021	2022								
Bottom %20	38.059	16,41	38.642	16,81	39.245	16,23	39.777	16,13	39.789	16,56	38.968	17,00	39.004	15,64	40.697	15,67
Middle %60	59.373	25,60	59.169	25,75	61.465	25,41	62.975	25,54	62.184	25,88	59.676	26,04	61.554	24,69	64.192	24,71
Top %20	134.458	57,98	132.012	57,44	141.140	58,36	143.816	58,33	138.268	57,55	130.528	56,96	148.791	59,67	154.885	59,62
Top20/Bottom20	3,53		3,42		3,60		3,62		3,48		3,35		3,81		3,81	
Top20/Middle60	2,26		2,23		2,30		2,28		2,22		2,19		2,42		2,41	
Middle60/Bottom20	1,56		1,53		1,57		1,58		1,56		1,53		1,58		1,58	

Grouped Deciles	Germany															
	2015	2016	2017	2018	2019	2020	2021	2022								
Bottom %20	26.293	12,74	27.531	13,07	28.155	13,10	28.561	13,25	28.117	12,86	28.301	13,56	32.410	15,54	33.302	15,63
Middle %60	48.403	23,46	49.568	23,53	50.932	23,71	51.839	24,05	49.624	22,70	47.465	22,74	52.715	25,28	54.234	25,46
Top %20	131.642	63,80	133.553	63,40	135.762	63,19	135.185	62,71	140.874	64,44	133.005	63,71	123.374	59,17	125.487	58,91
Top20/Bottom20	5,01		4,85		4,82		4,73		5,01		4,70		3,81		3,77	
Top20/Middle60	2,72		2,69		2,67		2,61		2,84		2,80		2,34		2,31	
Middle60/Bottom20	1,84		1,80		1,81		1,81		1,76		1,68		1,63		1,63	

Grouped Deciles	France															
	2015	2016	2017	2018	2019	2020	2021	2022								
Bottom %20	27.205	14,75	27.860	15,03	28.564	15,11	28.897	15,13	29.047	15,27	26.547	15,37	28.326	15,16	29.083	15,16
Middle %60	50.693	27,49	50.926	27,48	51.998	27,51	52.620	27,56	52.694	27,70	47.985	27,79	51.405	27,51	52.777	27,51
Top %20	106.492	57,75	106.540	57,49	108.432	57,37	109.421	57,31	108.459	57,02	98.139	56,84	107.119	57,33	109.980	57,33
Top20/Bottom20	3,91		3,82		3,80		3,79		3,73		3,70		3,78		3,78	
Top20/Middle60	2,10		2,09		2,09		2,08		2,06		2,05		2,08		2,08	
Middle60/Bottom20	1,86		1,83		1,82		1,82		1,81		1,81		1,81		1,81	

Grouped Deciles	Italy															
	2015	2016	2017	2018	2019	2020	2021	2022								
Bottom %20	17.212	11,40	17.761	11,31	17.915	11,12	17.819	10,88	18.073	11,10	19.341	13,16	13.613	8,58	10.502	6,33
Middle %60	38.424	25,46	38.408	24,47	38.738	24,05	39.281	23,99	39.189	24,07	34.905	23,76	38.466	24,23	40.382	24,35
Top %20	95.303	63,14	100.800	64,22	104.425	64,83	106.637	65,13	105.535	64,83	92.673	63,08	106.656	67,19	114.954	69,32
Top20/Bottom20	5,54		5,68		5,83		5,98		5,84		4,79		7,83		10,95	
Top20/Middle60	2,48		2,62		2,70		2,71		2,69		2,66		2,77		2,85	
Middle60/Bottom20	2,23		2,16		2,16		2,20		2,17		1,80		2,83		3,85	

Table 11: Average Income for Grouped Deciles – Developed Countries

Grouped Deciles	AVERAGE INCOME OF DEVELOPED COUNTRIES United Kingdom - Netherlands - Germany - France - Italy															
	2015	2016	2017	2018	2019	2020	2021	2022								
Bottom %20	27.444	14,44	28.131	14,64	28.635	14,50	28.865	14,41	28.751	14,44	27.722	15,08	28.509	14,61	28.820	14,27
Middle %60	48.082	25,30	48.408	25,19	49.752	25,19	50.445	25,19	49.612	24,92	45.716	24,87	49.552	25,40	51.435	25,46
Top %20	114.498	60,25	115.632	60,17	119.130	60,31	120.944	60,40	120.716	60,64	110.374	60,05	117.042	59,99	121.753	60,27
Top20/Bottom20	4,17		4,11		4,16		4,19		4,20		3,98		4,11		4,22	
Top20/Middle60	2,38		2,39		2,39		2,40		2,43		2,41		2,36		2,37	
Middle60/Bottom20	1,75		1,72		1,74		1,75		1,73		1,65		1,74		1,78	

4. Conclusion

This study aimed to analyze the changes in income distribution in the period of 2015-2022. Hence, this period covered the pre- and post Covid-19 era. World

Inequality Database is used to observe income distribution among the population with an age of 20 or older. Then, the population is divided into ten equal income deciles. The study employed five developing countries, namely; Czekhia, Hungary, Romania, Greece and Turkiye, and five developed countries, namely; United Kingdom, Netherlands, Germany, France, and Italy. Therefore, a total of 800 observation points downloaded from the database.

Covid-19 resulted in a substantial reduction in national incomes and, more critically, disrupted income distribution across all countries. The effect of Covid-19 is reflected on income distribution of deciles in the year 2020. There was a significant income loss for all deciles. In response, all countries implemented various social programs to support those (the people in bottom deciles) most affected by the pandemic. Developed countries largely succeeded in protecting and restoring their income distribution to pre-pandemic levels. However, developing countries faced challenges with their social programs. While the developing countries were able to increase their overall national income post-Covid era, they struggled to restore income distribution to pre-pandemic levels. This situation led to a notable income transfer from the bottom 20% and the middle 60% to the top 20%.

By the year 2022, the disparity in income distribution was stark. In developing countries, the average income for the bottom 10% was \$9,500 while the top 10% received \$141,000, a 14.8-fold difference. In developed countries, the average income for the bottom 10% was \$25,700 compared to \$160,400 for the top 10%, a 6.2-fold difference. These findings highlight the varying degrees of success in social policies between developed and developing countries and underscore the ongoing challenges in addressing income inequality exacerbated by the pandemic.

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