Araştırma Makalesi / Research Article

Assessing the Impact of Income Redistribution on Growth: Evidence From the E6 Countries

Emre GÖKÇELİ[1]

Abstract

This study examines the effect of income distribution on economic growth across the E6 countries, namely China, Türkiye, Mexico, Brazil, Russia, and India, from 1988 to 2021, employing the Panel Corrected Standard Errors (PCSE) method. The findings, based on the PCSE estimations and preliminary tests including cross-sectional dependence, unit root tests, and the Westerlund cointegration test, can be summarized as follows: i) Models exhibit cross-sectional dependence (CSD) according to various CD tests. ii) There is a long-term relationship among the variables according to the Westerlund cointegration test. iii) The growth-enhancing effect of absolute redistribution on the economic growth rate has been observed. iv) The growth-promoting effect of absolute redistribution is also confirmed through the use of the relative redistribution variable. v) Based on these findings, the study offers policy recommendations and outlines directions for future research on the topic.

Keywords: *Redistribution, Economic Growth Rate, Panel-Corrected Standard Errors.*

JEL Codes**:** *O47, D63, H23*

Yeniden Dağıtımın Büyüme Üzerindeki Etkisinin Değerlendirilmesi: E6 Ülkelerinden Kanıtlar

Öz

Bu çalışma, 1988-2021 yılları arasında E6 ülkeleri olan Çin, Türkiye, Meksika, Brazilya, Rusya ve Hindistan özelinde gelirin yeniden dağılımının ekonomik büyüme üzerindeki etkisini Panel Düzeltilmiş Standart Hatalar (PCSE) yöntemini kullanarak incelemeyi amaçlamaktadır. PCSE tahminlerine ve yatay kesit bağımlılığı, birim kök testleri ve Westerlund eşbütünleşme testi gibi ön testlere dayanan bulgular şu şekilde özetlenebilir: i) Uygulanan farklı yatay kesit bağımlılığı testlerine göre modeller yatay kesit bağımlılığı içermektedir. ii) Westerlund eşbütünleşme testine göre değişkenler arasında uzun dönemli bir ilişki vardır. iv) Mutlak yeniden dağıtımın ekonomik büyüme üzerinde pozitif etkisi bulunmaktadır gözlemlenmiştir. iv) Mutlak yeniden dağıtımın büyümeyi teşvik edici etkisi, göreli yeniden dağıtım değişkeni kullanılarak da teyit edilmiştir. v) Elde edilen bulgulara dayanarak, bu çalışma politika önerileri sunmakta ve konuyla ilgili gelecekteki araştırmalar için yönlendirmelerde bulunmaktadır.

Anahtar Sözcükler: *Yeniden Dağıtım, Ekonomik Büyüme Oranı, Panel Düzeltmeli Standart Hatalar*

JEL Kodları: *O47, D63, H23*

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1. Introduction

The rapid increase in production level driven by technological advancements has further widened income gaps between individuals, bringing the issue of income inequality to the forefront (Kilic & Gokceli, 2024, p. 216). Although the impact of income inequality on economic development has increasingly attracted the attention of researchers in recent years, the studies in the literature remain far from reaching a consensus on this issue (Brueckner and Lederman, 2018, p. 342). One of the most common policies used to reduce income inequality is redistribution, which refers to the reallocation of income. Redistribution refers to shifting income from higher-income groups to lower-income groups to improve the well-being of disadvantaged segments of society. The aim is to help them gain better access to essential services like education and healthcare, and ultimately, to reduce the large gap between high-income and low-income groups. This can be achieved through taxation policies that impose higher tax rates on upper-income groups and lower tax rates on economically disadvantaged groups, as well as through government spending that supports public services such as schools, hospitals, and social programs that mainly benefit lower-income groups. Within this context, the function of redistribution is important for society both economically and socially, which also makes its relationship with economic growth a subject worth investigating. The effect of redistribution on economic growth can be explained in several ways.

First, according to growth theories such as the Neoclassical Growth Theory and Endogenous Growth Theory, investment is the main driver of economic growth. In order to increase redistribution, governments need to collect higher taxes from high-income groups. However, this can negatively impact investment by pushing capital toward regions with lower tax rates. A decline in investment reduces capital accumulation, which in turn lowers economic growth. Therefore, from a theoretical perspective, redistribution is seen as a potential barrier to growth (Rehme, 2006, p. 393). In other words, higher redistribution, achieved by imposing higher taxes on those earning more money, distorts the economic environment by discouraging investment and reducing work efficiency, which negatively affects the growth rate (Barro, 2000, p.6). A similar argument is presented in the study by Vlad (2015, p. 443), using the metaphor that slicing the cake more equally may affect the size of the cake. In that study, it is also stated that income redistribution achieved through taxes imposed on higher-income groups leads to efficiency costs and discourages investors from making further investments.

On the other hand, from the Keynesian perspective, since the marginal propensity to consume is higher among low-income groups (Fisher et al., 2020, p. 2), an increase in their income through redistribution will boost their consumption. This increase in demand leads to higher production, thereby accelerating economic growth. Besides, redistribution also enables disadvantaged groups to access better education and healthcare, which helps them become more skilled and productive (Vlad, 2015, p. 443). In turn, this boosts total output and contributes positively to economic growth. Similarly, Benabou (2000, p. 97)

argues that if the tax burden on labor is reduced and replaced with higher taxes such as inheritance taxes, and if the revenue from these taxes is directed toward areas that primarily benefit low-income groups such as education, healthcare, and infrastructure, then redistribution can actually promote economic growth. Moreover, Barro (2000, p.6) points out that redistribution, by transferring earnings from rich to poor households, enables lower-income groups to invest in themselves, such as by obtaining better education, which increases the productivity of the labor force and thereby raises the rate of economic growth.

This study makes several important contributions to the existing literature in the following ways. The number of studies examining the impact of distribution on economic growth is quite limited. In this context, the present study stands out as the first and only work to investigate the effect of distribution on the economic growth of E6 countries[2], thereby offering a significant contribution. Additionally, unlike previous studies, it incorporates the measurement of redistribution in two distinct ways, absolute redistribution and relative redistribution, which allows for more in-depth analysis and offers a novel perspective to the literature. From a methodological standpoint, the use of the Panel Corrected Standard Errors (PCSE) technique, which accounts for CSD, enhances the reliability of the results. This aspect also emphasizes the study's valuable contribution to the existing body of research.

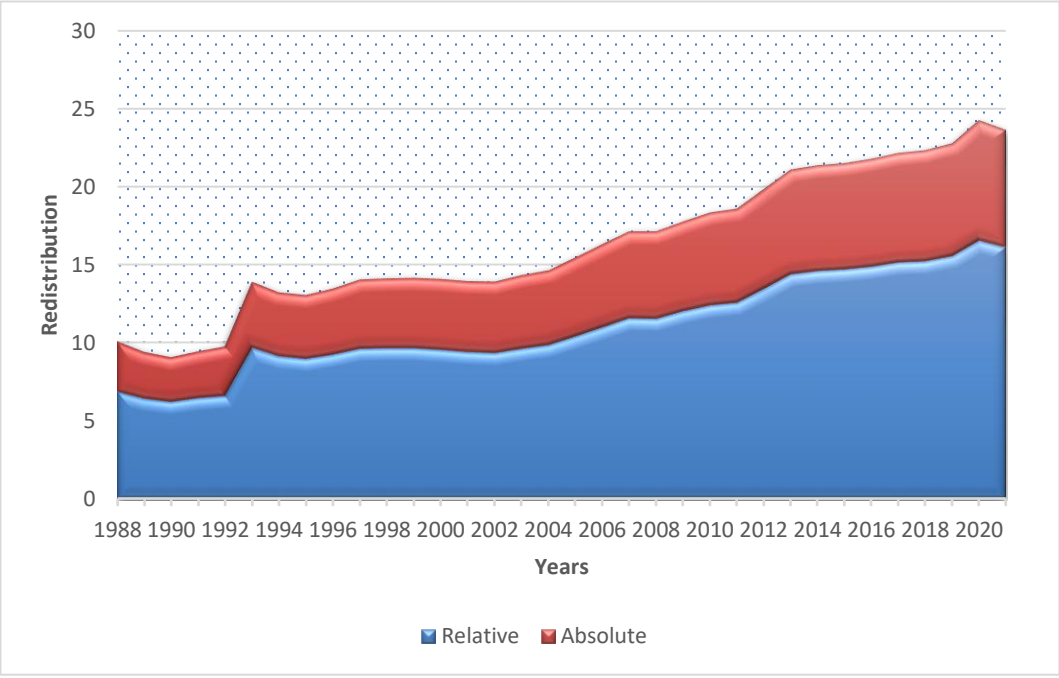
To assess the impact of redistribution on the growth rate, E6 countries are selected as the sample for the following reasons. First, these countries have drawn attention due to their relatively high economic growth rates (Kartal et al., 2025, p. 429). In addition, they have large populations, which make a significant contribution to the domestic market and attract foreign investment through a relatively low-cost labor force. The availability of such a large labor force also increases their potential growth rate compared to other countries (Aziz and Makkawi, 2012, p. 65). Furthermore, this group of countries has transitioned to market-based economies, gained a growing share in international trade, and made significant progress in shifting from agriculture-based economies to industrial and service-based sectors, supported by rapid urbanization (Liang et al., 2024, p. 65). However, in terms of income equality, these countries have not yet reached the desired levels (Wang et al., 2020, p. 3). To address income inequality, various redistribution policies, including taxation and transfer payments, have been implemented. The evolution of two different indicators representing income redistribution, the absolute indicator and the relative indicator, is presented in Figure 1. These indicators show the absolute and percentage reductions in the Gini index, respectively. The figure demonstrates a steady

[2] Originally, the E7 country group was intended to be selected as the sample. However, the two variables used to measure redistribution, absolute and relative redistribution, were not available for Indonesia. As a result, Indonesia was excluded from the group. Therefore, the remaining six countries are referred to as the E6. This group includes Brazil, India, Turkey, China, Mexico, and Russia.

increase in both forms of redistribution over the years, indicating a decline in income inequality. All these shared characteristics of the E6 countries make them a compelling case for examining the effect of redistribution on economic growth.

Figure 1

Changes in Redistribution in E6 Countries



The remaining parts of the paper are outlined as follows: In the literature review, the theoretical framework between the variables is presented, and studies on the link between redistribution and the growth rate are summarised, with an emphasis on how this study differs from existing ones. In the third section, data description, descriptive statistics, and the methodology applied in this paper are explained in detail. The empirical results section presents the analysis results and the interpretation of the findings. A sensitivity analysis is also conducted in this section. In the conclusion section, the findings are summarized, and based on the results, some policy implications are recommended along with suggestions for future studies on similar topics.

2. Literature Review

2.1. Review of Empirical Studies on Redistribution

Based on growth theories, a large number of studies have examined the determinants of economic growth (Barro, 2003; Cuaresma et al., 2014; Ciccone and Jarociński, 2010; Batrancea et al., 2023). The relationship between economic growth and income inequality was first explored by Kuznets (1955), whose pioneering work was

followed by numerous studies (see Brueckner and Lederman, 2018; Kuznets, 2019; Aiyar and Ebeke, 2020). However, relatively few studies have investigated the link between income redistribution used as a policy tool to reduce inequality and the economic growth rate. This scarcity of research may largely be attributed to the limited availability of data on redistribution indicators. Such data are available only for a limited time period and for a handful of countries, with the earliest observations dating back to 1988.

All empirical studies conducted on this topic are summarized in Table 1. As shown, the literature does not present a clear consensus on the effect of redistribution on economic growth. While some studies report that redistribution has a negative impact on growth (Gründler & Scheuermeyer, 2015; El-Shagi and Shao, 2019), others find that it enhances growth (Mericková and Halásková, 2014; Berg et al., 2018). Some studies also suggest that the effect may differ depending on a country's level of development (Perotti, 1996).

Table 1

Summary of Studies on the Effect of Redistribution on Economic Growth

Author/ies	Country/ies, Period	Method	Results	
			Diminishing effect	Growth-enhancing eff.
Woo (2020)	153 Countries, 1965-2010	OLS, FE, GMM	✓	
El-Shagi and Shao (2019)	123 Countries, 1960-2000	LSDV	✓	
Berg et al. (2018)	OECD Countries, 1985-2017	GMM		✓
Gründler and Scheuermeyer (2015)	154 Countries, 1965-2012	GMM	✓	
Vlad (2015)	EU Countries, 1991-2007	GMM	✓	
Mericková and Halásková (2014)	OECD Countries, 1990-2009	Pearson's Corr. Coeff.	✓	✓
Dahlby and Ferede (2013)	Canada, 1977-2006	2SLS	×	×
Perotti (1996)	69 Countries, 1960-1985	OLS, IV	✓	✓

Table 1 summarizes the key studies that explore the relationship between redistribution and economic growth. In comparison to these existing studies, our research stands out in several significant ways. As shown in the table, none of the previous studies have focused specifically on the E6 countries. In terms of methodology, most of the existing literature relies on the Generalized Method of Moments (GMM), and none of the

studies apply the Panel-Corrected Standard Errors (PCSE) approach. Additionally, prior studies typically measure redistribution using absolute redistribution, defined as the difference between the market Gini coefficient and the disposable income Gini coefficient. In contrast, our study also introduces a relative redistribution variable as a sensitivity check for the findings obtained using the absolute measure. Given these distinctions, this is the first and only study to investigate the impact of redistribution on the economic growth of E6 countries over the period 1988–2021. In this respect, the study makes a valuable and original contribution to the literature.

2.2. Theoretical Framework

In this section, the link between redistribution and economic growth is discussed. Additionally, the theoretical links between the growth rate and the other variables used as control variables in the study are also explained.

2.1.1. Redistribution and Growth Nexus

The impact of income redistribution through taxes and transfer expenditures on economic growth has been examined by only a limited number of studies in the literature, and there are opposing arguments on this issue. The arguments of studies claiming that redistribution has negative effects on economic growth are as follows: Redistribution, through higher taxes on high-income groups, can discourage investment and reduce work effort, leading to lower capital accumulation and slower economic growth. This happens because taxing the rich reduces their motivation to work and invest, creating an "efficiency cost" that negatively affects overall productivity (Rehme, 2006; Barro, 2000; Vlad, 2015). On the other hand, the arguments regarding the growth-enhancing effect of redistribution can be expressed as follows: Redistribution can promote economic growth by increasing the incomes of low-income groups, who tend to spend a larger share of their earnings due to a higher marginal propensity to consume, thereby boosting demand and production. Additionally, by improving access to education and healthcare, redistribution enhances the skills and productivity of disadvantaged groups, leading to higher total output and a stronger labor force (Fisher et al., 2020; Vlad, 2015; Barro, 2000).

2.1.2. GFCF and Growth Nexus

GFCF refers to the net increase in physical assets such as machinery, equipment, infrastructure, and other productive goods, after subtracting any assets that are no longer in use (Saragih et al., 2020, p. 372). Because of its role in expanding a country’s production capacity, GFCF is considered one of the main factors that influence GDP (Vedia-Jerez & Chasco, 2016, p. 171). The level of output in an economy is affected by the investments made by both the private sector and the government under GFCF (Ugochukwu & Chinyere, 2013, p. 36). According to growth theories, particularly the endogenous growth models developed by Romer (1986) and Lucas (1988), capital formation is a key driver of long-term economic growth. In the literature, nearly all

studies that analyze the effect of GFCF on economic growth have found it to be positive and supportive of growth (see Bakare, 2011; Kanu and Ozurumba, 2014; Solarin and Shahbaz, 2015). This is because capital, being one of the core inputs in the production process, increases the total output, leading to higher levels of economic growth.

2.1.3. Impact of Inflation on Economic Growth

Inflation plays an important role in affecting economic growth, as it is widely viewed as an indicator of macroeconomic stability. However, the literature presents mixed views on its effect, and there is no clear consensus. Based on the Tobin-Mundell hypothesis, an increase in expected inflation reduces people's demand for money, which in turn lowers real interest rates. As a result, individuals shift their wealth into real assets and investments, leading to higher production and thus faster economic growth (Chen and Feng, 2000, p. 9; Gakpa and Kouadio, 2023, p. 210). On the other hand, rising inflation can undermine economic stability, making the future more uncertain. This uncertainty discourages investors, as they face difficulties in accurately predicting prices and making investment decisions. In such an environment, inflation acts as a barrier to investment, ultimately having a negative impact on economic development (Kasidi and Mwakanelema, 2013, p. 363; Adaramola and Dada, 2020, p. 3).

2.1.4. Trade Openness and Growth Nexus

There are various arguments regarding trade openness as a determinant of economic growth, and there is no consensus on its effects. Arguments supporting its positive impact on economic growth can be summarized as follows: As trade openness increases, local firms that enter international markets begin to compete not only with domestic companies but also with foreign firms in the same sector. This competition encourages them to be more efficient and to produce higher-quality products (Adhikary, 2011, p. 18-19). Additionally, according to the theory of comparative advantage, countries can contribute to economic development by specializing in the production of goods in which they have an advantage, allowing them to produce more efficiently (Boldeanu and Constantinescu, 2015, p. 332). However, if this specialization happens in low-tech industries due to cheap labor, it may not lead to innovation or long-term growth (Chang et al., 2009, p. 33). Moreover, in countries where firms are not competitive enough, increased trade openness may cause some companies to exit the market (Nguyen et al., 2018, p. 84), leading to a decline in production, which can negatively affect economic growth.

2.1.5. FDI and Growth Nexus

FDI is often seen as an important driver of economic growth. It can boost the growth rate in several ways. For instance, when foreign firms enter a country, they bring advanced technology with them, which can spread throughout the economy (Aitken and Harrison, 1999, p. 605). FDI also brings in capital, which many developing countries desperately need. Another benefit is the transfer of skills and know-how (Kerner, 2018, p.1; Wanjere et al., 2022, p. 23), which can spread through labor turnover when

employees leave foreign firms and join domestic companies, bringing along the expertise gained in their previous roles. Moreover, FDI can help local businesses connect with international markets and build broader networks through trade relationships with multinational companies (Iamsiraroj and Ulubaşoğlu, 2015, p. 201). All these effects can raise a country's production levels and, in turn, support stronger economic growth.

That said, FDI doesn't always lead to positive outcomes. When foreign firms send their profits back to their home countries (a process known as profit repatriation), it causes a net outflow of foreign currency, which can lead to instability in the exchange rate (Ozturk, 2017, p. 80). Another issue arises when FDI mainly goes into the extractive industries like oil or natural gas. In those cases, it can cause problems like Dutch disease (Aykut and Sayek, 2007, p. 39), where a sudden inflow of foreign currency makes the local currency stronger, which then hurts exports and widens the current account deficit. Lastly, there's the risk that local firms might be pushed out of the market (Ahmed et al., 2014, p. 420). When foreign companies bring in better technology and operate at lower costs, it becomes really hard for domestic businesses in the same sector to compete with them. This can actually weaken the local economy over time instead of strengthening it.

3. Data and Methodology

The selection of the time period to examine the impact of redistribution on the economic growth rate depends on data availability; therefore, the starting and ending years in this study are 1988 and 2021, respectively. The information on the incorporated variables, including definitions, symbols, and sources, is presented in Table 2. As shown, lnEG is used as the dependent variable. lnRDA and lnRDR are the main independent variables, with the former serving as a sensitivity check. Both variables reflect income distribution by showing changes in the Gini coefficient due to redistribution policies. However, the difference between them lies in their calculation and representation. lnRDA measures the absolute reduction in the Gini coefficient after taxes and transfer payments, while lnRDR represents the percentage change in the Gini coefficient after redistribution. The other variables shown in the table are also used as independent variables.

Tablo 2
Variable Definitions and Sources

Variable	Symbol	Definition	Source
Economic Growth Rate	EG	It shows the percentage change in GDP per capita, which is calculated by dividing GDP by the midyear population.	WDI
Absolute Redistribution	RDA	It shows the absolute reduction in the Gini index after tax and transfer payments.	Solt (2024)
Relative Redistribution	RDR	It demonstrates the percentage reduction in the Gini index after tax and transfer payments.	Solt (2024)
Gross Fixed Capital Formation	GFCF	It indicates investments, including land improvements, machinery and equipment purchases, and infrastructure payments. It is expressed as the ratio of GFCF to GDP.	WDI

Inflation	INF	It is derived from the consumer price index, which measures the annual percentage change in the cost of a basket of goods and services that is adjusted yearly.	WDI
Trade Openness	TO	It represents the sum of exports and imports as a share of GDP.	WDI
Foreign Direct Investment	FDI	It refers to the net inflows of investment aimed at acquiring a lasting management interest in an enterprise operating in a country other than the investor's. It shows the ratio of total FDI to GDP.	WDI

Detailed statistical information on the variables included in the models is presented in Table 3. As shown, the highest standard deviation belongs to the lnINF variable, with a value of 358.5. The highest inflation value was seen in Brazil in 1990. Similarly, high inflation was recorded in Russia in 1992, reaching a value of 2500, and again in Brazil throughout the 1990s. In contrast, the minimum inflation rate was observed in China in 1999, with a value of -1.4. The fact that China's inflation remained close to zero throughout the 2000s, while Brazil and Russia continued to experience high inflation, contributed to the inflation variable having the highest standard deviation. The variable with the lowest standard deviation was FDI, with a value of 1.99. The minimum value of this variable was recorded in India in 1990, at 0.0018. Throughout the 1990s, India remained weak in attracting FDI, with values remaining close to this level. The highest value for FDI was observed in China in 1993, with a value of 6.18. China continued to attract similarly high levels of FDI throughout the 1990s, making it the leading country in receiving FDI among the E6 countries.

Table 3

Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
GE	204	4.103265	4.819017	-14.53107	14.23086
RDA	204	5.407353	3.547843	0.7	14.9
RDR	204	11.26912	7.452145	1.4	32.8
GFCF	204	27.17078	8.014711	14.62559	46.66012
INF	204	84.2553	358.5548	-1.401473	2947.733
TO	204	42.34322	15.88198	13.49045	110.5771
FDI	204	1.992738	1.338229	0.0018693	6.186882

This study aims to analyze the effect of redistribution on the economic growth rate in E6 countries based on the following equation:

$$EG_{i,t} = \alpha_i + \beta_1 RDA_{i,t} + \beta_2 Xi_{,t} + \varepsilon_{i,t} \quad (1)$$

where EG represents the economic growth rate, RDA denotes absolute redistribution, X refers to the incorporated other independent variables, ε stands for the error term, while β represents the coefficient of each variable. i and t represent the unit and time, respectively.

To check the sensitivity of Model 1, relative redistribution is used as an alternative to absolute redistribution in Equation 2 as follow:

$$EGi,t= \alpha i + \beta 1RDRi,t + \beta 2Xi,t + \varepsilon i,t \quad (2)$$

The only difference between Equation 2 and Equation 1 is the replacement of absolute redistribution with relative redistribution. The other dependent and independent variables remain the same.

The effect of redistribution on the growth rate is analyzed using the PCSE technique introduced by Beck and Katz (1995) due to its advantages over traditional methods. First, this technique addresses the issue of CSD, which appears when the error terms of different panel units are correlated (Ayuba et al., 2023, p. 211). Second, PCSE allows for heteroskedasticity, meaning it accommodates different variances across panel units, making the results more reliable in the presence of heteroskedasticity (Adeleye et al., 2023, p. 36197). Additionally, this method yields consistent results even under conditions of autocorrelation (Xu et al., 2023, p. 2-4). Moreover, PCSE tends to provide more accurate standard errors, particularly in panel datasets with small sample sizes. Additionally, this method is less sensitive to outliers, which enhances its reliability (Ikpesu et al., 2019, p. 4). Considering these advantages, it is evident that PCSE outperforms traditional methods such as Random Effects, Fixed Effects and Pooled OLS. These strengths justify the choice of PCSE for this analysis.

4. Empirical Results

Before conducting the PCSE method, some pretests should be performed to ensure that the necessary conditions are met. Therefore, the required pretests are first applied, and their results are presented in the following section.

4.1. Preliminary Analyses

First, a correlation matrix test was performed to explore the relationship between the variables employed in the model, and the results are presented in Table 4. As shown in the results, none of the correlations between the variables are close to 0.80, suggesting that multicollinearity is not an issue. However, the correlation between the lnRDA variable (representing absolute distribution) and the RDR variable (representing relative distribution), which is approximately 0.99, indicates that it seems not possible to include these two variables in the same model due to a multicollinearity issue. For this reason, and as previously mentioned, the RDR variable is included in a separate model (Model 2) as part of a sensitivity check.

Table 4
Correlation Matrix of Variables

	EG	RDA	RDR	GFCF	INF	TO	FDI
EG	1.000						
RDA	0.1758	1.000					
RDR	0.2748	0.9103	1.000				
GFCF	0.4883	-0.0744	-0.1022	1.000			
INF	0.2743	0.0720	0.0257	-0.0774	1.000		
TO	0.0801	0.0372	0.0799	0.1235	-0.0566	1.000	
FDI	-0.2495	0.0828	0.0167	0.1398	-0.2563	0.1379	1.000

To ensure that there is no multicollinearity issue in the two models, the Variance Inflation Factor (VIF) was calculated for both models, and the results are reported in Table 5. A VIF value above 5 or a 1/VIF value below 0.20 is typically considered an indicator of potential multicollinearity. However, it is also suggested that multicollinearity is more strongly indicated when the VIF exceeds 10 or the 1/VIF value is below 0.10. As shown in the table, for both models, there is no evidence of multicollinearity, as neither the VIF values nor the 1/VIF values exceed the thresholds, indicating no concern regarding multicollinearity.

Table 5
VIF Results for Both Models

Model 1			Model 2		
Variables	**VIF**	**1/VIF**	**Variables**	**VIF**	**1/VIF**
RDA	1.12	0.8949	**RDR**	1.10	0.9071
GFCF	1.08	0.9242	**GFCF**	1.07	0.9315
INF	1.04	0.9617	**INF**	1.05	0.9552
TO	1.03	0.9681	**TO**	1.04	0.9615
FDI	1.03	0.9755	**FDI**	1.02	0.9796
Mean	1.06		**Mean**	1.06	

After the VIF test, the Breusch-Pagan Likelihood Model (BP-LM) test is conducted to determine whether CSD exists among the units, which occurs when economic crises or shocks in one country are transmitted to others. Identifying CSD is essential for selecting the appropriate econometric method for analysis. The results of the test are presented in Table 6. For each model, three regressions are run, incorporating additional control variables incrementally as a sensitivity check. The results indicate that CSD exists in all regressions of both models, as the null hypothesis of no CSD is rejected. To ensure the reliability of these findings, additional CD tests, namely, Pesaran's (2015) Scaled LM (PS-LM) test and Baltagi et al.'s (2012) bias-corrected scaled LM (BS-LM) test, are applied. Their results, also shown in Table 6, confirm the presence of CSD across all regressions in both models.

Table 6
CSD Tests for Both Models

Test Types	BP- LM	PS-LM	BS-LM
Model 1			
Reg. 1	38.3574***	4.2645***	4.7833***
	(0.0008)	(0.0000)	(0.0000)
Reg. 2	35.1965***	3.6874***	4.9607***
	(0.0023)	(0.0002)	(0.0000)
Reg. 3	32.6607***	3.2244***	4.4933***
	(0.0052)	(0.0013)	(0.0000)
Model 2			
Reg. 1	35.9753***	3.8295***	4.5039***
	(0.0018)	(0.0006)	(0.0000)
Reg. 2	33.2536***	3.3326***	4.7694***
	(0.0043)	(0.0009)	(0.0000)
Reg. 3	32.1652***	3.1339***	4.3929***
	(0.0061)	(0.0017)	(0.0000)

Note: *, **, and *** referes to the significance levels of 1%, 5% and 10%, respectively. The values reported in parentheses show the probability values[3].

After conducting the CD tests, the Unit Root test is applied to determine whether the variables are stationary at level I(0) or at different difference levels. Given the presence of CSD, first-generation unit root tests such as the Fisher and ADF tests do not yield accurate results. Therefore, second-generation unit root tests that account for CSD should be used. In this context, the Cross-Sectionally Augmented Im-Pesaran-Shin (CIPS) test is applied to all variables included in the regressions for both models, and the results are presented in Table 7. As indicated, all variables exhibit a unit root at the level but become stationary at their first difference due to the rejection of the null hypothesis, which states that the variables are non-stationary.

Table 7
CIPS Unit Root Test Results

	Level [I (0)]	First Difference [I (1)]
Variables	**CIPS Stat.**	**CIPS Stat.**
EG	-2.146	-4.187***
RDA	-1.544	-4.632***
RDR	-0.908	-4.293***
GCFC	-2.163	-5.570***
INF	-2.232*	-5.299***
TO	-1.846	-4.988***
FDI	-2.169	-5.328***

Note: The critical values at the 1%, 5%, and 10% significance levels for both level and first difference are −2.55, −2.33, and −2.21, respectively.

[3] Since the number of asterisks and the values in parentheses in the following tables convey the same information, no explanatory notes have been added to avoid repetition in the other tables.

The final pretest before performing the PCSE test is the cointegration test developed by Westerlund (2005). Since PCSE provides long-run results, the existence of cointegration among the variables is a necessary precondition. Given the presence of CSD in the models, the selection of an appropriate cointegration test is essential, which justifies the selection of the Westerlund cointegration test. The presence of cointegration is tested for all regressions in both models, with the results given in Table 9. As shown, the variance ratio statistics exceed the critical value at the 5% level, and their corresponding p-values are below 0.05 for all three regressions in both models. This leads to the rejection of the null hypothesis of no cointegration, providing evidence of a long-run relationship among the variables.

Table 9
Cointegration Test for Both Models

Model 1	**Reg. 1**	**Reg. 2**	**Reg. 3**
Variance Ratio Stat.	-1.9128**	-1.8099**	-1.897**
P-Value	(0.0279)	(0.0352)	(0.0253)
Model 2	**Reg. 1**	**Reg. 2**	**Reg. 3**
Variance Ratio Stat.	-1.9711**	-1.6704**	-1.9856**
P-Value	(0.0244)	(0.0474)	(0.0235)

4.2. Results of PCSE Analysis

The effect of redistribution on the economic growth rate is analyzed using the PCSE method, with the results presented in Table 10. In Regression 1, the coefficient of lnRDA is positive and statistically significant, indicating that an increase in redistribution is associated with a higher economic growth rate in E6 countries during the period 1982–2021. The growth-enhancing effect of lnRDA is further examined by including additional control variables in Regressions 2 and 3, respectively. The findings consistently confirm the positive impact of lnRDA on the growth rate. Specifically, a one-unit increase in lnRDA raises the growth rate in E6 countries by a minimum of 0.704 percentage point and a maximum of 0.876 percentage point over the study period, according to the PCSE results. This finding of a positive effect of redistribution on the growth rate is consistent with the study by Berg et al. (2018). The growth enhancing effect of redistribution, as previously explained, can be expressed as follows: Transfer spending directed toward low income groups, who tend to have a higher marginal propensity to consume, increases overall consumption, which in turn raises production and contributes positively to economic growth. Furthermore, providing essential services such as education and healthcare to people in lower income groups can help them become more skilled and productive workers or even establish their own businesses, which also supports economic growth.

The coefficient of GFCF, one of the independent variable, is positive and statistically significant in all regressions. This indicates that an increase in GFCF

contributes to higher economic growth. This result is similar to the findings of Gibescu (2010) and Bal et al. (2016). The positive effect of GFCF on economic growth is expected, as capital is a fundamental input in the production process. Increasing capital investment raises overall output, which contributes to higher economic growth. Similarly, inflation also enters all regressions with a positive and significant coefficient, supporting its positive contribution to growth. This result aligns with the study of Chen and Feng (2010) Kryeziu and Durguti (2019). The positive impact of inflation can be explained by the fact that rising expected inflation reduces the demand for holding money, which lowers real interest rates. This shift encourages individuals to invest in real assets, leading to increased production and faster economic growth. In Regression 2, the variable lnTO, which represents trade openness, is included in the model. lnTO also has a positive and statistically significant coefficient. Its growth-enhancing effect is also estimated in Regression 3, indicating that its positive impact on growth is reliable. This finding is in line with previous studies by Keho (2017) and Raghutla (2020). The positive effect of trade openness is not surprising as it supports growth by exposing domestic firms to international competition, which drives efficiency and product quality. It also allows countries to specialize in industries where they are most efficient, boosting overall productivity. In Regression 3, the inclusion of lnFDI in the model indicates a negative and significant effect on the growth rate. This result is consistent with earlier studies by Li and Liu (2005) and Herzer (2012). The negative effect of FDI may be due to profit repatriation, which leads to exchange rate instability; Dutch disease effects resulting from the exploration of underground sources; and intensified competition that pushes local firms out of the market, as discussed earlier.

Table 10

PCSE Estimation Results for Model 1

Variables	Reg. 1	Reg. 2	Reg. 3
RDA	0.7049**	0.7359**	0.8763***
	(2.15)	(2.20)	(2.57)
GCFC	0.2823***	0.2932***	0.2821***
	(9.50)	(9.65)	(9.95)
INF	0.0031***	0.0032***	0.0027***
	(3.76)	(3.92)	(3.27)
TO		0.0466**	0.0521***
		(2.40)	(2.70)
FDI			-0.5411***
			(-2.87)
Cons.	-2.2067**	-0.4768***	-0.8729***
	(-3.80)	(-4.14)	(-4.54)
R-Squared	0.4690	0.4826	0.5025

Note: The values reported in parentheses indicate the z-statistic values

4.3. Sensitivity Check

To test the sensitivity of the growth-promoting effect of RDA, an alternative measure of redistribution, relative redistribution, which reflects the percentage change in the Gini index after taxes and transfers, is employed in Model 2. The results are reported in Table 11. The coefficients of lnRDR are positive and statistically significant across all three regressions, indicating that a 1% increase in lnRDR is associated with a higher economic growth rate, ranging from 0.24% to 0.249%.

Regarding the control variables, lnGFCF and lnINF enter Regression 1 with coefficients of 1.62 and 0.089, respectively. Their growth-enhancing effects persist in Regressions 2 and 3, which supports the previous findings. The only difference is that lnINF becomes statistically significant at the 5% level in Regressions 1 and 2. lnTO is included in Regressions 2 and 3, and its positive effect confirms earlier results. Finally, lnFDI is incorporated in Regression 3, and similar to the previous findings, its effect remains negative and statistically insignificant. In conclusion, the results are consistent with those obtained using lnRDA, thereby confirming the realibility of the findings.

Table 11
PCSE Estimation Results for Model 2

Variables	Reg. 1	Reg. 2	Reg. 3
RDR	0.1247***	0.1165***	0.1237***
	(3.21)	(3.16)	(3.31)
GCFC	0.2739***	0.2845***	0.2738***
	(9.40)	(9.41)	(9.71)
INF	0.0032***	0.0033***	0.0029***
	(3.98)	(4.11)	(3.53)
TO		0.0409**	0.0457**
		(2.17)	(2.46)
FDI			-0.5238***
			(-2.74)
Cons.	-0.6166***	-0.2561***	-0.7767***
	(-5.21)	(-5.60)	(-5.83)
R-Squared	0.4627	0.4807	0.5096

Note: The values reported in parentheses indicate the z-statistic values

5. Concluding Remarks and Suggestions for Policy and Further Studies

With technological advancements, significant increases in production have enabled both developed and developing countries to achieve unprecedented levels of economic growth. As a result, many countries have experienced substantial rises in their growth rates. Economic growth is a crucial macroeconomic indicator for the standard of living in a country. Therefore, it has attracted considerable attention from researchers, and a vast body of studies has been conducted on this topic. However, as the economic "pie" has

grown larger, its unequal distribution has resulted in some groups receiving disproportionately large shares, while others have seen their shares shrink. This imbalance has sparked debates about income inequality, and the effect of income inequality on growth has also become a frequent subject of research.

To reduce inequality, one of the main policies used is income redistribution, which is implemented through taxes and transfer payments. Despite this, the number of studies that specifically examine the effect of redistribution on economic growth remains quite limited. Therefore, this study provides an important contribution to the existing literature by analyzing the effect of redistribution on the growth rate of E6 countries using the PCSE method for the period 1988 to 2021.

The findings of the study show that redistribution has a growth-promoting effect, meaning that higher levels of redistribution are associated with higher growth rates in E6 countries. This result remains reliable, as an alternative measure, relative redistribution, also shows a growth-enhancing effect, confirming the growth-stimulating impact of absolute redistribution. Regarding the explanatory variables, GFCF, inflation, and trade openness have a positive impact on the growth rate, while the effect of foreign direct investment (FDI) is found to be statistically negative.

In light of the study's findings, several important policy implications can be provided as follows: First, since income redistribution contributes positively to the economic growth of countries, redistribution policies should be continued. This approach supports economic growth while also reducing income inequality. In this way, it contributes to Sustainable Development Goal (SDG) 10, which focuses on reducing inequality, and supports not only growth but also broader development objectives. However, excessively increasing income or labor taxes as part of redistribution efforts may have the opposite effect. Such increases could discourage investment or encourage a shift to the informal economy, which may harm economic growth. Therefore, redistribution policies should be designed carefully and implemented in a balanced manner. Directing redistribution through transfer spending toward key areas such as education, health, and infrastructure can be more beneficial. These sectors typically provide high returns in the long term and thus contribute more to sustainable economic growth.

GFCF has a positive effect on growth. Policies that encourage investment should be pursued to strengthen this area further. Trade openness also contributes positively to economic growth, so increasing both exports and imports is important. However, trade deficits should not be overlooked. In such cases, policies that promote export expansion become particularly significant. Inflation also supports growth to a certain extent. However, if inflation exceeds expectations, it can reduce predictability in the market and undermine economic stability. Therefore, maintaining inflation within an acceptable range is crucial. The findings show that FDI reduces the economic growth rate. Considering this result, instead of encouraging FDI without considering its type or sector,

policies should focus on promoting cooperation between foreign and local firms. Encouraging collaboration between foreign investors and domestic firms can support technology transfer and enable local companies to access and strengthen networks with international partners, thereby promoting economic growth. In sectors like agriculture, where FDI may lead to capital outflows after extracting local resources, measures should be taken to prevent such losses. As research highlights the positive impact of FDI in the manufacturing sector (Doytch and Uctum, 2012; Fazaalloh, 2024), more effort should be made to attract foreign investment to that area.

Of course, this study is not without limitations, as it is restricted to the E6 countries. Future research on this topic could consider different country groups as samples. Moreover, researchers could classify countries based on their level of development and analyze them separately to examine whether the effect of redistribution on growth differs across these groups. Additionally, by including the square of the redistribution variable in the regression analysis, they could investigate whether the relationship with growth is linear or follows an inverted U-shape pattern.

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