Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi • Cilt: 46 • Sayı: 1 2024, ISSN: 2587-2672, ss. 195-220
DOI: 10.14780/muiibd.1404123

ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

DOES GLOBALIZATION REDUCE POVERTY AT EACH LEVEL OF DEVELOPMENT? – SENSITIVITY TO POVERTY LINES

KÜRESELLEŞME HER GELİŞMİŞLİK DÜZEYİNDE YOKSULLUĞU AZALTIYOR MU? – YOKSULLUK SINIRLARINA DUYARLILIK

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Abstract

This paper aims to estimate the effect of globalization on poverty by using alternative poverty lines, namely the World Bank's $ 3.10-a-day poverty approach and national poverty line in comparison with the World Bank's $ 1.90-a-day absolute poverty approach. The data covers 176 countries for the 2005-2018 period, and the methodology is based on heterogeneous panel data analysis. According to the results, globalization reduces absolute poverty in the least developed and developing countries. Moreover, the negative effect is found as significant only for the least developed countries in terms of national poverty. Lastly, globalization does not reduce poverty in developed countries.
Keywords: Globalization, Poverty, Economic Development, Education
JEL Classification: I3, F6, O1

Öz

Bu çalışma, Dünya Bankası'nın günde 3,10 Dolar yoksulluk yaklaşımı ve ulusal yoksulluk sınırı gibi alternatif yoksulluk sınırlarını kullanarak küreselleşmenin yoksulluk üzerindeki etkisini Dünya Bankası'nın günde 1,90 Dolar mutlak yoksulluk yaklaşımıyla karşılaştırmalı olarak tahmin etmeyi amaçlamaktadır. Çalışmanın verileri 2005-2018 dönemi için 176 ülke olarak geniş bir veri setini kapsamakta ve çalışmanın

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As corresponding author, I would like to thank my PhD. supervisor, Professor Selahattin Güriş, for his support throughout my academic life. I will never forget his place in my life. Rest in peace!

How to cite this article/Atıf için: Selim, R., & Kaya, G. (2024). Does globalization reduce poverty at each level of development? - Sensitivity to poverty lines. *Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi, 46*(1), 195-220. DOI: 10.14780/muiibd.1404123

Makale Gönderim Tarihi: 12.12.2023 **Yayına Kabul Tarihi:** 20.02.2024 **Benzerlik Oranı:** %21

metodolojisi heterojen panel veri analizine dayanmaktadır. Çalışmanın sonucuna göre, küreselleşme az gelişmiş ülkelerde ve gelişmekte olan ülkelerde mutlak yoksulluğu azaltmaktadır. Buna ek olarak, küreselleşmenin yoksulluk üzerindeki negatif etkisi ulusal yoksulluk yaklaşımı ile sadece az gelişmiş ülkeler için anlamlı bulunmuştur. Son olarak, çalışmanın sonucuna göre küreselleşmenin gelişmiş ülkelerde yoksulluğu azaltmadığı bulunmuştur.
Anahtar Kelimeler: Küreselleşme, Yoksulluk, Ekonomik Kalkınma, Eğitim
JEL Sınıflandırması: I3, F6, O1

1. Introduction

The impact of globalization on poverty has long been a topic of theoretical discussion. Neoliberals contend that economic integration reduces poverty since it boosts productivity and generates incomes for the underprivileged through growth (Kraay and Dollar, 2001; Winters, 2003). The counterargument, however, is qualified by the observation that the benefits of globalization are not dispersed equally throughout nations, and it ends with a rise in national poverty (Rosenthal, 1996; Guan, 1995). Increased economic vulnerability and the poverty effect may result from increased overseas commerce (Bannister and Thugge, 2001). Furthermore, there are some views that this influence is ambiguous and dependent on national institutions (Santos-Paulino, 2012). When the economic, demographic, and political structures of the states are considered to be different from each other, it can be said that the argument of neoliberals is not wholly valid (Le Goff and Singh, 2013).

The effect of globalization on poverty has long been estimated empirically by using instruments for globalization and poverty. The first problem in these analyses is that early studies use economic growth in poor incomes as a poverty instrument (Dollar and Kraay, 2004), and the main disclaimer of this analysis is its misleading indicator of poverty (Wade, 2004). Many studies, (e.g., Bergh and Nilsson, 2014; Khan and Majeed, 2018; Gnangnon, 2019, etc.) use the World Bank's $ 1.90-a-day absolute poverty line for the poverty type. The $ 1.90-a-day poverty line approach takes account of the survival food requirements of the poor, whereas the other two poverty definitions are determined concerning the basic needs approach. World Bank's $1.90 a-day absolute poverty approach has a reservation that even if households exceed it, poverty will not end since it was constructed based on the national poverty lines for the poorest economies in the world (World Bank, 2023a). The World Bank presents poverty rates with a $3.10 a day line approach as a reflection of poverty rates with a national poverty line approach found in low-middle-income countries (World Bank, 2023a). This approach seems more inclusive for the poor, and the number of people living under this line is equal to the number of people living in extreme poverty in 1990 (World Bank, 2023b). Likewise, the United Nations (1997) proposes that a daily poverty line of $2 (PPP$) should be used for Latin America and the Caribbean while a poverty line equivalent to the US poverty line of $14.40 (1985 PPP$) a day per person should be used for comparison between industrial countries.

The other problem is the measurement of globalization. Bergh and Nilsson (2014) overcome both problems by using the headcount measures of absolute poverty and the KOF index. KOF Index (Dreher et al., 2008) is an inclusive and well-explaining instrument for globalization. In this study, we test the significance of the negative relationship between globalization and poverty by using

alternative poverty lines such as the World Bank's $ 3.10-a-day poverty line and national poverty line in comparison with the World Bank's $ 1.90-a-day absolute poverty line by using the KOF index. This is the first contribution of this paper.

The effect of openness to distributional concerns may differ over the path of development (Roine et al., 2009). Jenkins (2007) investigates the impact of production on poverty and focuses on the business and income opportunities created by globalization in four countries (Bangladesh, Kenya, South Africa, and Vietnam). The study reveals that a more educated workforce has benefited from globalization in Kenya and South Africa, while in Bangladesh and Vietnam, an untrained workforce has benefited more. Thus, the impact of the globalization process varies significantly according to the country's institutional structure and policies. The gains for the poor from globalization may change in countries with different stages of economic development. The depth of poverty can also vary according to the stages of economic development. Absolute poverty, which includes food requirement necessity, is the initial poverty concept in the least developed countries. Absolute poverty, which includes food requirement necessity, is the initial poverty concept in the least developed countries. However, for developed and developing countries, the basic needs approach is more critical in the calculation of poverty. That's why, our study also examines the validity of the negative causality from globalization to poverty for countries with varying levels of development. This is the second contribution of this study. We use a large data coming from 176 countries. We regress the KOF index of globalization, education index[1], growth, unemployment rate, inflation rate, GDP per capita (constant 2010 US$), and Gini index on the poverty rate under $3.10 a day and national poverty line with a comparison of $1.90 a day approach which is widely used before in the literature. In terms of methodological contribution, this study examines these hypotheses with heterogeneous panel data models that give different slope coefficients according to the countries. For instance, the result of the analysis of two developed countries may be different from the analysis of the other less developed countries. It provides control of whether the results are consistent within each development level or not. In addition to comparing the results of both poverty levels with the $1.90 per day approach, applying this methodology also provides a robustness check in this study.

2. Literature Review

The standard approach in the literature (shown in Figure 1) checks the link between economic globalization and poverty via economic growth. However, there are also some different findings in the literature examining this relationship.

As a result of globalization, trade barriers for products and services are removed, financial barriers to the free flow of capital diminish, and cultural and intellectual exchange between nations occurs. The growth of nations and the diversification of commodities and services are both facilitated by the expansion of international commerce. Numerous scholars have elucidated the beneficial impacts of globalization on economic growth (Sachs and Warner, 1995; Frankel and Romer, 1999; Kraay and Dollar, 2001).

1 The education index is calculated by combining average adult years of schooling with expected years of schooling for students under the age of 25, each receiving 50% weighting.

For instance, Kraay and Dollar (2001) checked at a set of developing nations that participated more in globalization and saw how it affected poverty and inequality. Their study found that globalizing countries after 1980 had experienced tremendous increases in trade in the last twenty years and their growth rates had caught rich countries and had gone beyond other developing countries.

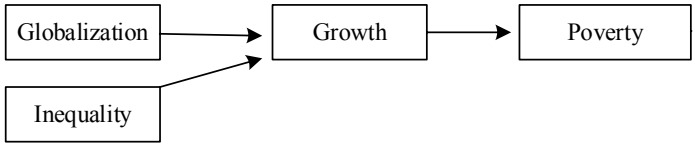

Figure 1: Standard Approach in the Globalization, Growth, Inequality and Poverty Relationship

Some studies highlight the negative or dubious consequences of globalization on growth, in contrast to the neo-classical theory that contends that globalization is beneficial to growth. Harrison (1996) reports that while openness and growth are positively correlated, the degree of this correlation varies depending on the econometric model's inputs. Additionally, some studies imply that growth may be indirectly impacted by the consequences of globalization. According to Santos-Paulino and Thirlwall (2004), liberalization drives growth in exports, but it also determines growth in imports. So, they conclude the nations' trade and payment balances will be worse and affect people's standards of living.

(a) Links from globalization to poverty via growth

The neoliberal theory argues that poverty has decreased over the past two decades due to the rising density of economic integration (Wade, 2004). According to mainstream economic theory, capital should be collected in certain hands to increase investments due to the higher saving rates of the rich. When the investments are realized in this way, turning to productive areas will create economic growth. All segments of society will benefit from this growth, and poverty will be reduced because of the trickle-down approach. Dollar and Kraay (2004) indicate an empirical evidence that trade increases growth. Their study shows that this effect creates proportionate increases in the income of the poor. For example, Tsai and Huang (2007) examine that openness to trade has contributed to raising the mean income of the poor in Taiwan (Table 1). Therefore, globalization is expected to have a positive impact on growth and reduce poverty. Some of the specific country studies on trade liberalization and country relationships support the neoliberal theory hypothesis using time series data. These studies show a negative relationship between trade liberalization and poverty such as Akmal et al. (2007) for Pakistan, Nyarkoh (2017) for Ghana, Salahuddin et al. (2020) for South Africa and Osinubi (2020) for Mexico (Table 1). Moreover, Bergh et al. (2016) note that globalization helps reduce poverty by acting as a substitute for weak institutions, when governments degenerate or form unstable, social, and economic contacts with the rest of the world become an invaluable source of information and resources and help fight poverty.

The discussions on the effects of globalization focus on many questions about distributional concerns: *Does openness benefit everyone equally? Do gains from openness, especially go to the poor?*

Does economic growth come at the price of increased inequality? (Roine et al., 2009). While some researchers state that growth is an essential factor in reducing poverty, it also leads to increased inequality in income distribution. An increase in inequality can increase poverty and reduce the effect of growth on poverty (Bourguignon, 2004). Moreover, Stiglitz (1999) states that the benefits of development are not shared equally in countries during periods of economic boom and economic growth and the poor do not benefit from economic growth in countries where the distribution of wealth is quite unequal. In the other study, Stiglitz (2002) argues that the management style of globalization deteriorates its effects in many cases (Akoum, 2008). The hypothesis that income inequality reduces economic growth has been tested by Alesina and Rodrik (1994), Persson and Tabellini (1994), Clarke (1995), Perotti (1996), and Alesina and Perotti (1996). On the other hand, Deininger and Squire (1996) state that there is no systematic relationship between inequality and growth. Herzer and Vollmer (2012) measure the long-term effects of income inequality on per capita income for 46 countries in the 1970-1995 period using heterogeneous panel cointegration techniques and show that the long-term effect of inequality on growth is negative. Using system GMM panel data techniques in the income distribution-growth relationship Halter et al. (2014) state that income inequality benefits growth in the short run, but it is harmful in the long run.

The empirical country studies on the trade liberalization and poverty relationship may also reach conflicting findings when the data belongs to the one country. For instance, Akmal et al. (2007) indicate a reduction in poverty with trade liberalization in Pakistan. In contrast, Khan and Bashir (2012) do not find a significant effect on poverty using time series data starting from the 70s for three decades (Table 1). Khan and Bashir (2011) estimate the same relationship for India, and they find that there is also no evidence of a significant effect on poverty, as well. Economic globalization increases poverty in Nigeria (Uzonwanne, 2018); Turkiye, and Indonesia (Osinubi, 2020). Although there are many studies in the literature that examine the globalization-poverty relationship using time series analyses, the heterogeneity of units is not included in the model estimations made with time series or cross-sectional data. That's why, there is a risk of obtaining biased results in time series and cross-sectional models where such differences between units are not taken into account (Tüzüntürk, 2010). For this reason, panel data analyses have been used more frequently to analyze these relationships in the literature (see Table 2 and Table 3).

Table 1. Country Case Studies Using Time Series Data over Globalization-Poverty Relationship

Study	Country and Period	Poverty Indicator	Globalization Indicator	Result
Akmal et al. (2007)	Pakistan 1973-2003	Headcount poverty	Trade openness*	Trade liberalization reduces poverty in the long run.
Tsai and Huang (2007)	Taiwan 1964-2003	The average income of the poors	Openness to trade*	Openness to trade has contributed to raising the mean income of the poor.
Khan and Bashir (2011)	India 1970-2009	Headcount poverty	Trade liberalization*	Trade has no significant effect on poverty.

Khan and Bashir (2012)	Pakistan 1975-2010	Headcount poverty	Trade liberalization*	Trade liberalization has no significant effect on poverty.
Nyarkoh (2017)	Ghana 1960-2013	Poverty incidence (proxied by child mortality)	Trade openness*	Poverty incidence is negatively related to trade liberalization the long-run and short-run.
Uzonwanne (2018)	Nigeria 1981-2016	Poverty rate	Balance of trade	Economic globalization has increased poverty as against poverty reduction in Nigeria.
Salahuddin et al. (2020)	South Africa 1991-2016	Headcount poverty, infant mortality, life expectancy	KOF Index	The results confirm that globalization reduces poverty.
Osinubi (2020)	MINT countries: Mexico, Indonesia, Nigeria, Turkiye 1980-2018	Real consumption expenditure of per capita, multidimensional poverty index	KOF Index (Economic globalization, Social globalization, Political globalization)	Economic globalization increases poverty in Nigeria, Turkiye and Indonesia, and reduces it in Mexico. Social globalization increases poverty except for Indonesia. Political globalization reduces poverty in Nigeria and Turkiye.

**Trade openness or trade liberalization is measured as the ratio of trade volume (Import +Export) to GDP*

(b)Poverty at different economic stages

When there are conjunctures inside a country or the level of development varies among nations, the impact of growth on poverty may alter. The main factor influencing the extent of globalization exploitation is a nation's degree of economic growth. Galor (2000) argues that inequality promotes growth for countries at the early stage of economic development since the least developed countries need physical capital accumulation from the outside. In developing countries and least developed countries that have unformed growth in human capital accumulation, the impact of globalization on poverty will be different. Singh and Huang (2015) do not indicate a significant effect of trade openness on poverty in 37 Sub-Saharan African countries. On the other hand, Le Goff and Singh (2013) examine that trade openness reduces poverty in countries that have an intense financial sector, high education levels, and stable governments in 30 African countries.

Developed countries have a disproportionate share of trade and investment in the world, and they have to access information technologies. On the other hand, economic progress and material well-being of developing countries are linked to those in developed economies. The internal conditions of individual countries – their history, culture, political institutions, forms of civil society, and natural and human resource base influence their developmental hopes. However, despite the claims of 'neo-environmental determinants', low levels of development cannot be explained in terms of the natural environment. As always, it is the specific combination of external and internal conditions that determine the developmental trajectories of each country. The main problems for the least developed countries as a whole are extreme poverty, constant population growth, and lack of adequate employment opportunities. Besides the gap between developed and developing countries, there are also significant differences in the developing world itself (Dicken, 2015).

Table 2 summarizes empirical studies examining the relationship between poverty and globalization in developing countries using panel data. It is observed that these studies usually use trade openness as a globalization indicator and poverty level mostly as a $ 1.90-a-day approach. The overall results show that trade liberalization reduces poverty in developing countries. According to Siddiqui (2017), globalization has opened a series of beneficial pathways in favor of developing countries through innovation and entrepreneurship. Still, unemployment, inequality, and poverty remain the main problems in developing countries.

The panel data studies that use trade openness as a globalization indicator find either weak evidence of poverty reduction or a reduction but at a prolonged and diminishing rate (Table 3). The mix of developing countries and developed countries in these panel data countries can weaken this relationship since the relationship can vary according to different globalization, poverty lines and the country-specific context (Nissanke and Thorbecke, 2010; Bardhan,2007). However, recent studies usually use the KOF index as a globalization indicator (Bergh and Nilson, 2014; Bergh et al., 2016; Deyshapperia, 2018) and absolute poverty level with $1.90 a day as the poverty line. The common results of them state that globalization reduces poverty are presented in Table 3.

Our study handles the relationship between poverty and globalization with an extensive data set according to different development levels of countries and various poverty lines. It also uses the KOF index as a globalization measure. These are the main contributions of this study.

Table 2. Empirical Studies on Developing Countries over Globalization-Poverty Relationship

Study	Period	Country	Poverty Indicator	Globalization Indicator	Result
Figini and Santarelli (2006)	1970-1998 (five-year periods)	Developing countries (max 77)	Absolute poverty, Relative poverty	Trade openness	For absolute poverty, trade openness is correlated with lower poverty levels. Trade openness has not significantly affected relative poverty.
Neutel and Heshmati (2006)	2001	54 developing countries	Poverty line ($1, and $2 a day), National poverty line	Kearney globalization index	Globalization leads to poverty reduction, and it reduces income inequality.
Trabelsi and Liouane (2013)	1980-2010	106 developing countries	Absolute poverty ($1.25, and $2.00 a day)	Trade openness	Trade is not the main factor affecting inequality and poverty persistence.
Pradhan and Mahesh (2014)	2000, 2005, and 2010	25 developing countries	Headcount poverty ($1.25 a day)	Trade openness	Poverty has a negative and significant relationship with total trade, imports, exports, and merchandise trade.
Ha and Cain (2017)	1976-2005	132 low – and middle-income countries	National poverty gap	Total trade volume, FDI	Trade reduces poverty. Foreign direct investment has a weak and positive effect on the poverty gap.

Khan and Majeed (2018)	1980-2014	113 developing countries	Headcount poverty ($1.90 a day)	KOF	Economic and social globalization significantly help to reduce global poverty while the political globalization does not significantly cause poverty reduction in all models.
Gnangnon (2019)	1996–2016 (three-year periods)	51 developing countries	Absolute poverty ($1.90 a day)	Index of multilateral trade liberalization	Multilateral trade liberalization is conducive to poverty reduction in developing countries.
Hassan et al. (2020)	2005-2016	73 developing countries	Poverty gap ($1.90 a day)	Trade openness % of GDP	Globalization assists in poverty alleviation.

Table 3. Empirical Studies for Various Countries from Different Economic Stages using Panel or Pooled Data

Study	**Period**	**Country**	**Poverty Indicator**	**Globalization Indicator**	**Result**
Hasan et al. (2003)	1960-1997 (five-year periods)	85 countries	Absolute poverty	Openness to trade	Economic freedom is as much important for economic growth as for poverty reduction.
Heshmati (2007)	1995-2000	62 countries	The national poverty line, Headcount poverty ($1.08, and $2.15 a day)	Two composite indices of globalization	The results provide weak evidence that globalization reduces poverty.
Vinueza and McGee (2010)	1989-2008	84 countries	Poverty gap ($1.25, and $2.00 a day), Relative poverty	Volume of trade	Trade does help reduce absolute poverty but at a very slow and diminishing rate.
Bergh and Nilsson (2014)	1983-2007 (five-year periods)	114 countries	Absolute poverty	KOF	Globalization correlates negatively with absolute poverty.
Bergh et al. (2016)	1983-2007 (5, 10 – or 15-years periods)	64 countries	Absolute poverty ($1.00 a day)	KOF	Globalization has the power to reduce poverty, even in countries with low institutional quality.
Deyshappria (2018)	1990-2016	119 countries	Absolute poverty ($1.90 a day)	KOF	Globalization significantly reduces the level of poverty.

(c) Other nexus to poverty

Learning by doing may accelerate the development of human capital, particularly in high-tech industries that produce things. As a result, the growth of human capital will accelerate (Lucas, 1988). So, the leading indicator of human capital accumulation is the high level of education. In developed countries, where the labor market has a high potential for evaluating this workforce in employment, increasing educational levels will play a role in reducing poverty. Among the developing countries, those countries that have been successful in education can be differentiated from the countries

that are at the same level of development due to the accumulation they have created. For instance, although the United Nations (2017), has classified South Korea as a developing country, this could have given a similar opportunity to developed countries to benefit from if they have an excellent education system.

Education is usually expected to have a reducing effect on poverty in the long run. However, the increasing demand for tradeable products increases employment opportunities for children in poor countries, preventing them from attending school. Suppose the leading cause of children's work is considered as chronic poverty caused by their families. In that case, it should be ensured that liberalization is primarily spread through policies that affect household welfare. Where trade increases the living standards of poor households can divert their children from work to education. Considering that education will contribute to growth and poverty in this way in the long-term poverty will be expected to decrease. Besides, Janvry and Sadoulet (2000) examine that income growth is more effective in reducing urban poverty in Latin American countries when inequality and poverty are relatively lower, and the levels of secondary education are higher.

Employment is an essential source of income, and its absence is a reason for poverty. Under the influence of globalization, cheaper imports of labor-intensive goods provide higher economic efficiency on the demand side and cause high productivity in the labor market, but especially in labor-intensive industries, increasing imports in developing countries, along with competitive changes in technology and other factors, lead to unavoidable losses in job quality, including employment and wages. It increases gaps between skilled and unskilled workers (ILO, 1996). Thus, this triggers poverty.

Bergh and Nilsson (2014) examine the effects of globalization on poverty by using control variables such as the average level of education, urbanization rate, government consumption expenditures/GDP, and inflation. Their findings imply that globalization has a negative impact on absolute poverty. On the other hand, inflation can also contribute to poverty via a fall in the purchasing value of money. If inflation causes a rise in income inequality, the level of poverty will increase because the poor will not benefit from the globalization process (Osinubi, 2020). Ben Naceur and Zhang (2016) also indicate that inflation harms the poor. Moreover, Easterly and Fischer (1999) state based on a survey in 38 countries that the poor suffer more from inflation than the rich do. Lastly, unemployment can lead to poverty. The basic issues for the developing world are severe poverty, continued rapid population growth, and a lack of sufficient job opportunities (Dicken, 2015). Kedir and McKay (2005) show the presence of a substantial degree of persistent urban poverty, which tends to be strongly related to high levels of dependence, low levels of human resources, and unemployment.

The trade liberalization and poverty relationship are searched at the regional level, as well. Cain et al. (2012) estimate the relationship using trade protection, labor market flexibility, and financial development as globalization indicators for states of India and find a significant relationship between trade liberalization and poverty reduction. Kis-Katos and Sparrow (2015) examine the relationship among districts of Indonesia and found that reductions in tariffs on intermediate goods lead to decreases in poverty.

3. Data and Methodology

The cross-country researchers generally use the international poverty line for extreme poverty which is $ 1.90 a day for the 2011 purchasing power parity. For instance, Bergh and Nilsson (2014), Hasan et al. (2003), and Singh and Huang (2015) use absolute poverty to analyze the globalization and poverty relationship. Using a line that defines poverty in terms of basic needs, in a period when the average per capita income is $8,932 in 2005, will be a more realistic approach than defining poverty at $3.10 a day poverty line. Throughout the years, the World Bank has adjusted the worldwide poverty line on a regular basis as the cost of essential food, clothes, and shelter varies all over the world. The poverty line was established at $1.25 per day in the 2008 update, then the threshold was raised to $1.90 per day in 2015. The period covering our work (2005-2018) is a relatively more prosperous period in the world. Therefore, a poverty line defined as $3.10 a day better reflects the current level of welfare than $1.90. Moreover, benefiting from the poverty values specific to each country is also important in order to make comparisons according to different poverty lines in the poverty-globalization relationship (see Neutel and Heshmati 2006; Khan and Majeed, 2018). The poverty headcount ratio at national poverty lines is more heterogeneous than other poverty measures, but this heterogeneity can be modeled with the heterogeneous panel data methods. Lastly, studies investigating the poverty-globalization relationship in the literature, there are enough number of them using $ 3.10 a day as the poverty line (see Table 1-3). For these reasons, our study checks the robustness of the globalization and poverty relationship considering the $3.10 a day and national poverty line approaches in comparison with the $1.90 a day approach.

While examining the effects of globalization on poverty, it is also necessary to analyze how poverty in the relationship is measured and its sensitivity to development stages over time. The World Bank's definition of absolute poverty which is based on the $ 1.90 expresses an estimation of the absolute minimum food requirement that people need to live. Depending on the growth of countries, the diversification of goods and services, and the abundance of technological developments, the definition of poverty has evolved to make absolute poverty calculations specific to countries and/or to evaluate poverty through relative or national poverty calculations for countries. Deaton (2002) emphasizes that getting an accurate poverty count is very important. Fighini and Santarelli (2002) state that poverty measures are separate concepts, with different meanings, measurement procedures, and theoretical links with globalization. The fact that the choice of poverty and the measurement of inequality are essential is also discussed by Ravaillon (2003). He states that globalization is good for the world's poor according tends to be "absolutist". In contrast, most critics of globalization consider poverty in relative terms. If the poverty line is proportional to average income, then it behaves more like a measure of inequality. Also, there are differences in how available data are interpreted and differences in basic assumptions made in the measurement (Neutel and Heshmati, 2006). So, our study assumes that the analysis results of this relationship are sensitive to the selection of the criteria related to poverty. Since absolute poverty rates in developed countries are relatively lower due to high welfare, our study considers national poverty for these countries. It compares results of national poverty with relative poverty obtained from the OECD database, as well.

The balanced data set of our study includes yearly data for the period 2005-2018 which is a large data set different from studies in Tables 2-3. The period comes across faster international trade years with

the effects of well-established relations with trade agreements. According to the data of the World Bank, while the average rate of trade/GDP ratio in the period 1970-2000 is approximately 38 % in the world, this rate is approximately 57 % for the 2001-2019 period (World Bank, 2023a). The initial period of this data is relatively stable. The 2005 was a year when the economies were relatively well (with 3.89% growth), and FDI movements were common (3.30% of GDP).

The data set includes 176 countries, respectively, 42 of them are the least developed, 97 of them are developing countries, and finally, 37 of them are developed countries which covers quite many countries from world. The classification of countries according to economic development level is determined according to the classification of the United Nations (United Nations, 2017). GNP per capita, human assets index, and economic vulnerability index are considered in these classifications as part of the initial conditions. The data on the real growth rate, Gini index, unemployment rate, and inflation rate come from the Euromonitor International (national statistics) database, while the data on poverty headcount ratios and GDP per capita come from the World Bank Open Data Catalog. On the other hand, the education index data, which is formed with the knowledge of mean years of schooling and expected years of schooling, comes from the UN database.

The globalization index, which has been calculated by Dreher et al. (2008) and is known as the KOF index, is obtained from the Swiss Economic Institute Database as used by Bergh and Nilsson (2014), Deyshappria (2018), Khan and Majeed (2018), Salahuddin et al. (2020) and Osinubi (2020). Although it is seen that trade openness or volume of trade variables are used as a globalization indicator in many studies, the KOF index reflects many dimensions of globalization instead of unilateral trade volume. According to Deaton (1995), there may be a systematic upward bias in trade data and national accounts as a result of over-invoicing of imports, a technique frequently employed to move monies from low-income nations (Bergh and Nilsson, 2014). The KOF index[2] is developed using the principal component analysis as a composite index that includes economic, social, and political globalization indicators.

Table 4. Descriptive Statistics

The Least Developed Countries	N	Mean	Standard Deviation	Min	Max
Poverty $ 1.90 (%)	644	30.67	17.68	3.20	79.40
Poverty $ 3.10 (%)	630	52.08	17.50	10.80	83.60
National Poverty (%)	616	42.09	16.67	6.70	83.80
Globalization Index (KOF) (%)	630	44.35	7.04	25.37	61.83
Education Index	602	0.39	0.09	0.14	0.60
Unemployment (%)	616	8.27	7.87	0.10	40.00
Growth (%)	616	5.18	5.33	-36.39	37.50
Inflation (%)	630	8.77	18.63	-14.40	379.85
Gini (%)	112	49.77	2.79	45.60	56.40
GDP	602	1205.32	1138.06	210.80	7090.86

2 The KOF index is determined by dividing real GDP by trade, FDI, portfolio investments, income payments to foreign nationals, and GDP by constraints, such as mean tariff rates, levies on international trade, capital account restrictions, and hidden import barriers.

Developing Countries	N	Mean	Standard Deviation	Min	Max
Poverty $ 1.90 (%)	1456	6.30	8.18	0.00	41.20
Poverty $ 3.10 (%)	1442	14.23	15.38	0.00	66.90
National Poverty (%)	1106	26.94	15.80	0.20	78.50
Globalization Index (KOF) (%)	1414	60.34	9.32	36.91	84.70
Education Index	1372	0.64	0.11	0.31	0.88
Unemployment (%)	1442	9.34	6.40	0.11	37.27
Growth (%)	1442	3.93	7.23	-61.27	124.71
Inflation (%)	1442	51.38	1721.47	-12.85	65374.08
Gini (%)	868	44.07	6.89	26.70	63.90
GDP	1428	10079.91	12017.50	603.44	71974.45
Developed Countries	**N**	**Mean**	**Standard Deviation**	**Min**	**Max**
Poverty $ 1.90 (%)	518	0.59	0.88	0.00	7.90
Poverty $ 3.10 (%)	518	1.35	2.11	0.00	16.80
National Poverty (%)	448	15.52	4.33	1.90	26.40
Globalization Index (KOF) (%)	518	81.53	6.46	53.68	90.98
Education Index	518	0.84	0.07	0.57	0.94
Unemployment (%)	518	8.06	4.18	2.27	27.49
Growth (%)	518	2.12	3.43	-14.84	25.18
Inflation (%)	518	2.14	2.12	-4.48	15.40
Gini (%)	462	35.28	4.68	23.20	48.50
GDP	518	36706.63	23538.20	918.59	112077.60

The variables utilized in the analysis of the combined countries according to various stages of economic growth are displayed in Table 4 as fourteen-year averages. The least developed nations have the highest averages of the three poverty categories, and they also have relatively low globalization and education indexes. However, compared to developing nations, the average growth rate is higher and the average unemployment rate is lower. In developed countries, poverty is low compared to other countries. However, the average of economic globalization is relatively higher than the developing countries. The average education index is high with a 0.8 mean that is close to the maximum value of 1.

Figure A1 presents the scatter plots for the whole sample and separates three country groups according to the different stages of economic development. It can be seen easily from the entire sample; that there is a negative correlation between globalization and absolute poverty. Figure 2 also presents the globalization and poverty relationship using the $3.10 poverty line. The same negative relationship is seen in this figure. The sign of the relationship is undetermined for the developed countries since their absolute poverty is closer to each other.

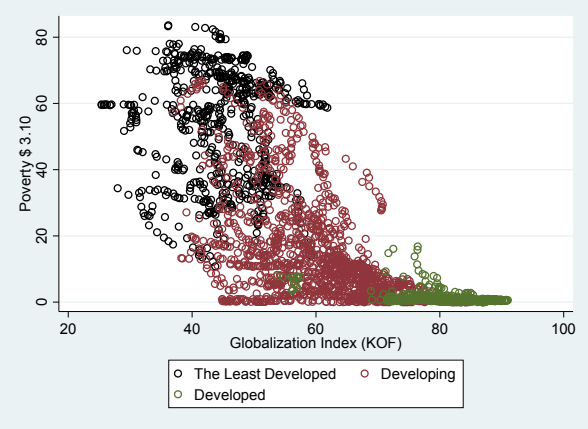

Figure 2: Poverty ($3.10 a day) and Globalization

In a random-coefficients model, the parameter heterogeneity is preserved as stochastic variation. Assume that it is written as,

$$y_i = X_i\beta_i + \epsilon_i \tag{1}$$

where $i = 1,...,m$, and β_i is the coefficient vector $(k\times1)$ for the i_{th} cross-sectional unit, such that

$$\beta_i = \beta + v_i \qquad E(v_i) = 0 \quad E(v_i v_i') = \Sigma \tag{2}$$

The derivation of the estimator assumes that the cross-sectional specific coefficient vector β_i is the outcome of a random process with mean vector β and covariance matrix Σ,

$$y_i = X_i\beta_i + \epsilon_i = X_i(\beta + v_i) + \epsilon_i = X_i\beta_i + (X_i v_i + \epsilon_i) = X_i\beta_i + \omega_i \tag{3}$$

where $E(\omega_i) = 0$ and $E(\omega_i\omega_i') = \sigma_i^2 I + X_i\Sigma X_i' = \Pi_i$ (4)

Stacking the m equations, it can be written as,

$$Y = X\beta + \omega \tag{5}$$

where $\Pi \equiv E(\omega\omega')$ is a block diagonal matrix with Π_i, $i = 1...m$, along the main diagonal and zeros elsewhere. The GLS (generalized least squares) estimator of $\hat{\beta}$ is then,

$$\hat{\beta}=(\sum_i X_i'\pi_i^{-1}X_i)^{-1}\sum_i X_i'\pi_i^{-1}y_i = \sum_{i=1}^m W_i b_i \tag{6}$$

where

$$W_i = \{\sum_{i=1}^m(\Sigma + V_i)^{-1}\}^{-1}(\Sigma + V_i)^{-1} \tag{7}$$

$b_i = (X'_iX_i)^{-1}X'_iy_i$ and $V_i = \sigma^2{}_i\,(X'_iX_i)^{-1}$, showing that the resulting GLS estimator is a matrix-weighted average of the panel-specific OLS estimators. The variance of $\hat{\beta}$ is

$$Var\ (\hat{\beta})=\sum_{i=1}^{m}\ (\Sigma + V_i)^{-1} \tag{8}$$

To calculate the above estimator $\hat{\beta}$ for the unknown Σ and V_i parameters, it is used the two-step approach suggested by Swamy (1970):

b_i=*OLS (ordinary least squares)-panel specific estimator*

$$\hat{\sigma}_i^2 = \frac{\hat{\epsilon}_i'\hat{\epsilon}_i}{n_i-k}\ ,\ \hat{V}_i = \hat{\sigma}_i^2(X_i'X_i)^{-1}\ ,\ \bar{b}=(1/m)\sum_{i=1}^{m} b_i \tag{9}$$

$$\hat{\Sigma} = \left(\frac{1}{m-1}\right) * \left(\sum_{i=1}^{m} b_i b_i' - m\bar{b}\bar{b}'\right) - (1/m)\sum_{i=1}^{m}\hat{V}_i \tag{10}$$

Swamy (1970) further explains that the matrix $\hat{\Sigma}$ may not be positive definite and that because the second term is of order *1/(mT)*, it is unimportant in large samples. A simple and asymptotically practical solution is simply to drop this second term and instead use

$$\hat{\Sigma} = \left(\frac{1}{m-1}\right) * \left(\sum_{i=1}^{m} b_i b_i' - m\bar{b}\bar{b}'\right) \tag{11}$$

As conversed by Judge et al. (1985), the feasible best linear predictor of β_i is given by

$$\hat{\beta}_i = \left(\Sigma^{-1} + \hat{V}_i^{-1}\right)^{-1}\left(\Sigma^{-1}\hat{\beta} + \hat{V}_i^{-1}b_i\right) \tag{12}$$

$$var(\hat{\beta}_i) = var\left(\hat{\beta}\right) + (I - A_i)\{\hat{V}_i - var(\hat{\beta})\}(I - A_i)' \tag{13}$$

$$A_i = \left(\hat{\Sigma}^{-1} + \hat{V}_i^{-1}\right)^{-1}\hat{\Sigma}^{-1} \tag{14}$$

To test the model, it may be looked at the difference between the OLS estimate of β, ignoring the panel structure of the data and the matrix-weighted average of the panel-specific OLS estimators. The test statistic recommended by Swamy (1970).

H_0: $\beta_1 = \beta_2 = \cdots = \beta_m$

$$\chi^2_{k(m-1)} = \sum_{i=1}^{m}\left(b_i - \bar{\beta}^*\right)'\hat{V}_i^{-1}\left(b_i - \bar{\beta}^*\right)\ \text{ where } \bar{\beta}^*=\left(\sum_{i=1}^{m}\hat{V}_i^{-1}\right)^{-1}\sum_{i=1}^{m}\hat{V}_i^{-1}b_i \tag{15}$$

For this study, the broad model regresses the globalization on poverty with a set of control variables in Equation 16. This equation is estimated by using the whole sample and each development stage separately and repeated analysis for each three-poverty line is done.

$$Poverty_{it} = \beta_{oi} + \beta_{1i}Globalization_{it} + \beta_{2i}Education\ Index_{it} + \beta_{3i}Unemployment_{it} + \beta_{4i}Growth_{it} + \beta_{5i}Inflation_{it} + \beta_{6i}\ Gini_{it} + \beta_{7i}\ GDP\ per\ capita_{it} + u_{it} \tag{16}$$

Here, *i* identifies the cross-sectional units as countries, *t* shows the time dimension and, finally, u_{it} shows the error terms. The GDP per capita is defined with 2010 constant prices (2010 US$). Since the number of missing values in the Gini index is high, models containing it are estimated separately.

The fact that the country group contains different development levels necessitated the creation of separate models for each country classification. If the parameters are heterogeneous according to different units in a panel data model and not considered in the modeling phase, it causes biased parameter estimators (Emek and Tatoğlu, 2020). Therefore, in this study, parameter heterogeneity is tested with Swamy's test of slope homogeneity. According to these tests' results, Swamy's (1971) random coefficients heterogenous panel data methodology is chosen for the modeling phase. It allows various

slope parameters according to different units and assumes that slope parameters are random. Equation 16 is also estimated with three different poverty measures by using the data of all countries to diagnostic check. The models are tested the presence of heteroscedasticity using the modified Wald test, presence of autocorrelation using Wooldridge test, and of cross-sectional dependence using the Pesaran's test[3]. Due to the presence of three issues, robust standard errors are used in the estimated models.

4. Results

Based on the heterogeneous panel data methodology, the relationship between poverty and globalization is tested by using alternative models. Table A1 shows the results for the $ 1.90-a-day poverty line approach. The first column presents estimated coefficients without any distinction among the least developed, developing, and developed countries. Like Bergh and Nilson's (2014), Vinueza and McGee's (2010), and Deyshappria's (2018) findings, globalization is negatively associated with absolute poverty. However, it is necessary to separate the decreasing poverty effect from per capita income increases. When GDP per capita is added as a control variable in column 2, the size of the association decreases. In column 3, the Gini coefficient is added among the control variables, but a significant coefficient for the whole sample is not found. Its effect is seen as significant for the least-developed countries when it is separate countries into groups concerning their development stage. The same three models are addressed separately for the least developed countries in columns 4, 5, and 6, for developing countries in columns 7, 8, and 9, and finally for developed countries in columns 10, 11, and 12 in Table A1. According to the results, globalization reduces poverty for the least developed and developing countries at the $ 1.90-a-day poverty line for all three models. This result supports the results of the studies conducted for developing countries such as Figini and Santarelli (2006), Pradhan and Mahesh (2014), Khan and Majeed (2018), and Gnangnon (2019). Whereas for the developed countries, a significant relationship is not found.

In Table 5, the same models in Table A1 are estimated concerning the $ 3.10 poverty approach. However, except for the expanded model for developed countries, similar results are obtained for the least developed and developing countries at a poverty level according to $ 3.10 with a poverty level of $ 1.90. There is a significant negative relationship between poverty and globalization. Moreover, when we control the GDP per capita and inequality, the inclusion of these control variables decreases the magnitude of the globalization coefficient for the whole sample. If inequality is high, poverty will be high in the least developed countries, and if the GDP per capita increases poverty decreases.

In terms of education, there is more evidence that education reduces poverty for the least developed and developing countries at the $1.90 poverty level, whereas it is weaker for developed countries. At the level of $3.10 poverty, it is found the same. Le Goff and Singh (2013) indicate that if education attainment is high, openness curtails poverty in 30 African countries. Ravallion and Chen (2003), and Dartanto and Otsubo (2013) also confirm that higher education levels reduce poverty. The results

3 The model with Poverty $ 1.90: Wald chi-squared (97): 2.4e+05***, Wooldridge test F (1, 96): 1163.325***, Pesaran test: 43.575***
The model with Poverty $ 3.10: Wald chi-squared (97): 1.1e+05***, Wooldridge test F (1, 96): 754.390***, Pesaran test: 26.111***
The model with National Poverty: Wald chi-squared (84): 90322.41***, Wooldridge test F (1, 83): 412.327***, Pesaran test: 4.638***
Statistical significance at the *10%, ** 5%, ***1% levels.

for education are the opposite of Bergh and Nilson's (2014) findings that insignificant coefficients for education. However, they call it as a surprise. On the other hand, the inclusion of GDP per capita as a control variable creates a reduction in the coefficient of education even if we divided all countries into three groups concerning development levels. The GDP per capita captures the impact of welfare increases on poor people's incomes. Figure 3 presents the relationship between globalization and national poverty. Here, the negative relationship is seen more clearly for developed countries.

By using the whole data set, this study indicates that there is a strong evidence that globalization reduces poverty at $1.90 and $3.10, while this relationship is weaker at the national poverty level according to results presented in Table 6. Globalization reduces poverty only for the least developed countries at the national poverty level. On the other hand, for the effect of education, there is no robust evidence. By using the whole data set, there is strong evidence that education is reducing poverty at $ 1.90 and $ 3.10, while at the national poverty level, this is weak.

For the least developed and developing countries in all poverty measures, GDP per capita significantly reduces poverty. However, we do not obtain reliable results in terms of the effects of unemployment, inflation, growth, and Gini on poverty. The Gini has only a positive and significant impact on poverty for the least developed countries. The fact that globalization's poverty reduction effect at the level of $ 1.90 and $ 3.10 is valid in the least developed and developing countries is an indication that globalization positively affects the real poor or in other words the chronic poor in hunger. In developed countries and at the level of higher poverty lines, the impact of globalization on poverty is not strong because of the excess of the poverty structure, which changes depending on the economic conditions, against the chronically poor. The fact that education at the national poverty level does not affect all development levels is related to a similar situation. The poor included in the national poverty include people who have become impoverished due to economic conditions as well as the chronic poor. For this reason, the effect of education on poverty becomes meaningless, especially considering the high level of education in developed countries. The results of this study show that education is only the tool for the chronically poor to get out of poverty. Thus, it has no meaningful effect on the non-chronic poor.

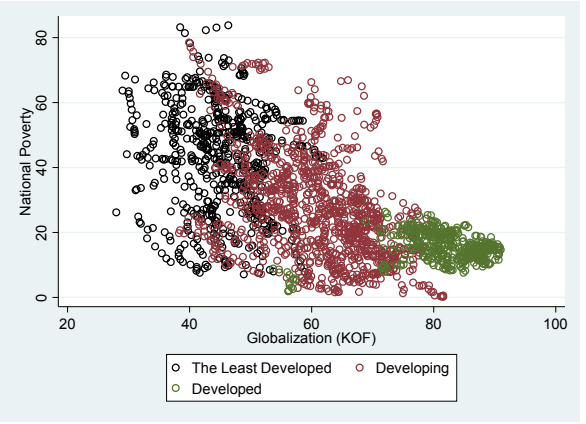

Figure 3: National Poverty and Globalization

The KOF index is an aggregate index that includes three dimensions of globalization such as economic globalization index, social globalization index, and political globalization index. To check the robustness of the findings for the first model, the analysis is repeated for these in three different components. It is reported in Table A2, it is found that social globalization and political globalization have led to a reduction in poverty. The social globalization index includes various indicators from international activities on tourism, student exchange, patents, trademarks, and stores to trade in cultural goods and personal services. On the other hand, political globalization has relatively few indicators such as international NGOs.

Social globalization is the most significant factor in reducing poverty for each poverty line for the whole sample. Khan and Majeed (2018) find the same result for developing countries by using only headcount poverty ($ 1.90 a day). In terms of different development stages, a similar result is obtained for the model with absolute poverty in the least developed and developing countries, but the poverty reduction effect of social globalization in developing and developed countries is not found as significant at the national poverty level.

Fighini and Santarelli (2002) investigate whether globalization reduces poverty by using absolute poverty and relative poverty levels for developing countries and find that trade openness may be associated with poverty and low poverty levels. For relative poverty, they state that trade openness tends not to affect relative poverty. In our study, the globalization-poverty relationship at low poverty levels supports this finding. We also test the robustness of this situation by using the relative poverty rates obtained from the OECD database (both developed and developing countries). In terms of the poverty-globalization relationship, it shows that the results are robust. Additionally, various controls are made in the modelling phase. Since 2009 is the year of the financial crisis, the dummy variable for 2009 is added to the models at all levels of development, but the effect of economic crisis on poverty is not found as significant. Similarly, the Worldwide Governance Indicator Index (Kaufmann, 2007) is also added to models, but insignificant results are obtained again. Finally, to examine whether there is a nonlinear relationship between poverty and globalization or not, the squares or lags of KOF indices are added into the models, but the effect on poverty is found as insignificant. In all models, multicollinearity is also checked using VIF criteria and, it is found that multicollinearity does not create any problem (VIF<10).

Table 5: Regression Results for Poverty $ 3.10

	All			The Least Developed			Developing			Developed		
Poverty $ 3.10	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Globalization Index (KOF)	-0.352***	-0.197***	-0.211***	-0.495***	-0.349**	-0.993***	-0.400***	-0.207***	-0.198**	-0.081	-0.019	-0.057
	(0.074)	(0.056)	(0.060)	(0.184)	(0.163)	(0.383)	(0.104)	(0.072)	(0.079)	(0.070)	(0.018)	(0.038)
Education Index	-54.395***	-21.181***	-13.961*	-88.836***	-38.039*	-59.176	-59.213***	-20.210**	-15.466*	-1.891	-0.271	0.693
	(9.159)	(7.402)	(8.076)	(25.958)	(21.614)	(74.946)	(11.425)	(9.568)	(9.297)	(5.766)	(3.703)	(3.287)
Unemployment	0.062	0.029	-0.210	0.832	0.346	-18.223	0.204	-0.049	-0.038	0.021	-0.076	-0.080
	(2.312)	(0.545)	(1.486)	(9.741)	(2.125)	(18.287)	(0.318)	(0.409)	(0.142)	(0.020)	(0.100)	(0.070)
Growth	0.061**	0.067***	0.095***	0.095	0.090	0.423***	0.057	0.072**	0.091***	0.026	0.029**	0.029***
	(0.030)	(0.023)	(0.026)	(0.061)	(0.055)	(0.152)	(0.047)	(0.035)	(0.034)	(0.016)	(0.013)	(0.011)
Inflation	0.021	0.012	0.012	0.030	0.004	0.034	0.024	0.014	0.024	-0.009	-0.006	-0.007
	(0.018)	(0.014)	(0.012)	(0.052)	(0.039)	(0.060)	(0.024)	(0.019)	(0.017)	(0.013)	(0.014)	(0.012)
GDP		-0.007***	-0.007***		-0.018***	-0.045***		-0.005***	-0.006***		-0.001	-0.001
		(0.001)	(0.002)		(0.004)	(0.014)		(0.002)	(0.002)		(0.000)	(0.000)
Gini			0.118			1.719***			-0.153			0.004
			(0.375)			(0.638)			(0.621)			(0.060)
Constant	67.415***	53.653***	36.780**	107.761**	97.671***	125.314***	71.582***	53.068***	53.135**	9.046***	7.450***	9.978***
	(11.747)	(7.316)	(16.045)	(41.875)	(16.234)	(42.094)	(10.933)	(10.679)	(25.996)	(2.565)	(2.115)	(3.245)
Swamy's Test (Chi-Squared)	*1.8e+07****	*2.6e+07****	*9.0e+05****	*6.0e+05****	*7.9e+05****	*5895.35****	*1.2e+06****	*1.5e+06****	*5.8e+05****	*42902.73****	*60901.09****	*53827.34****
Wald (Chi-Squared)	*50.43****	*60.44****	*31.87****	*14.06***	*15.24***	*91.95****	*46.98****	*60.19****	*32.34****	*18.36****	*13.04***	*13.82**
N	*2464*	*2436*	*1400*	*588*	*574*	*112*	*1358*	*1344*	*826*	*518*	*518*	*462*

*Statistical significance at the *10%, ** 5%, ***1% levels.*

Table 6: Regression Results for National Poverty

	All			The Least Developed			Developing			Developed		
National Poverty	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Globalization Index (KOF)	-0.346***	-0.160**	-0.090	-0.462***	-0.305***	-0.238**	-0.442***	-0.151	-0.109	0.042	0.033	0.003
	(0.092)	(0.079)	(0.140)	(0.116)	(0.099)	(0.110)	(0.157)	(0.132)	(0.226)	(0.121)	(0.125)	(0.133)
Education Index	-50.107***	-11.732	-0.661	-64.318***	-26.592	-57.957	-62.728***	-8.997	6.866	-2.066	6.323	5.607
	(13.656)	(19.386)	(15.462)	(22.097)	(26.453)	(43.772)	(22.880)	(34.886)	(23.700)	(16.229)	(13.299)	(15.784)
Unemployment	0.495	0.089	0.003	1.131	-0.585	-8.738	0.452	0.185	0.115	0.101	0.065	-0.007
	(0.758)	(0.954)	(1.074)	(2.563)	(3.423)	(11.493)	(0.492)	(0.314)	(0.331)	(0.118)	(0.139)	(0.166)
Growth	0.026	0.041	0.063	0.049	0.044	0.161	0.021	0.062	0.097	0.001	0.009	-0.008
	(0.034)	(0.029)	(0.046)	(0.049)	(0.044)	(0.145)	(0.060)	(0.050)	(0.072)	(0.032)	(0.035)	(0.040)
Inflation	0.059*	0.040	0.051	0.028	0.007	-0.002	0.104*	0.084*	0.086	0.016	0.013	0.020
	(0.032)	(0.028)	(0.042)	(0.033)	(0.025)	(0.027)	(0.053)	(0.048)	(0.059)	(0.072)	(0.056)	(0.068)
GDP		-0.007***	-0.006***		-0.015***	-0.023***		-0.007***	-0.006**		-0.001	-0.000
		(0.002)	(0.002)		(0.005)	(0.006)		(0.002)	(0.002)		(0.001)	(0.000)
Gini			0.316			1.134**			0.472			-0.118
			(0.791)			(0.476)			(1.322)			(0.478)
Constant	69.102***	52.295***	27.184	80.990***	76.766***	61.626	85.058***	56.699***	28.326	13.297	9.406	19.197
	(9.460)	(10.765)	(25.697)	(14.351)	(16.563)	(56.630)	(15.528)	(18.165)	(41.154)	(12.376)	(10.735)	(22.865)
Swamy's Test (Chi-Squared)	*1.4e+06****	*1.3e+06****	*2.7e+05****	*2.7e+05****	*3.1e+05****	*6234.24****	*8.6e+05****	*8.3e+05****	*1.8e+05****	*8655.17****	*21471.25****	*9367.90****
Wald (Chi-Squared)	*31.57****	*29.13****	*8.58*	*32.48****	*29.85****	*136.86****	*19.79****	*26.32****	*12.33**	*0.94*	*2.81*	*3.07*
N	*2114*	*2086*	*1218*	*588*	*574*	*112*	*1078*	*1064*	*714*	*448*	*448*	*392*

*Statistical significance at the *10%, ** 5%, ***1% levels.*

5. Conclusion

This study makes a significant contribution to the literature by examining the impact of globalization on poverty, both in terms of different levels of economic development, and comparing the robustness of results based on various poverty lines. In this regard, it fills the significant gaps in the existing literature. In conclusion, it is found that globalization has a significant impact on poverty reduction in both the least developed and developing countries for both $ 1.90 and $ 3.10 poverty levels. In contrast, it has not a strong impact on developed countries.

Education reduces poverty for the least developed and developing countries at the $ 1.90 poverty level, while there is no strong evidence for developed countries. It is the same for 3.10 $ poverty, while the national poverty level does not have strong evidence. The results of this study show that the fight against poverty has different meanings for developed and developing countries.

Social globalization decreases poverty in the least developed countries. Furthermore, the rich and the poor benefit from globalization at different rates. For policymakers, it is not easy to achieve justice at this point. Governments should be encouraged to invest in education and have the necessary skills to equip people to take advantage of new employment opportunities and provide adequate safety nets to protect the poor. Apart from that, public investments in health and guiding people to have social insurance may help the poor and can reduce poverty. It should be noted that the least developed countries and developing countries can reduce poverty if they manage to increase their per capita income and distribute it equally. In these countries, having an institutional and strong economic structure, realizing sustainable growth, adopting social state understanding, and learning effective redistribution policies provide poverty alleviation. On the one hand, in developed countries, with the help of globalization, demands on capital's orientation to labor-intensive countries, increase in unemployment, and poverty are marginalized due to the limitation of the work areas of unskilled employees. On the other hand, increasing income inequalities begin to increase poverty. For these reasons, when income inequality is added to models in developed countries, it has a positive sign for absolute poverty. That is why, in developed countries, it became more important to reduce inequality and to develop policies targeting pro-poor growth especially for the poor who are affected by globalization.

For further studies, the relations between poverty, globalization, growth, and income inequality can be performed in detail by examining panel time series models for a more extended period. Thus, specific relations can be observed for each development level. It is also important to see the impact of COVID-19 on this relationship.

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Appendix

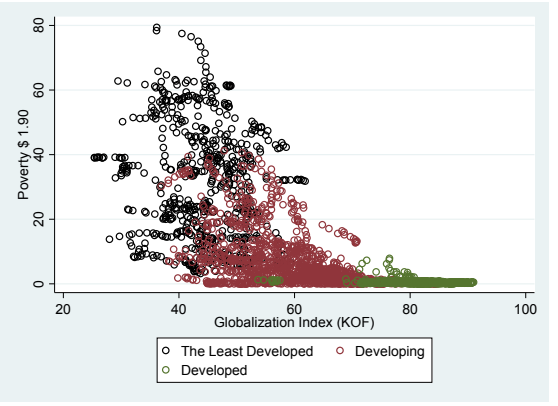

Figure A1: Poverty ($1.90 a day) and Globalization

Table A1: Regression Results for Poverty $1.90

	All			The Least Developed			Developing			Developed		
Poverty $ 1.90	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Globalization Index (KOF)	-0.189***	-0.114***	-0.099***	-0.423***	-0.316***	-0.574***	-0.146***	-0.073**	-0.081**	-0.037	-0.010	-0.026
	(0.043)	(0.034)	(0.031)	(0.125)	(0.119)	(0.219)	(0.054)	(0.034)	(0.037)	(0.033)	(0.010)	(0.020)
Education Index	-35.202***	-14.808***	-8.247**	-87.135***	-43.140**	-42.702	-26.268***	-8.193*	-8.059**	-0.491	-0.560	-0.155
	(6.968)	(5.575)	(3.699)	(22.995)	(20.688)	(36.580)	(6.768)	(4.453)	(3.628)	(2.814)	(2.047)	(1.775)
Unemployment	0.140	0.038	-0.045	0.878	0.131	-5.906	0.083	-0.013	-0.029	0.009	-0.033	-0.031
	(0.846)	(0.313)	(0.447)	(3.544)	(1.284)	(5.416)	(0.176)	(0.200)	(0.069)	(0.009)	(0.050)	(0.034)
Growth	0.034*	0.034**	0.038***	0.081*	0.065**	0.217***	0.021	0.031	0.031***	0.011	0.010*	0.011**
	(0.018)	(0.014)	(0.010)	(0.041)	(0.032)	(0.069)	(0.028)	(0.022)	(0.012)	(0.008)	(0.006)	(0.005)
Inflation	0.011	0.006	0.002	0.028	0.019	0.035	0.000	-0.003	0.005	-0.004	-0.005	-0.005
	(0.011)	(0.010)	(0.006)	(0.037)	(0.032)	(0.042)	(0.011)	(0.011)	(0.008)	(0.008)	(0.008)	(0.007)
GDP		-0.005***	-0.004***		-0.018***	-0.026**		-0.003***	-0.003***		-0.000	-0.000*
		(0.002)	(0.001)		(0.007)	(0.011)		(0.001)	(0.001)		(0.000)	(0.000)
Gini			0.057			1.026***			-0.207			0.038**
			(0.271)			(0.287)			(0.453)			(0.019)
Constant	36.339***	28.763***	16.609	79.850***	72.096***	51.420***	29.713***	21.747***	28.532	3.909***	3.066***	2.926***
	(5.923)	(4.353)	(11.251)	(19.063)	(11.795)	(15.112)	(6.431)	(5.165)	(18.744)	(1.152)	(0.922)	(1.118)
Swamy's Test (Chi-Squared)	*5.5e+06***	*6.2e+06***	*7.6e+05***	*1.3e+06***	*1.4e+06***	*14159.79***	*9.8e+05***	*1.1e+06***	*4.6e+05***	*26322.39***	*30904.06***	*30591.74***
Wald (Chi-Squared)	*35.81***	*38.68***	*25.18***	*14.70***	*15.83***	*30.78***	*39.88***	*49.59***	*26.27***	*17.66***	*10.12*	*22.06***
N	*2464*	*2436*	*1400*	*588*	*574*	*112*	*1358*	*1344*	*826*	*518*	*518*	*462*

*Statistical significance at the *10%, ** 5%, ***1% levels.*

Table A2: Regression Results for Sub-Globalization Indices

	Poverty $ 1.90			Poverty $ 3.10			National Poverty		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Economic Globalization Index	-0.019			-0.048			-0.041		
	(0.023)			(0.037)			(0.068)		
Social Globalization Index		-0.164***			-0.288***			-0.286***	
		(0.038)			(0.055)			(0.065)	
Political Globalization Index			-0.188***			-0.366***			-0.320**
			(0.060)			(0.102)			(0.140)
Education Index	-44.986***	-27.548***	-36.758***	-74.360***	-43.822***	-58.049***	-73.645***	-42.010***	-56.337***
	(7.445)	(5.531)	(7.472)	(10.155)	(8.209)	(9.846)	(14.368)	(13.377)	(17.453)
Unemployment	0.153	0.183	0.109	0.210	0.289	0.022	0.608	0.452	0.548
	(0.832)	(0.912)	(0.795)	(2.326)	(2.386)	(2.132)	(1.327)	(1.119)	(0.662)
Growth	0.022	0.010	0.021	0.051	0.024	0.044	0.028	-0.003	0.016
	(0.022)	(0.014)	(0.015)	(0.044)	(0.023)	(0.029)	(0.050)	(0.033)	(0.034)
Inflation	0.006	0.021	0.009	0.005	0.036*	0.013	0.047	0.059*	0.043
	(0.013)	(0.013)	(0.012)	(0.021)	(0.019)	(0.020)	(0.031)	(0.034)	(0.031)
Constant	32.519***	29.919***	40.654***	61.396***	56.054***	76.692***	64.469***	60.648***	75.284***
	(5.388)	(5.062)	(6.497)	(11.522)	(11.155)	(12.574)	(10.963)	(9.275)	(15.318)
Swamy's Test (Chi-Squared)	*4.8e+06****	*5.5e+06****	*5.4e+06****	*1.6e+07****	*1.8e+07****	*2.6e+07****	*8.9e+05****	*1.2e+06****	*1.4e+06****
Wald (Chi-Squared)	*39.93****	*38.84****	*36.88****	*52.52****	*63.50****	*41.82****	*25.96****	*16.89****	*14.72***
N	*2464*	*2464*	*2464*	*2464*	*2464*	*2464*	*2114*	*2114*	*2114*

*Statistical significance at the *10%, ** 5%, ***1% levels.*