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# THE IMPACT OF GLOBALIZATION ON INCOME INEQUALITY: THE MEDIATING EFFECT OF INTELLECTUAL POTENTIAL

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## Abstract

**Purpose.** This research aims to revisit the relationship between globalization and income inequality while improving on previous research. It also considers how technological advancements and human capital can alter this relationship in countries with different income levels worldwide.

**Methodology.** This research is based on panel data regression models with multiplicative terms where, after controlling for other important inequality factors, different types of globalization are regressed using two alternative measures of income inequality. Multiplicative terms allowed us to analyze the heterogeneity of the globalization-inequality nexus, i.e., how it changed over the distribution of the moderating factors: technological advancements and human capital.

**Findings.** The results show that different types of globalization impact income inequality differently: trade globalization reduces income inequality in some cases, while financial globalization can increase it. Education proved to moderate the effect of globalization on reducing income inequality; technological advancement, on the other hand, stimulates the impact of globalization in terms of increasing income inequality.

**Originality.** This paper differs from previous research by focusing on multiple aspects of globalization, using additional TOP20/BOT20 estimates to measure income inequality and to explore the differences between the income inequality/globalization relationship

based on the effects of education and technological advancement on countries with different income levels.

**Keywords:** *globalization, income inequality, human capital, technological innovations*

***JEL index:*** *O15, F60*

## Introduction

Income inequality is a topic that now receives a lot of coverage from scientists and society. It has gained traction over the years, especially regarding increasing income inequality during the COVID-19 pandemic (Chen, Gozgor, & Kwong, 2021). Despite significant amounts of research, broad public concern remains, indicating that this phenomenon is still worth considering. Even though the pandemic slowed globalization, recent decades have seen the world increasingly connected in different aspects, such as culture, politics, and economics. At the same time, we cannot ignore how impactful human capital (Pelinescu, 2015) and innovations (Maradana et al., 2017; Melnikas, 2013) are to countries' development and economies. This paper revisits the relationship between income inequality and globalization by exploring how it is altered by the intellectual potential of a country.

Many researchers have already delved into exploring the relationship between income inequality and globalization (for example, the meta-analysis of 123 works by Heimberger (2019)). Some research also claims no significant relationship between the two phenomena (Babones & Vonada, 2009). A consensus cannot be reached despite numerous academic works on this topic. This can partially be explained by the scale of this topic and the numerous relevant factors, such as human capital and technological advancements, which might be difficult to account for. The results and their credibility might vary due to the selected countries and choice of data (Atkinson & Brandolini, 2001). Thus, the current research focuses on global data, including as many countries as possible in its estimations.

This paper will differ from and improve on previous research in numerous ways. First, we will cover more aspects of globalization (overall, economic, trade, and financial) in the estimations instead of using a single proxy. Second, most research measures income inequality using only the GINI index – this paper will also estimate the top 20 and bottom 20 income ratios. Third, we will also estimate the potentially heterogeneous globalization-income inequality relationship in high- and low-income countries. Finally, our estimations will focus on education and technological advancements as potential sources of heterogeneity in the globalization–income inequality relationship across countries. We believe the foundation created by prior academic works, together with the improvements we have introduced, will make this research a valuable contribution to bringing the academic world closer to a consensus on this topic.

This paper aims to investigate what type of globalization affects income inequality in

developed and developing countries and how it does so. In addition, we explore how the intellectual potential of a country, in areas such as education and technological advancement, might affect the relationship between globalization and income inequality after controlling for development level, urbanization, and wealth distribution.

The rest of the paper is organized as follows: Section 2 presents a literature review; Section 3 presents the research methodology, i.e., model, data, and estimation strategy; Section 4 presents and discusses estimation results; and the last Section concludes the paper with scientific and policy implications.

## Literature Review

### 1. Income Inequality and Factors Affecting It

Income inequality refers to the phenomenon in which money is not distributed equally between people, creating differences in people's income. Income is usually defined by the amount of money gained from labor or capital (Piketty & Saez, 2014), and is generally received in regular intervals.

Simon Kuznets defined an empirical curve known as the Kuznets curve (Piketty, 2006), which explains how income inequality changes throughout the economic development lifecycle. It argues that income inequality will rise during the early stages of economic development, but in later stages, it will reach its peak and begin to descend. Based on these assumptions, one could argue that the developed nations currently or in the near future should witness a decrease in income inequality. At the same time, developing countries should expect income inequality to rise. However, nations' economies have many intricacies and relations with one another, which usually means that we cannot generalize.

Despite the inherent differences between countries, it is possible to determine the most common drivers for income inequality based on previous theoretical research. The intensity of these factors is heterogeneous across countries, highlighting the complexity of income inequality phenomena.

*Skill premium*. According to Pavcnik (2011), the wages of educated people are affected by globalization and technological advancement because these factors increase the demand for a skilled, educated workforce. Simply put, an educated person is expected to earn more money than someone less skilled and educated. Skill premium rises in developing countries due to supply and demand laws within the skilled workforce market.

*Spatial inequality*. This results from rural areas being less economically developed than urban ones. Better infrastructure, faster growth, closer proximity to major trade routes, and ease of attracting investments are some of the advantages of urban areas. This can increase productivity and wages in advantaged areas (Nijman & Wei, 2020).

*Wealth distribution*. Households that possess more wealth can more freely spend and focus on health and education compared to less fortunate ones (Juzhong & Li, 2016). More

gains can be expected from wealthier households (being able to spend on education and health increases people's productivity), with further increases in income in their favor. As a result, income inequality rises between different households/people based on existing wealth distribution.

*Shares of labor and capital incomes*. Capital income is often distributed less equally than labor income, contributing to income inequality (Juzhong & Li, 2016). If labor income lags behind total generated income, the remainder will go to capital. In addition, increasing efficiency and automation through science and technological advancements can decrease the demand for labor, with leftover value going to capital.

Stolper–Samuelson's theorem suggests that the relative prices of output goods are connected to the relative real returns of capital and labor. In the case of income inequality, developing nations, which possess an abundance of cheap labor, should observe income inequality decrease if they start liberalizing their trade and trade with more developed countries (Heimberger, 2019). The situation is slightly worse for developed countries, as income will keep rising for their highly skilled workforce and continue to reduce for the less skilled workers. Leamer (1998) uses similar logic as Stolper–Samuelson, explaining that the reason behind the income inequality between high-skilled and low-skilled labor is that imports increase from low-income countries. However, it is worth mentioning that this theorem was developed in 1941, so we should not exaggerate its importance and can expect it to work differently in a modern setting (Abrego & Edwards, 2002).

According to Bergh and Nilsson (2010), an increase in economic freedom for developed countries through the ability to freely trade internationally can significantly affect income inequality. The Heckscher–Ohlin theorem (with a model including skilled and unskilled workforces) can explain the increase in income inequality in this situation (Kanbur, 2000). Trade openness and a large unskilled workforce in developed countries will mean that capital will produce more income and create downward pressure on the income of people who earn the least. Meanwhile, according to the same model, low-skilled labor income would increase in developing countries.

There are some possible countermeasures that institutions and governments try to leverage against income inequality. However, as mentioned before, due to the complexity of income inequality and differences between economies, no foolproof or go-to strategy can be applied to any country. As a result, the same measure can have completely different (sometimes undesirable) results depending on the country in which it is applied. Despite this, we can still identify the most common measures which have been proven to work (at least more often than not) in real-life scenarios by decreasing income inequality.

One of the factors which can have a serious impact on income inequality is taxation policy (Piketty, 2014; Guillaud, Olckers & Zemmour, 2020). Many different approaches to taxation can affect income inequality to a varying degree, depending on the characteristics of the nation applying these policies. A study by Oishi, Kushlev and Schimmack (2018) covered over 50 years of statistics from the United States regarding income inequality and taxes, showing that income inequality decreased during the years when taxes were

progressive. Furthermore, this research used time lags and found that progressive taxation decreased income inequality up to 5 years in the future. Substantial property and capital taxation is another approach that a country can use to fight the growth of income inequality. Research also states that a higher tax wedge (considered to be the ratio of the employer's cost of labor to the amount of tax an employee pays) can raise inequality by lowering employment (Koske & Wanner, 2012). However, further investigation has proved that this also causes the compression of wage distribution, which is meant to decrease inequality instead, highlighting the complexity of this topic and urging caution while applying suggested taxation policies.

Redistribution is an important process which can allow income inequality reduction (Atkinson, 2015), and redistribution programs are tools at governments' disposal to achieve this. While every country's goal is to have as many people as possible productively participating in society, social welfare can be used to support less fortunate people. This can be accomplished with such policies as sickness pay, unemployment payments, and pensions (Lu et al., 2013). However, this can also lead to problems if the social welfare is not distributed properly and the support meant for the less fortunate part of society benefits the higher-income population more (Lu et al., 2013). Generally, the money collected through taxes from the population with the higher income should end up supporting the poorer part of the population to raise their income level. It is also worth noting that, similarly to other countermeasures, this only works if adapted to the context of the individual country, and if the extra funds reach people in need.

According to Farber et al. (2021), increasing employment and unionizing the labor force can also help decrease income inequality. For example, unionization can increase labor's size of the share of income if a country's labor has disproportionately small or stagnating income (Chang & Hung, 2016). Unionization also increases wage transparency, preventing employers from firing workers. Moreover, it further encourages employment and lessens income inequality because an increase in unemployment can strain lower-income households, increasing income inequality (Mocan, 1999).

The abovementioned policies and tools designed to decrease income inequality have been investigated thoroughly and can be applied to different economies. However, to create the desired effect, they should be adjusted to fit the specific country context to ensure the most favorable outcome.

## 2. Globalization and Income Inequality

There are many ways to describe globalization. One could say that the world shares various resources and ideas, and different nations depend on each other to maximize their wellbeing and prosperity. Due to the scale of this phenomenon, it would not be inappropriate to hypothesize about its effects on income inequality. Globalization is often described as being made up of three main aspects: politics, culture, and economics, so the significance

of their effect on income inequality may differ.

The rising significance of international politics might be partly attributed to globalization. Political globalization is about the influence, scale, and complexity of international politics. It comprises social movements as well as international non-governmental, governmental, and intergovernmental organizations of the world's nations which willingly give away some of their control to international organizations. These organizations have efficiently tackled issues requiring more cooperation between nations. Concerns such as climate change, international trade, aid, and defense are some examples explored by international politics (Amoore, 2002). However, some nations refuse to give away their power to the international community and these organizations, which are criticized for failing to control some of the issues that countries themselves could manage (Laffan, 2018).

Another aspect of globalization is culture. Social relations are strengthened worldwide due to the exchange of values, thoughts, and beliefs (Paul, 2006). Travel, the internet, and media access to all kinds of people have enabled this exchange of ideas and interactions, despite differences in nationalities and traditions (Paul, 2006). This allows the sharing of experiences and concepts which previously were not globally accepted. Some critics highlight the concerns that cultural globalization discourages diversity and erases some of the world's cultures in favor of Western ideas. Despite this critique, there are opinions stating that these concerns are exaggerated (Tomlinson, 1996).

Recent decades have favored political and cultural globalization due to improvements and the accessibility of new technologies. However, it can be argued that their significance to economic issues such as income inequality might be minor compared to the scale of economic globalization. Albrow and King (1990) even suggested that globalization is just an economic process with aspects of culture and politics. These days, markets and production are globalized, creating interconnections between nations' economies. Globalized markets are a union of smaller, less important markets into larger and more influential entities. Globalized production allows supply and manufacturing chains spanning the world, manufacturing products with minimal costs and selling them in the markets where the largest gains can be made. Movements of capital and cross-border trade usually cause economic globalization. Having made this observation, we can see that trade and financial globalization are the most important parts of economic globalization.

International trade has played a crucial part in nations' prosperity for centuries. In the 1970s, the growth of international trade accelerated and became one of the leading factors indicating a country's wellbeing (Ekberg & Lange, 2014). One of the pillars of economic globalization is the trade of various goods and services between countries. This allows the improvement of the general availability and usage of resources and enables the building of additional wealth. It is also beneficial for consumers, as international standards, regulations, and global market competition enhance the reliability and competitiveness of goods and services. Various types of organizations, such as common markets and international deals, increase the efficiency and benefits for all participating nations (O'Sullivan & Sheffrin, 2003). Prospects to generate even more wealth and prosperity due to economic

globalization are rarely dismissed, as businesses, individuals, and even governments try to benefit from this phenomenon by adopting global practices. Depending on the redistribution and usage of the additionally generated wealth, this can impact income inequality differently. If the country uses additional wealth to increase the wages and compensation of its workers, or for social welfare, trade globalization can reduce income inequality. However, if newly generated wealth is only taken as profit for individuals who are already top earners, this could lead to an increase in income inequality.

Financial globalization can be considered as important as trade globalization: it opens up and boosts processes such as foreign direct investment; it encourages business and growth in different countries (Gaies, Goutte, & Guesmi, 2020), which further encourages improving international connections between different markets; and it allows joining capital with labor, creating additional wealth for everyone involved. In addition to this, nations around the world increasingly rely on technological and scientific advancements. However, the skilled labor required to achieve this might not be available locally, and as a result, the world is experiencing a labor movement (Burgmann, 2016). Countries can also find themselves in situations where they possess skilled and educated labor but lack the capital to use it fully. Leveraging international funds is often essential to overcome a nation's limitations. Financial globalization can often be the key to providing access to these funds (Poelhekke, 2020). Regarding the effect of financial globalization on income inequality, it is similar to the additional wealth generated from international trade. The increase or decrease in income inequality depends on the effectiveness and usage of the funds and resources received due to financial globalization.

## 3. The Intellectual Potential of a Country as a Moderating Factor

According to a meta-study by Heimberger (2019), education and technological advancement are often considered to be the factors moderating the effect of globalization on income inequality. Education has been found to reduce the income share of the rich and increase the income share of the poor (Abdullah, Doucouliagos, & Manning, 2015). Moreover, a higher education level in a nation usually means that a large proportion of the population is highly qualified, which might result in a larger income for the middle class. However, it can also result in a skill surplus due to skill mismatch (Rehman, Rauf, & Khan, 2021) or lead to "brain-drain" due to globalization (Docquier & Rapoport, 2012). Education can also correlate to technological advancement because highly educated people are required for progress and innovation, which leads to higher productivity and improved returns on investment. However, researchers have found that innovations, which can be strengthened by the effects of globalization (Gorodnichenko, Svejnar, & Terrell, 2010), widen income inequality (Law et al., 2020).

In summary, education and technological advancement combined, i.e., intellectual potential, can lead to higher efficiency and productivity, higher returns on capital, and higher

wages due to the demand for skilled workers. If the additional wealth generated only goes to the nation's top earners instead of the larger middle class, this might not reduce income inequality. Thus, the intellectual potential of a country can either reinforce or weaken the impact of globalization on income inequality.

Based on the previous discussion, we can also hypothesize that the impact of factors or moderators can vary based on the country's development level. Therefore, it is crucial to measure the effect of globalization and other moderating factors on income inequality in the contexts of developed and developing countries.

## Methodology

The panel specification for estimating the effect of globalization on income inequality is as follows:

$$II_{i,t} = \alpha_i + \beta_1 lnY_{i,t} + \beta_2 lnY_{i,t}^2 + \beta_3 G_{i,t} + c_k \boldsymbol{C}_{k,i,t} + \theta_t + \varepsilon_{i,t}, (1)$$

where *II* stands for the income inequality in country *i* over year *t*. To proxy income inequality, we use the GINI index and the ratio between the top 20% and bottom 20% of income (*T20_B20*). *Y* is the per capita GDP, and $Y^2$ is the squared term of per capita GDP to account for the inverted U-shaped relationship between countries' development level and income inequality, i.e., the Kuznets curve. *G* stands for globalization. To proxy globalization, we will use the indexes provided by the KOF institute (Gygli et al., 2019; Dreher, 2006): the overall globalization index (*OG*); and economic globalization (*EG*) and its constituent parts, i.e., trade globalization (*TG*) and financial globalization (*FG*). $\boldsymbol{C}$ is the vector of control variables that, based on previous research, affect income inequality. This vector consists of: education, which we proxy by mean years of schooling (*S*); technological advancements, i.e., innovations, which we proxy by patent applications (*P*); urbanization (*U*); and wealth distribution, which we measure by the wealth share of the top 20% (*TOP20WS*). Information about variables is presented in Table 1, and descriptive statistics are in Table 2. $\alpha_i$ is the country-specific intercept that proxies time-invariant cross-country heterogeneity, $\theta_t$ is time dummies, $\varepsilon_{i,t}$ is the idiosyncratic error term, and $\beta_{(.)}$ and $c_{(.)}$ are parameters to be estimated.

$$II_{i,t} = \alpha_i + \beta_1 lnY_{i,t} + \beta_2 lnY_{i,t}^2 + \beta_3 G_{i,t} + c_k \boldsymbol{C}_{k,i,t} + \theta_t + \varepsilon_{i,t}, (1)$$

Table 1. Information about the variables of the research

| Variable | | Source of the data and explanation |
|---|---|---|
| Abbreviation | Full name | |
| *OG* | Overall globalization | KOF Globalization Index (de facto) from KOF Swiss Economic Institute. Measures social, economic and political dimensions of globalization. Scale from 1 to 100 (maximum value for variable). |

| | | |
|---|---|---|
| *EG* | Economic globalization | Economic Globalization, de facto (trade, financial), from KOF Swiss Economic Institute. Measures economical dimension of globalization. Scale from 1 to 100 (maximum value for variable). |
| *TG* | Trade globalization | Trade Globalization, de facto (trade in goods, trade in services, trade partner diversity), from KOF Swiss Economic Institute. Measures trade dimension of globalization. Scale from 1 to 100 (maximum value for variable). |
| *FG* | Financial globalization | Financial Globalization, de facto (FDI, portfolio investment, international debt, international reserves, international income payments), from KOF Swiss Economic Institute. Measures financial dimension of globalization. Scale from 1 to 100 (maximum value for variable). |
| *Y* | GDP per capita (constant 2015 US$) | Gross domestic product (data in constant 2015 US dollars) divided by midyear population. From WorldBank. |
| *S* | Mean years of schooling | Measures the mean years of schooling for the country. Data in years, from 0 to 15. From UN Human Development Reports, Human Development composite indices tables. |
| *P* | Patents | Measures patent applications (direct and PCT national phase entries) per 100,000 citizens. Total count by filing office. From WIPO IP Statistics Data Center. |
| *GINI* | GINI | Measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. From 0 (perfect equality) to 100 (perfect inequality). Data on the distribution of income or consumption come from nationally representative household surveys from WorldBank. |
| *U* | Urban population (% of total population) | Percentage of people living in urban areas as defined by national statistical offices. From WorldBank. |
| *B20* | Pre-tax national income Bot 20% | Measures the income (US dollars, 2021 pre-tax average income or wealth, adults) of the bottom 20%. From World Inequality Database. |
| *T20* | Pre-tax national income Top 20% | Measures the income (US dollars, 2021 pre-tax average income or wealth, adults) of the top 20%. From World Inequality Database. |

| | | |
|---|---|---|
| *T20/B20* | Top 20% income to Bot 20% income ratio | Own calculations (T20/B20). |
| *TOP20WS* | Net personal wealth Top 20% | Measures the wealth of the top 20%. Share of the total wealth, adults. From World Inequality Database. |

Our unbalanced panel dataset includes 122 countries, with 70 identified as high- and upper-middle-income and 52 as lower-middle- and low-income countries (see Tables A1 and A2 in the Appendices). The data spans a 29-year period, from 1990 to 2019. See Table 2 for descriptive statistics.

Table 2. Descriptive statistics of the data

| Variable's abbrev. | Mean | Median | S.D. | Min | Max |
|---|---|---|---|---|---|
| *GINI* | 37.1 | 35.5 | 8.25 | 23.0 | 65.8 |
| *T20/B20* | 126. | 92.5 | 98.4 | 22.8 | 764. |
| *Y* | $1.89 \cdot 10^4$ | $9.63 \cdot 10^3$ | $2.16 \cdot 10^4$ | 286 | $1.12 \cdot 10^5$ |
| *S* | 9.80 | 10.6 | 2.77 | 1.04 | 13.8 |
| *P* | 45.9 | 6.59 | 90.1 | 0.00269 | 597 |
| *U* | 66.4 | 68.3 | 18.2 | 10.9 | 98.0 |
| *TOP20WS* | 0.761 | 0.750 | 0.0590 | 0.485 | 0.920 |
| *OG* | 69.9 | 71.1 | 13.3 | 31.6 | 90.9 |
| *EG* | 64.2 | 66.0 | 15.6 | 19.9 | 92.9 |
| *TG* | 61.9 | 65.9 | 17.6 | 18.6 | 91.7 |
| *FG* | 66.5 | 67.1 | 16.1 | 14.8 | 98.0 |

Specification (1) allows us to examine the effect of globalization on income inequality. Additionally, we aim to analyze how the intellectual potential of a country, i.e., education and innovation, alters the impact of globalization on income inequality. We specify Eq. (2), which introduces the moderator ($M$) and its interactions with the globalization variable ($G$). As moderators, we will use schooling ($S$) and patients ($P$) that proxy countries' intellectual potential. The specification is as follows:

$$II_{i,t} = \alpha_i + \beta_1 lnY_{i,t} + \beta_2 lnY_{i,t}^2 + \beta_3 G_{i,t} + \beta_4 G_{i,t} \cdot M_{i,t} + c_k \boldsymbol{C}_{k,i,t} + \theta_t + \varepsilon_{i,t} \quad (2)$$

Since the moderating effect is introduced, the effect of *G* on *II* is no longer unconditional. We see this by outputting the slope coefficient of *II* on *G*, i.e., $\beta_3+\beta_4 \cdot M$. Now the impact of globalization on income inequality becomes conditional and depends on the size of *M*. We should point out here that not only does the slope coefficient become conditional, but so does the standard error associated with the slope coefficients. This means that besides the direction and magnitude of the effect of *G* on *II,* its significance could also change over the conditional distribution of *M*. Conditional standard errors are calculated using the formulae provided by Brambor (2006).

## Results and Discussion

All of our estimates are based on fixed effects since panel diagnostics revealed a persistent cross-country heterogeneity. Moreover, in the presence of heterogeneity and serial correlation, we used robust standard errors to reduce bias in the conclusions regarding the significance of the estimated effect. Additionally, since our dataset comprises almost 30 years of observations, we might expect that the effect of globalization on income inequality would change over time. To check this, we interacted globalization variables with a time dummy which represents the post-financial crisis period in our general estimations. $\beta_{3(1990-2009)}$ now shows the effect over the 1990–2009 period, and $\Delta\beta 3_{(2010-2019)}$ shows whether this effect is different over 2010–2019 compared to the initial period.

The results suggest that globalization has an income inequality-reducing effect considering GINI, which is more sensitive to changes in income distribution around the mean (see Table 3). However, the estimated effect is heterogeneous across both types of globalization and time. While the inequality-reducing effect of overall and trade globalization did not change significantly over time, the effect of economic globalization increased since the impact of financial globalization only became significant in 2010–2019.

Table 3. Fixed-effect estimates of Eq. (1), dependent variable – GINI

| Regressor | Coeff. | Est. (I) | Est. (II) | Est. (III) | Est. (IV) | Est. (V) |
|---|---|---|---|---|---|---|
| | | | Overall globalization (*OG*) | Economic globalization (*EG*) | Trade globalization (*TG*) | Financial globalization (FG*)* |
| Intercept | α | –77.46*** | –86.44*** | –77.55*** | –76.50*** | –80.15*** |
| | | (7.913) | (7.671) | (7.803) | (7.590) | (7.939) |
| Per capita GDP (*lnY*) | $\beta_1$ | 16.11*** | 20.26*** | 17.34*** | 18.16*** | 16.67*** |
| | | (1.861) | (1.833) | (1.832) | (1.784) | (1.862) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Squared per capita GDP ($lnY^2$) | $\beta_2$ | −0.950*** | −1.079*** | −0.984*** | −1.033*** | −0.983*** |
| | | (0.103) | (0.101) | (0.102) | (0.010) | (0.104) |
| Schooling ($S$) | $c_1$ | −1.248*** | −0.991*** | −1.005*** | −0.850*** | −1.206*** |
| | | (0.073) | (0.074) | (0.078) | (0.077) | (0.075) |
| Patent applications ($P$) | $c_2$ | 0.002 | 0.0023 | 0.004 | 0.004* | 0.003 |
| | | (0.003) | (0.003) | (0.003) | (0.002) | (0.003) |
| Urbanization ($U$) | $c_3$ | 0.124*** | 0.104*** | 0.107*** | 0.090*** | 0.122*** |
| | | (0.013) | (0.013) | (0.013) | (0.013) | (0.013) |
| Wealth distribution ($TOP20WS$) | $c_4$ | 68.56*** | 64.28*** | 64.53*** | 59.95*** | 68.81*** |
| | | (2.609) | (2.553) | (2.632) | (2.611) | (2.611) |
| Globalization | $\beta_{3(1990-2009)}$ | | −0.228*** | −0.096*** | −0.123*** | 0.003 |
| | | | (0.024) | (0.015) | (0.013) | (0.015) |
| | $\Delta\beta_{3(2010-2019)}$ | | −0.004 | −0.012*** | −0.008* | −0.014*** |
| | | | (0.004) | (0.004) | (0.004) | (0.004) |
| Number of observations | | 1234 | 1234 | 1234 | 1234 | 1234 |
| Number of countries | | 122 | 122 | 122 | 122 | 122 |
| The average number of observations per country | | 10 | 10 | 10 | 10 | 10 |
| Within $R^2$ | | 0.442 | 0.320 | 0.341 | 0.410 | 0.485 |
| Test for differing group intercepts(1) [p-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Breusch–Pegan (2) [$p$-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Hausman test(3) [$p$-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wooldridge test(4) [$p$-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wald test for heteroscedasticity(5) [$p$-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Pesaran CD test(6) [$p$-value] | | [0.095] | [0.126] | [0.107] | [0.132] | [0.101] |
| Wald joint test on time dummies(7) [$p$-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

Note: All estimations include time dummies since null on joint insignificance of time dummies was rejected.

Since the presence of heteroscedasticity and serial correlation in error term was detected, heteroscedasticity and serial correlation robust standard errors are presented in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.
(1) A low p-value counts against the null hypothesis that the pooled OLS model is adequate in favor of the fixed-effects alternative.
(2) A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the random-effects alternative.
(3) A low p-value counts against the null hypothesis that the random-effects model is consistent, in favor of the fixed-effects model.
(4) A low p-value counts against the null hypothesis: no first-order serial correlation in error terms.
(5) A low p-value counts against the null hypothesis: heteroscedasticity is not present.
(6) A low p-value counts against the null hypothesis: cross-sectional independence.
(7) A low p-value counts against the null hypothesis: no time effects.

Considering a change in income distribution closer to its tail-ends, economic globalization, especially financial, increases income inequality (see Table 4). This means that while globalization reduces income inequality by redistributing income more equally in the middle class or increasing the upward mobility of those at the lower income distribution, it increases the gap between the richest and the poorest. Considering T20/B20 as a proxy for income inequality, we do not observe a temporal change in the estimated effects, thus the conclusion that the inequality-reducing effect of globalization has increased over time is not robust, despite some evidence in the case of GINI.

Table 4. Fixed-effect estimates of Eq. (1), dependent variable – T20/B20

| Regressor | Coeff. | Est. (VI) | Est. (VII) | Est. (VIII) | Est. (IX) | Est. (X) |
|---|---|---|---|---|---|---|
| | | | Overall globalization (*OG*) | Economic globalization (*EG*) | Trade globalization (*TG*) | Financial globalization (*FG*) |
| Intercept | $\alpha$ | −876.4*** | −885.2*** | −896.4*** | −869.1*** | −917.8*** |
| | | (117.3) | (118.4) | (117.5) | (118.4) | (115.1) |
| Per capita GDP ($lnY$) | $\beta_1$ | 147.8*** | 153.8*** | 140.9*** | 146.2*** | 145.4*** |
| | | (27.57) | (28.28) | (27.58) | (27.83) | (27.00) |
| Squared per capita GDP ($lnY^2$) | $\beta_2$ | −9.508*** | −9.649*** | −9.455*** | −9.417*** | −10.18*** |
| | | (1.538) | (1.553) | (1.537) | (1.550) | (1.510) |
| Schooling ($S$) | $c_1$ | −10.19*** | −9.826*** | −12.10*** | −10.30*** | −12.30*** |
| | | (1.076) | (1.145) | (1.174) | (1.205) | (1.094) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Patent applications (*P*) | $c_2$ | 0.073* | 0.071* | 0.066* | 0.071* | 0.065* |
| | | (0.038) | (0.039) | (0.039) | (0.039) | (0.039) |
| Urbanization (*U*) | $c_3$ | 1.168*** | 1.137*** | 1.310*** | 1.174*** | 1.265*** |
| | | (0.191) | (0.193) | (0.193) | (0.196) | (0.187) |
| Wealth distribution (*TOP20WS*) | $c_4$ | 632.3*** | 623.7*** | 670.8*** | 631.9*** | 658.1*** |
| | | (38.66) | (39.40) | (39.63) | (40.74) | (37.86) |
| Globalization | $\beta_{3(1990-2009)}$ | | −0.428 | 0.904*** | −0.008 | 1.719*** |
| | | | (0.378) | (0.226) | (0.185) | (0.215) |
| | $\Delta\beta_{3(2010-2019)}$ | | 0.028 | 0.011 | 0.033 | 0.042 |
| | | | (0.063) | (0.065) | (0.067) | (0.061) |
| Number of observations | | 1234 | 1234 | 1234 | 1234 | 1234 |
| Number of countries | | 122 | 122 | 122 | 122 | 122 |
| The average number of observations per country | | 10 | 10 | 10 | 10 | 10 |
| Within $R^2$ | | 0.383 | 0.433 | 0.501 | 0.337 | 0.450 |
| Test for differing group intercepts(1) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Breusch–Pegan (2) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Hausman test(3) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wooldridge test(4) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wald test for heteroscedasticity(5) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

| | | | | | |
|---|---|---|---|---|---|
| Pesaran CD test[6] [*p*-value] | [0.096] | [0.099] | [0.110] | [0.109] | [0.113] |
| Wald joint test on time dummies[7] [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

Note: see note under Table 3.

Tables A3 and A4 in the Appendices present the country income level-dependent effect of globalization on income inequality. The results suggest that, considering GINI as the proxy for income inequality, all types of globalization have an income inequality-reducing effect in low-income countries. The effects in high-income countries follow the same trend, except for financial globalization, which has no significant impact. Analyzing the TOP20/BOT20 gap, we see larger differences. In low-income countries, overall globalization, and especially trade globalization, significantly reduces the gap between the richest and the poorest, while financial globalization significantly increases this gap. This is why we observe insignificant effects of economic globalization, since the impact of trade and financial globalization cancel each other out. In high-income countries, economic and primarily financial globalization is associated with a higher income gap, while trade globalization has no significant effect.

The results of using Eq. (2) to examine the moderating effect are presented in the Appendices, while the conditional slope coefficients and their 95% CIs are presented in the Figures. The results suggest that schooling significantly reduces (i.e., the slopes are negative) the impact of globalization on income inequality, i.e., increasing schooling reduces the positive correlation between globalization and income inequality or increases the negative correlation between the two (see Figs. 1 and 2). Moreover, this effect is consistent considering all analyzed globalization types and income inequality proxies.

However, schooling is more effective at softening the impact of globalization on income inequality proxied by GINI compared to the TOP20/BOT20 ratio. This means that schooling is not so crucial in combatting the widening gap between the richest and the poorest due to globalization, while it is relatively efficient in reducing inequality around the middle across the income distribution. This is indicated by the lower slope of the curves representing how schooling is changing the globalization-income inequality nexus and by a wider CI.

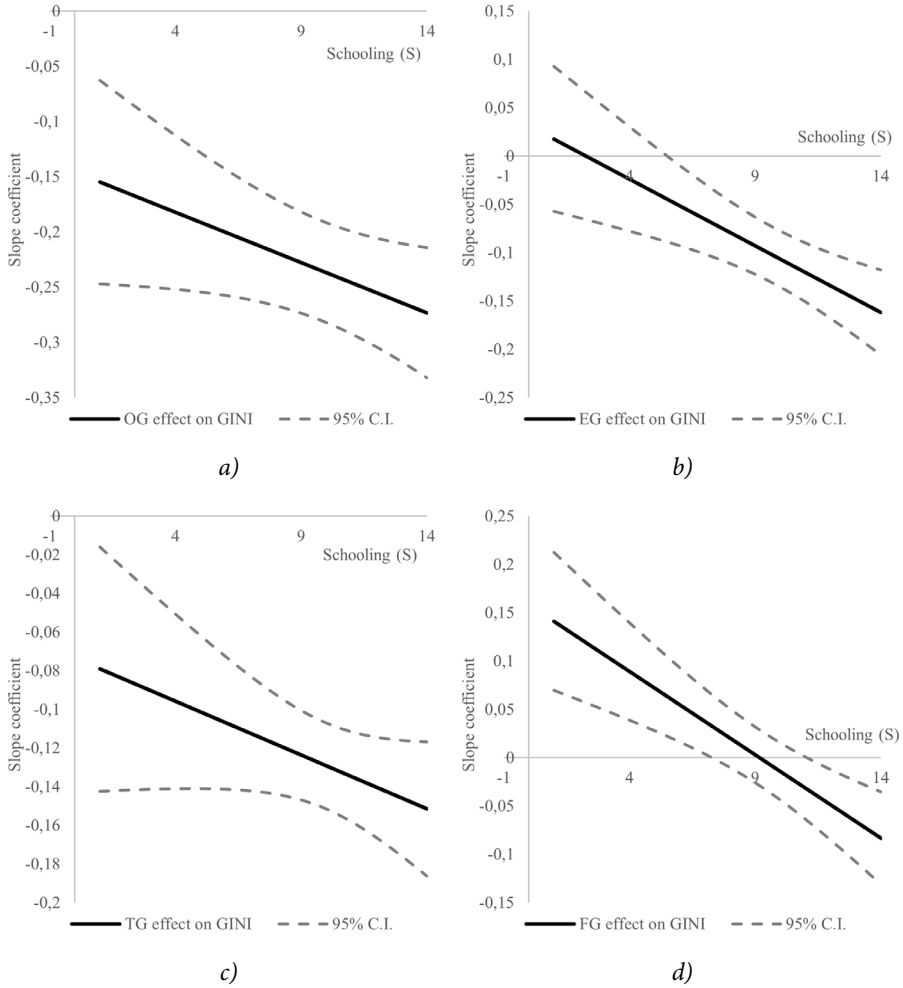


Figure 1. The conditional effect of globalization on income inequality (GINI) moderated by schooling. a) Effect of overall globalization. b) Effect of economic globalization. c) Effect of trade globalization. d) Effect of financial globalization. Visualization is based on estimates in Table A5 (see Appendices).

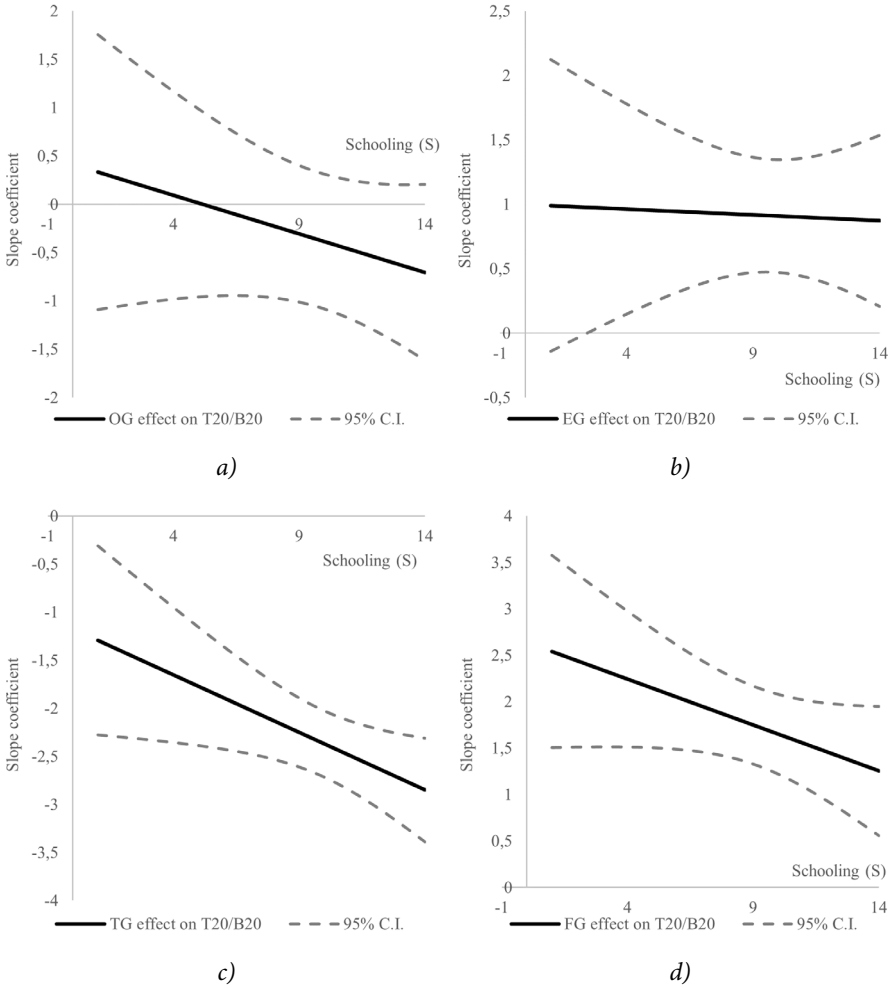


Figure 2. The conditional effect of globalization on income inequality (T20/B20) moderated by schooling. a) Effect of overall globalization. b) Effect of economic globalization. c) Effect of trade globalization. d) Effect of financial globalization. Visualization is based on estimates in Table A6 (see Appendices).

We observe quite the opposite situation by analyzing patent applications as a proxy of technological advancements, which are also associated with intellectual potential. The results suggest that technological advancements diminish the income inequality-reducing effect of globalization or stimulate the income inequality-increasing effect of globalization (i.e., the slopes are positive).

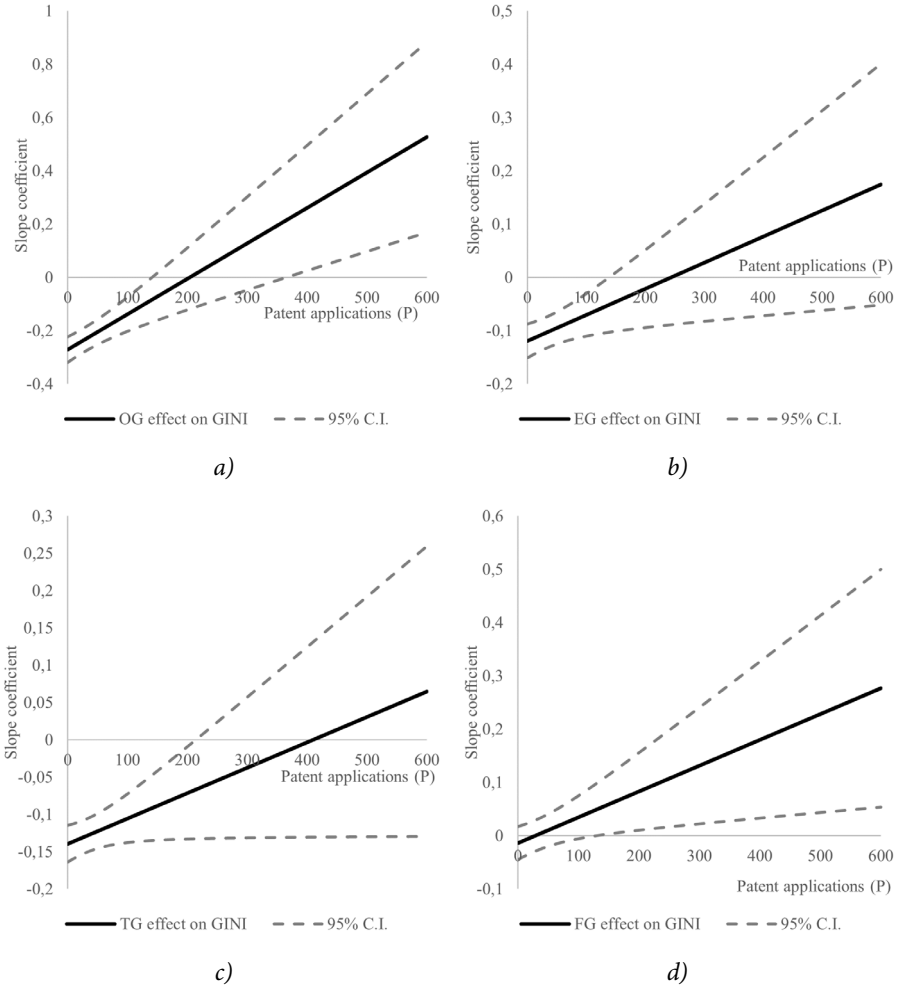


Figure 3. The conditional effect of globalization on income inequality (GINI) moderated by patent applications. a) Effect of overall globalization. b) Effect of economic globalization. c) Effect of trade globalization. d) Effect of financial globalization. Visualization is based on estimates in Table A7 (see Appendices).

The effect is smaller (lower slope of the curve) and less robust (wider CI) on GINI compared to TOP20/BOT20 as proxies for income inequality. This reveals that globalization has far more negative outcomes in widening the gap between the richest and the poorest due to technological advancements compared to those in the middle of the income distribution.

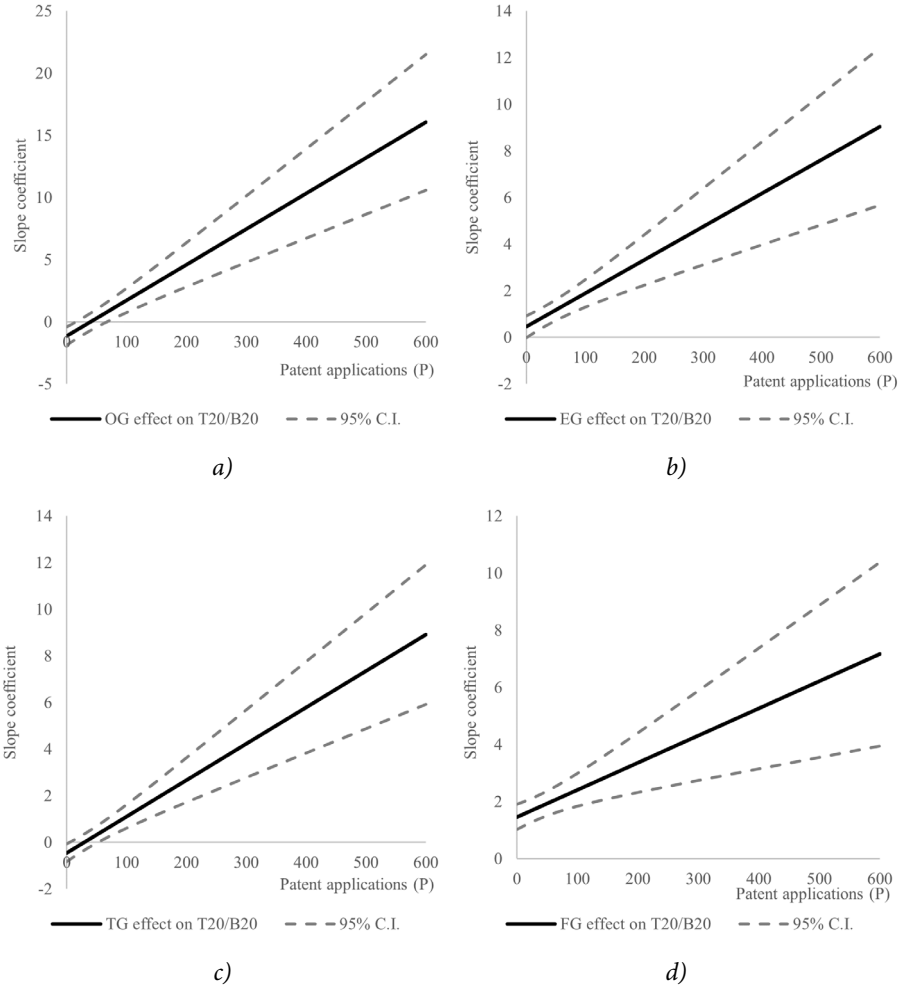


Figure 4. The conditional effect of globalization on income inequality (T20/B20) moderated by patent applications. a) Effect of overall globalization. b) Effect of economic globalization. c) Effect of trade globalization. d) Effect of financial globalization. Visualization is based on estimates in Table A8 (see Appendices).

These results lead to the conclusion that the effects of schooling are more widely dispersed across society, allowing the benefits of globalization to be channeled to more people and thus moderating the effect of globalization toward income inequality reduction. Contrarily, the benefits of technological advancements are much more concentrated in the hands of the richest, thus stimulating the income inequality-increasing effect of globalization.

## Conclusions

Even though globalization is not the only factor defining income inequality inside different countries, the globalization–income inequality relationship is widely studied. Nevertheless, there are still ways to improve on past research, especially by including different moderating effects and embracing heterogeneity between the surveyed countries. By having globalization broken down into its aspects, we observed how different types of globalization interact with income inequality. We found that trade globalization can decrease income inequality in low-income countries. Financial globalization, on the other hand, can increase income inequality for high-income countries.

The moderation of countries' intellectual potential significantly alters the relationship between globalization and income inequality. Technological advancement has proven to be more beneficial for top earners, and as a result, it boosts globalization to increase income inequality. The effect of education is much more spread across the population, so it can stimulate globalization to reduce income inequality.

These insights allow us to be more specific in defining and recommending strategies for different income level countries by answering what types of globalization should be stimulated or impeded and which kind of intellectual potential should be developed to decrease income inequality.

Future research could improve this paper by adding other income inequality proxies. The GINI and TOP20/BOT20 estimates did not provide the same results, so having additional proxies would possibly produce even more insights that could be compared to each other. In addition, the research could also benefit from countries being grouped not only by income level but also by other aspects such as institutional quality or income-inequality-reducing policies. This could also bring more insights into the heterogeneous effects of globalization based on the differences between countries.

## Scientific and Practical Implications

The results of this research suggest that the globalization–income inequality nexus is heterogeneous and conditional. Thus, the effects of globalization on income inequality are country-specific. First, the outcome depends on the type of globalization we are trying to measure. Second, it depends on the country's development level, and third, on the size of the mediating factor. This all means that globalization, for some countries, could be an inequality-reducing instrument (if human capital is relatively well developed but technological advancements are still relatively low), and vice-versa. The findings of this study suggest that simple linear and symmetric models will fail to capture the whole complexity of the effect that globalization has on income inequality. Thus, this research fosters the application of asymmetric and non-linear models to examine the heterogeneity of the globalization-income inequality nexus.

We find that the globalization of trade has the most considerable inequality-reducing effect. Thus, trade-promoting policies should be considered if policymakers are targeting the reduction of income inequality. Contrarily, the regulation of financial globalization must be revised, since current policies do not reduce the negative effect on income inequality. New policies that channel the benefits of financial globalization to broader social strata must be adopted.

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## Appendices

Table A1. Lower-middle and low-income countries in the sample

| | | | | |
|---|---|---|---|---|
| Algeria | Angola | Bangladesh | Benin | Bhutan |
| Burkina Faso | Cameroon | Chad | Comoros | Cote d'Ivoire |
| Djibouti | Egypt, Arab Rep | El Salvador | Ethiopia | Ghana |
| Guinea | Haiti | Honduras | India | Indonesia |
| Iran, Islamic Rep | Kenya | Kyrgyz Republic | Lao PDR | Madagascar |
| Malawi | Mali | Mauritania | Mongolia | Morocco |
| Mozambique | Nepal | Nicaragua | Niger | Nigeria |

| | | | | |
|---|---|---|---|---|
| Pakistan | Philippines | Rwanda | Sao Tome & Principe | Senegal |
| Sri Lanka | Sudan | Syrian, Arab Rep | Tajikistan | Tanzania |
| Togo | Tunisia | Uganda | Ukraine | Uzbekistan |
| Vietnam | Zambia | | | |

Table A2. High and upper-middle income countries in the sample

| | | | | |
|---|---|---|---|---|
| Albania | Argentina | Armenia | Australia | Austria |
| Azerbaijan | Belgium | Bosnia & Herzegovina | Botswana | Brazil |
| Bulgaria | Canada | Chile | China | Colombia |
| Costa Rica | Croatia | Cyprus | Czech Republic | Denmark |
| Dominican Republic | Ecuador | Estonia | Finland | France |
| Gabon | Georgia | Greece | Guatemala | Hungary |
| Iceland | Ireland | Israel | Italy | Jamaica |
| Japan | Jordan | Kazakhstan | Latvia | Lithuania |
| Luxembourg | Malaysia | Malta | Mauritius | Mexico |
| Moldova | Montenegro | Namibia | Netherlands | North Macedonia |
| Norway | Panama | Paraguay | Peru | Poland |
| Portugal | Romania | Russian Federation | Serbia | Seychelles |
| Slovak Republic | Slovenia | Spain | Sweden | Switzerland |
| Thailand | Turkey | United Arab Emirates | United Kingdom | United States |
| Uruguay | | | | |

Table A3. Income level-dependent fixed-effects estimates of Eq. (1), dependent variable – GINI.

| Regressor | Coeff. | Est. (XI) | Est. (XII) | Est. (XIII) | Est. (XIV) |
|---|---|---|---|---|---|
| | | Overall globalization (*OG*) | Economic globalization (*EG*) | Trade globalization (*TG*) | Financial globalization (*FG*) |
| Intercept | $\alpha$ | −59.51*** | −46.93*** | −49.42*** | −49.95*** |
| | | (8.195) | (8.314) | (8.049) | (8.466) |
| Per capita GDP (*lnY*) | $\beta_1$ | 15.25*** | 11.79*** | 13.21*** | 11.17*** |
| | | (1.898) | (1.886) | (1.836) | (1.918) |
| Squared per capita GDP ($lnY^2$) | $\beta_2$ | −0.856*** | −0.720*** | −0.806*** | −0.721*** |
| | | (0.102) | (0.103) | (0.100) | (0.106) |
| Schooling (*S*) | $c_1$ | −1.095*** | −1.089*** | −0.900*** | −1.330*** |
| | | (0.073) | (0.076) | (0.075) | (0.074) |
| Patent applications (*P*) | $c_2$ | 0.004 | 0.004 | 0.005* | 0.003 |
| | | (0.002) | (0.003) | (0.002) | (0.003) |
| Urbanization (*U*) | $c_3$ | 0.108*** | 0.108*** | 0.095*** | 0.121*** |
| | | (0.012) | (0.013) | (0.012) | (0.013) |
| Wealth distribution (*TOP20WS*) | $c_4$ | 63.00*** | 62.83*** | 58.49*** | 67.40*** |
| | | (2.488) | (2.573) | (2.548) | (2.560) |
| Globalization (effect in low income countries) | $\beta_3$ | −0.264*** | −0.178*** | −0.192*** | −0.071*** |
| | | (0.023) | (0.017) | (0.014) | (0.017) |
| Globalization * High-income countries dummy (*M*) | $\beta_4$ | 0.068*** | 0.080*** | 0.072*** | 0.080*** |
| | | (0.009) | (0.010) | (0.009) | (0.010) |
| Globalization (effect in high-income countries) | $\beta_3 + \beta_4$ | −0.196*** | −0.097*** | −0.121*** | 0.010 |
| | | (0.023) | (0.015) | (0.011) | (0.015) |
| Number of observations | | 1234 | 1234 | 1234 | 1234 |
| Number of countries | | 122 | 122 | 122 | 122 |
| The average number of observations per country | | 10 | 10 | 10 | 10 |
| Within $R^2$ | | 0.327 | 0.408 | 0.354 | 0.362 |

| | | | | |
|---|---|---|---|---|
| Test for differing group intercepts(1) [p-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Breusch–Pegan (2) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Hausman test(3) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wooldridge test(4) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wald test for heteroscedasticity(5) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Pesaran CD test(6) [*p*-value] | [0.09] | [0.083] | [0.073] | [0.077] |
| Wald joint test on time dummies(7) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

Note: see note under Table 3.

Table A4. Income level-dependent fixed-effects estimates of Eq. (1), dependent variable – T20/B20

| Regressor | Coeff. | Est. (XV) | Est. (XVI) | Est. (XVII) | Est. (XVIII) |
|---|---|---|---|---|---|
| | | Overall globalization (*OG*) | Economic globalization (*EG*) | Trade globalization (*TG*) | Financial globalization (*FG*) |
| Intercept | α | −517.5*** | −573.3*** | −568.8*** | −594.5*** |
| | | (126.9) | (126.1) | (126.6) | (123.2) |
| Per capita GDP (*lnY*) | $\beta_1$ | 84.30*** | 82.74*** | 91.09*** | 87.58*** |
| | | (29.40) | (28.61) | (28.87) | (27.91) |
| Squared per capita GDP ($lnY^2$) | $\beta_2$ | −6.648*** | −6.765*** | −6.911*** | −7.517*** |
| | | (1.578) | (1.567) | (1.580) | (1.535) |
| Schooling (*S*) | $c_1$ | −11.20*** | −12.73*** | −10.71*** | −13.16*** |
| | | (1.137) | (1.152) | (1.185) | (1.070) |
| Patent applications (*P*) | $c_2$ | 0.091** | 0.078** | 0.083** | 0.080** |
| | | (0.038) | (0.038) | (0.038) | (0.037) |
| Urbanization (*U*) | $c_3$ | 1.186*** | 1.316*** | 1.222*** | 1.231*** |
| | | (0.190) | (0.190) | (0.194) | (0.183) |
| Wealth distribution (*TOP20WS*) | $c_4$ | 609.9*** | 655.9*** | 620.5*** | 644.9*** |
| | | (38.54) | (39.04) | (40.08) | (37.25) |
| Globalization (effect in low-income countries) | $\beta_3$ | −0.775** | 0.055 | −0.751*** | 0.884*** |
| | | (0.353) | (0.258) | (0.216) | (0.247) |

| | | | | | |
|---|---|---|---|---|---|
| Globalization * High-income countries dummy (*M*) | $\beta_4$ | 0.960*** | 0.932*** | 0.872*** | 0.966*** |
| | | (0.135) | (0.149) | (0.145) | (0.146) |
| Effect in high-income countries | $\beta_3 + \beta_4$ | 0.185 | 0.987*** | 0.121 | 1.850*** |
| | | (0.357) | (0.219) | (0.175) | (0.212) |
| Number of observations | | 1234 | 1234 | 1234 | 1234 |
| Number of countries | | 122 | 122 | 122 | 122 |
| The average number of observations per country | | 10 | 10 | 10 | 10 |
| Within $R^2$ | | 0.437 | 0.398 | 0.444 | 0.342 |
| Test for differing group intercepts(1) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Breusch–Pegan (2) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Hausman test(3) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wooldridge test(4) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wald test for heteroscedasticity(5) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Pesaran CD test(6) [*p*-value] | | [0.086] | [0.139] | [0.133] | [0.087] |
| Wald joint test on time dummies(7) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

Note: see note under Table 3.

Table A5. Fixed-effects estimates of Eq. (2) with schooling as the moderator, dependent variable – GINI.

| Regressor | Coeff. | Est. (XIX) | Est. (XX) | Est. (XXI) | Est. (XXII) |
|---|---|---|---|---|---|
| | | Overall globalization (*OG*) | Economic globalization (*EG*) | Trade globalization (*TG*) | Financial globalization (*FG*) |
| Intercept | α | −83.82*** | −72.47*** | −73.97*** | −73.46*** |
| | | (7.707) | (7.769) | (7.541) | (7.929) |
| Per capita GDP (*lnY*) | $\beta_1$ | 18.51*** | 14.78*** | 17.10*** | 13.21*** |
| | | (2.022) | (1.916) | (1.831) | (1.971) |
| Squared per capita GDP ($lnY^2$) | $\beta_2$ | −0.975*** | −0.837*** | −0.974*** | −0.777*** |
| | | (0.112) | (0.107) | (0.102) | (0.111) |

| | | | | | |
|---|---|---|---|---|---|
| Schooling (*S*) | $c_1$ | −0.440 | −0.283 | −0.571*** | −0.269 |
| | | (0.292) | (0.232) | (0.192) | (0.242) |
| Patent applications (*P*) | $c_2$ | 0.003 | 0.004 | 0.004 | 0.004 |
| | | (0.003) | (0.003) | (0.003) | (0.003) |
| Urbanization (*U*) | $c_3$ | 0.101*** | 0.105*** | 0.091*** | 0.118*** |
| | | (0.013) | (0.013) | (0.013) | (0.013) |
| Wealth distribution (*TOP20WS*) | $c_4$ | 64.22*** | 63.69*** | 59.36*** | 68.14*** |
| | | (2.541) | (2.628) | (2.606) | (2.604) |
| Globalization | $\beta_3$ | −0.146*** | 0.031 | −0.074** | 0.158*** |
| | | (0.051) | (0.042) | (0.035) | (0.040) |
| Globalization * Schooling (*M*) | $\beta_4$ | −0.009** | −0.014*** | −0.006* | −0.017*** |
| | | (0.005) | (0.004) | (0.003) | (0.004) |
| Number of observations | | 1234 | 1234 | 1234 | 1234 |
| Number of countries | | 122 | 122 | 122 | 122 |
| The average number of observations per country | | 10 | 10 | 10 | 10 |
| Within $R^2$ | | 0.385 | 0.463 | 0.484 | 0.431 |
| Test for differing group intercepts(1) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Breusch–Pegan (2) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Hausman test(3) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wooldridge test(4) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wald test for heteroscedasticity(5) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Pesaran CD test(6) [*p*-value] | | [0.114] | [0.117] | [0.123] | [0.134] |
| Wald joint test on time dummies(7) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

Note: see note under Table 3.

Table A6. Fixed-effects estimates of Eq. (2) with schooling as the moderator, dependent variable – T20/B20

| Regressor | Coeff. | Est. (XXIII) | Est. (XXIV) | Est. (XXV) | Est. (XXVI) |
|---|---|---|---|---|---|
| | | Overall globalization (*OG*) | Economic globalization (*EG*) | Trade globalization (*TG*) | Financial globalization (*FG*) |
| Intercept | $\alpha$ | −871.6*** | −897.0*** | −893.2*** | −903.1*** |
| | | (119.0) | (117.2) | (117.4) | (115.2) |
| Per capita GDP (*lnY*) | $\beta_1$ | 139.4*** | 140.0*** | 163.4*** | 130.5*** |
| | | (31.23) | (28.90) | (28.50) | (28.63) |
| Squared per capita GDP ($lnY^2$) | $\beta_2$ | −8.849*** | −9.404*** | −10.36*** | −9.290*** |
| | | (1.727) | (1.612) | (1.585) | (1.614) |
| Schooling (*S*) | $c_1$ | −4.928 | −11.58*** | −16.49*** | −6.548* |
| | | (4.516) | (3.493) | (2.985) | (3.519) |
| Patent applications (*P*) | $c_2$ | 0.076** | 0.068* | 0.064* | 0.078** |
| | | (0.039) | (0.039) | (0.039) | (0.038) |
| Urbanization (*U*) | $c_3$ | 1.111*** | 1.307*** | 1.174*** | 1.226*** |
| | | (0.195) | (0.193) | (0.196) | (0.188) |
| Wealth distribution (*TOP20WS*) | $c_4$ | 626.4*** | 670.8*** | 638.2*** | 656.5*** |
| | | (39.25) | (39.63) | (40.57) | (37.83) |
| Globalization | $\beta_3$ | 0.413 | 1.000 | −1.174** | 2.641*** |
| | | (0.789) | (0.634) | (0.551) | (0.584) |
| Globalization * Schooling (*M*) | $\beta_4$ | −0.080 | −0.009 | −0.120** | −0.099* |
| | | (0.072) | (0.061) | (0.052) | (0.059) |
| Number of observations | | 1234 | 1234 | 1234 | 1234 |
| Number of countries | | 122 | 122 | 122 | 122 |
| The average number of observations per country | | 10 | 10 | 10 | 10 |
| Within $R^2$ | | 0.432 | 0.451 | 0.380 | 0.392 |
| Test for differing group intercepts[(1)] [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Breusch–Pegan [(2)] [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Hausman test[(3)] [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wooldridge test[(4)] [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

| | | | | |
|---|---|---|---|---|
| Wald test for heteroscedasticity[5] [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Pesaran CD test[6] [*p*-value] | [0.140] | [0.106] | [0.080] | [0.110] |
| Wald joint test on time dummies[7] [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

Note: see note under Table 3.

Table A7. Fixed-effects estimates of Eq. (2) with patent applications as the moderator, dependent variable – GINI.

| Regressor | Coeff. | Est. (XXVII) | Est. (XXVIII) | Est. (XXIX) | Est. (XXX) |
|---|---|---|---|---|---|
| | | Overall globalization (*OG*) | Economic globalization (*EG*) | Trade globalization (*TG*) | Financial globalization (*FG*) |
| Intercept | α | −85.98*** | −75.32*** | −75.23*** | −77.62*** |
| | | (7.592) | (7.757) | (7.527) | (7.911) |
| Per capita GDP (*lnY*) | $\beta_1$ | 20.35*** | 16.90*** | 17.92*** | 16.11*** |
| | | (1.819) | (1.825) | (1.775) | (1.858) |
| Squared per capita GDP ($lnY^2$) | $\beta_2$ | −1.064*** | −0.948*** | −1.013*** | −0.942*** |
| | | (0.100) | (0.102) | (0.099) | (0.104) |
| Schooling (*S*) | $c_1$ | −0.936*** | −0.982*** | −0.817*** | −1.213*** |
| | | (0.075) | (0.080) | (0.080) | (0.076) |
| Patent applications (*P*) | $c_2$ | −0.114*** | −0.039** | −0.023* | −0.042** |
| | | (0.028) | (0.017) | (0.014) | (0.018) |
| Urbanization (*U*) | $c_3$ | 0.107*** | 0.104*** | 0.086*** | 0.124*** |
| | | (0.013) | (0.013) | (0.013) | (0.013) |
| Wealth distribution (*TOP20WS*) | $c_4$ | 64.10*** | 64.47*** | 59.93*** | 68.74*** |
| | | (2.526) | (2.634) | (2.608) | (2.616) |
| Globalization | $\beta_3$ | −0.271*** | −0.119*** | −0.139*** | −0.014 |
| | | (0.024) | (0.016) | (0.013) | (0.016) |
| Globalization * Patent applications (*M*) | $\beta_4$ | 0.001*** | 0.001** | 0.001** | 0.001** |
| | | (0.001) | (0.001) | (0.001) | (0.001) |
| Number of observations | | 1234 | 1234 | 1234 | 1234 |
| Number of countries | | 122 | 122 | 122 | 122 |

| | | | | |
|---|---|---|---|---|
| The average number of observations per country | 10 | 10 | 10 | 10 |
| Within $R^2$ | 0.434 | 0.368 | 0.383 | 0.324 |
| Test for differing group intercepts(1) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Breusch–Pegan (2) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Hausman test(3) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wooldridge test(4) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wald test for heteroscedasticity(5) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Pesaran CD test(6) [*p*-value] | [0.083] | [0.134] | [0.115] | [0.080] |
| Wald joint test on time dummies(7) [*p*-value] | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

Note: see note under Table 3.

Table A8. Fixed-effects estimates of Eq. (2) with patent applications as the moderator, dependent variable – T20/B20.

| Regressor | Coeff. | Est. (XXXI) | Est. (XXXII) | Est. (XXXIII) | Est. (XXXIV) |
|---|---|---|---|---|---|
| | | Overall globalization (*OG*) | Economic globalization (*EG*) | Trade globalization (*TG*) | Financial globalization (*FG*) |
| Intercept | $\alpha$ | −891.7*** | −910.5*** | −899.3*** | −929.5*** |
| | | (116.3) | (115.6) | (115.9) | (114.0) |
| Per capita GDP ($lnY$) | $\beta_1$ | 157.3*** | 143.0*** | 150.7*** | 147.2*** |
| | | (27.88) | (27.20) | (27.32) | (26.77) |
| Squared per capita GDP ($lnY^2$) | $\beta_2$ | −9.519*** | −9.324*** | −9.437*** | −10.12*** |
| | | (1.528) | (1.515) | (1.521) | (1.497) |
| Schooling ($S$) | $c_1$ | −8.513*** | −10.57*** | −8.193*** | −11.50*** |
| | | (1.147) | (1.197) | (1.234) | (1.092) |
| Patent applications ($P$) | $c_2$ | −2.424*** | −1.141*** | −1.161*** | −0.788*** |
| | | (0.423) | (0.256) | (0.214) | (0.259) |
| Urbanization ($U$) | $c_3$ | 1.188*** | 1.211*** | 0.973*** | 1.255*** |
| | | (0.191) | (0.192) | (0.197) | (0.186) |

| | | | | | |
|---|---|---|---|---|---|
| Wealth distribution (*TOP20WS*) | $c_4$ | 625.6*** | 680.6*** | 650.2*** | 662.5*** |
| | | (38.71) | (39.27) | (40.15) | (37.69) |
| Globalization | $\beta_3$ | −1.133*** | 0.462* | −0.447** | 1.465*** |
| | | (0.374) | (0.240) | (0.192) | (0.228) |
| Globalization * Patent applications (*M*) | $\beta_4$ | 0.029*** | 0.014*** | 0.016*** | 0.010*** |
| | | (0.005) | (0.003) | (0.003) | (0.003) |
| Number of observations | | 1234 | 1234 | 1234 | 1234 |
| Number of countries | | 122 | 122 | 122 | 122 |
| The average number of observations per country | | 10 | 10 | 10 | 10 |
| Within $R^2$ | | 0.368 | 0.373 | 0.304 | 0.325 |
| Test for differing group intercepts(1) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Breusch–Pegan (2) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Hausman test(3) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wooldridge test(4) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Wald test for heteroscedasticity(5) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |
| Pesaran CD test(6) [*p*-value] | | [0.114] | [0.104] | [0.102] | [0.076] |
| Wald joint test on time dummies(7) [*p*-value] | | [<0.001] | [<0.001] | [<0.001] | [<0.001] |

Note: see note under Table 3.