



Do Globalization, Technology Adoption and Economic Development Influence Income Inequality in Developing Asian Nations?

Shujaat Abbas¹ ✉

Qazi Muhammad Adnan Hye²

Raja Rehan³

Sadaf Mubeen⁴



(✉ Corresponding Author)

¹Ural Federal University, Russian Federation.

Email: shujaat.abbas@urfu.ru

²Mohammad Ali Jinnah University, Karachi, Pakistan.

Email: adnan.econ@gmail.com

³ILMA University, Karachi, Pakistan.

Email: rajarehans3@hotmail.com

⁴National College of Business Administration and Economics Lahore, Pakistan.

Email: sadaf.mubeengcu@yahoo.com

Abstract

Currently, income inequality has become an international issue that needs to be overcome and also requires the attention of researchers and policymakers. Hence, this study is an attempt to explore the impact of globalization, technology adoption, and economic development on income inequality. For this purpose, 20 years of large-scale panel data over the period from 2001 to 2020 for ten emerging Asian nations (Iran, Jordan, Iraq, Laos, Pakistan, Bangladesh, Sri Lanka, Thailand, Indonesia, and the Philippines) is mined from the World Bank database and KOF globalization index. In order to inspect the empirical relationship among the selected variables, the panel data fixed effects model (FEM) along with the robust standard error is employed. The results indicate that globalization, technology adoption, and economic development have a negative linkage with income inequality, which means these factors play a significant role in removing the income inequality in developing countries. This study provides insight for policymakers while developing policies regarding income inequality elimination in the country.

Keywords: Globalization index, Technology adoption, Economic development, Income inequality, Net national income.

JEL Classification: F60; F63; D63.

Citation | Shujaat Abbas; Qazi Muhammad Adnan Hye; Raja Rehan; Sadaf Mubeen (2022). Do Globalization, Technology Adoption and Economic Development Influence Income Inequality in Developing Asian Nations? Asian Journal of Economics and Empirical Research, 9(2): 83-90.

History:

Received: 13 December 2021

Revised: 15 July 2022

Accepted: 29 July 2022

Published: 22 August 2022

Licensed: This work is licensed under a [Creative Commons](https://creativecommons.org/licenses/by/4.0/)

Attribution 4.0 License

Publisher: Asian Online Journal Publishing Group

Funding: This study received no specific financial support.

Authors' Contributions: All authors contributed equally to the conception and design of the study.

Competing Interests: The authors declare that they have no conflict of interest.

Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study, that no vital features of the study have been omitted, and that any discrepancies from the study as planned have been explained.

Ethical: This study followed all ethical practices during writing.

Contents

1. Introduction	84
2. Literature Review	85
3. Research Methods.....	86
4. Findings of the Study	87
5. Discussions	88
6. Conclusions	89
7. Implications.....	89
8. Limitations and Future Recommendations	89
References.....	89

Contribution of this paper to the literature

The study makes a distinction in economic-based literature. The findings obtained from this empirical study address the present issue of income inequality and also analyze the impacts of globalization, high technology exports, GDP, and NNI on income inequality.

1. Introduction

With the passage of time, rapid technological changes have converted the world into a global village and it has reduced the differences among nations. Unfortunately, this wave of globalization has also delivered some adverse effects, such as raised income inequality and unequal distribution of wealth (Heshmati, 2007). In fact, the business community of any country is one of the core reasons for the unequal circulation of wealth (Crane, Husted, Bapuji, & Derry, 2014). Also, in order to earn high revenue, the local business community is attracted more toward advanced nations' markets (Morisset, 2003). This trend marks an adverse effect on foreign direct investment (FDI), capital mobility, international trade, skilled labor, fewer available jobs, taxation, economic reforms, growing regional disparities, the role of communication media, etc., in developing countries. Particularly, when developing nations' industries move into the international market, they need to follow international business trends, such as adopting universally recommended technology, hiring highly skilled employees, and manufacturing products according to the global market needs. These factors urge companies to: 1) hire skilled labor from developed countries, which further leads to discrimination of local skilled manpower, leading to unemployment; 2) import highly demanded raw materials for better quality products, resulting in lower demand for local raw materials; 3) increase local taxes – once the business community moves towards the international market, this allows the government to levy more taxes to satisfy its financial needs. Clearly, this specifies a strong association between globalization and income inequality (Auguste, 2018; Dorn, Fuest, & Potrafke, 2018; Khan, Shehzad, & Ahmad, 2021). Remarkably, technology advancement is one of the core reasons for increased globalization and income inequality.

Undeniably, information technology is one of the most expensive sectors in the world. The developed republics are inventing more technological tools for many different industries, which is followed by developing countries. Adoption of the latest technology is one of the major differences between developed and developing nations (Bauer, 2018). Thus, in order to meet the requirements of the international market, developing nations' business communities have no option but to adopt the globally recommended technology, otherwise they will be crushed by competitors. Notably, the literature proposed the same, that technology impacts income inequality (Asongu & Odhiambo, 2019). Thus, all the various sectors of the markets are forced to adopt modern technology to meet the current era requirements. Consequently, new developments, such as accounting, inventory, supply chain, recording and other related software is introduced into the markets. Hence, if the evolving nations do not adopt the latest technological advancements, they may not be able to meet the standards of the international markets, leaving them lagging behind and facing income inequality. Therefore, even if a low degree of technological development is able to reduce income inequality, one may consider technological development as a core factor that reduces income inequality in developing countries (Asongu & Odhiambo, 2019; Bauer, 2018; Untari, Priyarsono, & Novianti, 2019). Clearly, the adoption of technology is necessary for all levels of community.

Economic performance also plays a vital role in the prosperity of a country. Visibly, the prime difference between developed and developing nations is their wealth and economic development growth rate (Wu & Li, 2017). In reality, the role of economic growth is the core factor that specifies the stability or instability of nations. Therefore, it is vital for every nation to sustain its economic growth to ensure stability. Notably, the economic policies of a country strongly influence its income inequality level. Therefore, in order to keep up with recent developments and meet international standards, developing nations need to formulate their own policies regarding tax reforms, business-related issues, utility prices, etc., to maintain standards and meet global needs. However, the negative side of these policies are that they support the rich and crush the poor, sometimes leading to income inequality. This is why scholars have previously specified that economic development leads to income inequality (Bolarinwa & Akinlo, 2021; Hailemariam, Dzhumashev, & Shahbaz, 2020; Khan, Saleem, & Fatima, 2018).

Interestingly, globalization has also been considered to be a significant exogenous driver of inequality, especially in developing nations. Particularly in emerging nations, these forces have exacerbated existing patterns of inequality in a variety of ways, including persistently high wealth inequality and intergenerational transfer of inequality due to unequal access to higher-level education. Over the last three decades, the negative impact of financial and trade globalization on income inequality has been worsened by national policies that have had a detrimental influence on income distribution in developing countries. Likewise, during the Covid-19 pandemic, developing countries were more affected by income inequality as they have slower economic growth in comparison to developed countries.

Evidently, in spite of adopting similar strategies to survive the recent pandemic, the increasing amount of literature specifies that each nation postulates a dissimilar mortality rate due to income inequality (Elgar, Stefaniak, & Wohl, 2020; Mollalo, Vahedi, & Rivera, 2020; Oronce, Scannell, Kawachi, & Tsugawa, 2020). This opens a new debate and reignites the need to recognize developing countries' economic factors for measuring inequality. Although earlier studies have not provided a holistic view and conclusive findings, most of them agree that globalization, technological process and economic development are the core determinants that elucidate dynamic aspects of income distribution (see (Milanovic, 2016; Nolan, Richiardi, & Valenzuela, 2019)). Nevertheless, the factors that help in attaining a fitting way of distributing income without hurting economic development remain unidentified (Khan et al., 2021; Untari et al., 2019). Remarkably, numerous prior investigations that were conducted to inspect inequality determinants are country- or region-specific and rely on dissimilar estimation methods and data samples (see (Asteriou, Dimelis, & Moudatsou, 2014; Bukhari & Munir, 2016; Giri, Pandey, & Mohapatra, 2021)), hence delivering inconsistent outcomes and leaving gaps in the literature. For instance, current literature separately emphasizes technology, economic development and globalization, thus offering limited opinions regarding the sources of inequality. In view of this background, this study is set to offer numerous additions to the existing literature by recognizing inequality determinants in developing Asian nations.

The structure of the study is divided into various phases. In the first phase, the introduction of the study is presented. In the second phase, the evidence regarding globalization, technology adoption, economic development

and income inequality is discussed based on past studies. The third phase discusses the methodology regarding globalization, technology adoption, economic development and income inequality and related data and analyzes its validity. The fourth phase presents the findings of the study based on the analysis conducted. The paper ends with the conclusions, implications, and recommendations for future studies.

2. Literature Review

Over the past few years, numerous countries around the world faced substantial enhancement in globalization and economic freedom. This benefited the economic growth of many countries but also brought factors related to income inequality. Roy-Mukherjee and Udeogu (2021) investigated the relationship between income inequality and neo-liberal globalization in the Western Balkan countries. The study indicates that proper arrangement of capital, trade and income are dependent on the good governance of globalization. The increased expenses due to globalization in developing countries highlighted the issue of income inequality. Aluko, Ibrahim, and Atagbuzia (2021) examined the relationship between globalization and foreign direct investment that extended its influence on income inequality in Africa. The study states that globalization plays an important role and influences income inequality. The limited knowledge has been considered a similar element in the globalization and liberalization that neglected the flow of income. Therefore, the dimensions of globalization influences and economic freedom clearly indicate its dominant influence on the inequality of income. Gozgor (2017) analyzed the impact of globalization on the unemployment structures that have a significant influence on income inequality. The finding states that robust potential exists in the globalization index that poses a strong influence over income inequality. The concepts of rich and poor are rigorously enumerated due to the quantifying impact of globalization. Globalization has eliminated the distance among people but has also had various impacts on the lives of people. These impacts vary, from culture to income, due to the inappropriate distribution of essential elements among people globally. Several dimensions of globalization that benefited the world with rising economic growth also disrupted the levels of income among the people. Improper policy reforms that promoted sensitivity of inequality among different cultures and classes of people is also the biggest disaster in developing countries (Khan et al., 2021). Deregulation and improper social regulation also have a non-equalizing impact on income inequality in developing countries.

Technology has been a major intervention in the current world and eliminated a much-skilled labor force that has impacted people's income. Developing countries export their energy to developed countries that are influencing income inequality. Sultanuzzaman, Fan, Mohamued, Hossain, and Islam (2019) explored the impacts of technology and exports on the growth of the economy and on the income inequality of Asian countries. The study states that high technology exports not only disrupt the economic growth but also disrupts the income inequality among people. Technology plays a vital role in the enhancement of economic growth, but exports have a larger impact. Hayduk (2020) enumerated the high technology exports among developed countries influencing the income inequality in developing countries. The finding states that significant and severe impacts of technology exports impact skills as well as income inequality. Income inequality is one of the greatest factors that is influenced by the export of high technology. Idris, Ismail, Ibrahim, and Hamzah (2021) assessed the trade of high technology from developing countries that clearly impacts income inequality. Results indicated that inappropriate policies of retaining high technology create more unemployment and income inequality. Usually, high technology is important in motivating workers as well as developing skills among the labor force. This benefits income stability and brings a more persistent inflow of money among the people without differentiation. More innovation within the industries develops people's skills and motivates them to increase their efforts in support of the economy. The export of high technology reduces innovation in industries and influences the income inequality in various ways. The positions of people working in the industries were improved due to the implementation of high technology (Untari et al., 2019). However, the export of high technology had a negative impact on people's income but also influenced the economic growth of developing countries.

The role of economic growth is dominant in the stability and instability of countries, whether developed or undeveloped. Therefore, it is important for every country to sustain its economic growth to ensure the stability of every sector and every need pertaining to the working people. Economic growth is defined as an increase in national per capita income and output. However, economic development does not imply an increase in people's living conditions. It might be due to a growth in income for the wealthy while the poor see little or no change in their living conditions. Vladušić, Dragović, and Bašić (2018) interpreted the relation and growth of gross domestic product and private savings in Bosnia and Herzegovina, indicating its influence on income inequality. The study revealed that gross domestic product and its growth and decline has a major influence on income inequality. Gross domestic product relates to the per capita growth that clearly impacts the income flows of the country. Lalwani and Chakraborty (2020) narrated the relationship between gross domestic product and aggregate earnings of developing countries that are influential on income inequality. The study indicates that there could be proper aggregate earnings of developing countries when the gross domestic product is properly and positively upgraded. The decrease in gross domestic product has a huge and lasting impact on the income inequality of developing countries from various stances. Nugent and Conway (2021) examined the relationship between ownership changes, income inequality and gross domestic product with various other factors. The findings indicate that the lack of growth in the gross domestic product and its sustainability shows a negative impact on income inequality. This is due to improper management of industries and regulation of institutions that contribute a major portion of their income to their governments. The need for stable social and political factors is also important as they impact the income inequality in developing countries. Mostly, developing countries are unable to meet the standards of economic conditions due to decreased international investments. The unstable economic conditions also have a lasting impact on the income and lives of people, and this may also create uncertainty. Low-income countries usually gain transitional growth by enlarging their political influence for attaining foreign investment to sustain their economic growth. The proper sustainability in economic growth and gross domestic product are instrumental in eliminating the factors of income inequality. National measures, especially the establishment of institutions to deal with inequality, can, nonetheless, play a significant role in lowering income disparity (Hailemariam et al., 2020). A number of developing countries have used fiscal measures to reduce high levels of primary income disparity to lower levels of secondary and tertiary inequality.

The incomes of countries are based on different factors and sectors that are majorly highlighted by sustainability and increased economic growth. Net national income is also defined as gross national income that is attained from higher asset sources. Li and Chen (2019) investigated the perspectives of global income chains and national income and their role in income distribution. Findings revealed that a boost in the net national income could be vital for the elimination of income inequality. Efficient management of net national income not only helps to sustain and increase economic growth but also benefits the livelihoods of people. Arlotti and Sabatinelli (2017) explored the support of net national income with the minimum income schemes for workers that influence income inequality. The results revealed that net national income is a strong factor related to global income that significantly impacts income inequality. Developing countries retained their highest assets for developed countries for the sake of loans that reduced the net national income. Liang (2021) examined the relationship between demand-driven growth and income distribution with the relevance of income traps that impact income inequality. The findings revealed that the net national income traps and their distribution are responsible for the influence on income inequality. This reduction has had a major impact on economic instability and income inequality among the Chinese people. Income inequality has been largely influenced by the net national income due to persistent higher expenses and lack of policy implementation. Due to the higher loan schemes, most of the net national income is put toward the payments that largely impact the expenses and budgets of developing countries. This impact has not only restrained resource allocation but has also limited people’s income (Khan et al., 2018). Inflation and rising expenses of commodities are expanded due to the improper management of national income. Lack of tax collection and income generation from developing countries contribute significantly to income inequality.

3. Research Methods

This article investigates the impact of globalization, technology adoption, and economic development on income inequality, using data from secondary sources for ten developing Asian countries for the analysis – Iran, Jordan, Iraq, Laos, Pakistan, Bangladesh, Sri Lanka, Thailand, Indonesia, and the Philippines. Large-scale panel data from 2001 to 2020 were extracted from the World Bank (WB) database and the KOF globalization index. In order to acquire robust outcomes, STATA statistical software is employed. The current article established the equation using understudy constructs mentioned below:

$$GINII_{it} = \alpha_0 + \beta_1 GI_{it} + \beta_2 HTE_{it} + \beta_3 GDP_{it} + \beta_4 NNI_{it} + e_{it} \quad (1)$$

Where:

GINII = GINI Index.

i = Country.

t = Time Period.

GI = Globalization Index.

HTE = High Technology Export.

GDP = Gross Domestic Product.

NNI = Net National Income.

This study uses income inequality as the dependent variable and measured as the GINI index. Globalization, technology adoption, and economic development are selected as predictors. Globalization is measured as the KOF globalization index, technology adoption has been measured as High Technology Export (% of manufactured exports), and economic development has been measured as the GDP growth (annual percentage) and net national income (annual % growth). The variables’ measurements and sources are detailed in Table 1.

Table 1. Measurements of the variables.

S#	Variables	Measurement	Source
01	Income Inequality	GINI Index	WB
02	Globalization	Globalization Index	KOF
03	Technology Adoption	High Technology Export (% of manufactured exports)	WB
04	Economic Development	GDP Growth (annual percentage)	WB
		Net National Income (Annual % growth)	WB

This section also provides the statistical methods that are used in the study. The descriptive statistics expose the variables’ details, such as mean and standard deviation, and show the minimum and maximum values and number of observations. The correlation matrix is used to check the statistical relationship among the selected variables. Analytically, the correlation clarifies the significant relationship among the selected variables (Taylor, 1990). In addition, this study employs the variance inflation factor (VIF) test to check the multicollinearity issue among the studied variables. Multicollinearity scrutiny is grounded on the measure explained by several scholars who explicate that the variables possess a serious multicollinearity issue if its VIF value exceeds 10 (see (Akinwande, Dikko, & Samson, 2015; Gujarati & Porter, 2009; Hernawati, Hadi, Aspiranti, & Rehan, 2021; Kennedy, 2008)). The equations of the test are detailed below:

$$R^2_Y \implies Y_{it} = \alpha_0 + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + e_{it} \quad (2)$$

$$j = R^2_Y, R^2_{X1}, R^2_{X2}, R^2_{X3}, R^2_{X4}, R^2_{X5} \quad (3)$$

$$Tolerance = 1 - R_j^2 \quad VIF = \frac{1}{Tolerance} \quad (4)$$

Moreover, consistent with the practices of former scholars (see (Atif, Srivastav, Sauytbekova, & Arachchige, 2012; Faustino & Vali, 2013; Perugini & Tekin, 2022)), this study uses a balanced panel data model (PDM) to investigate the relationship among the selected variables. A panel data model is a combination of time series and cross-sectional data (Abdul Razak, Rehan, Zainudin, & Hussain, 2018). A balanced panel data model specifies all time intervals with parallel observations. The PDM model is illustrated as follows:

$$PDM = y_{it} = \alpha_i + \gamma_t + \beta x_{it} + \varepsilon_{it} \tag{5}$$

where, i is the engaged individuals ($i = 1, 2, 3, 4 \dots N$), t is the period of time ($t = 1, 2, 3, 4 \dots T$), y_{it} is taken as the dependent variable (DV), α_i represents the specific cross-sectional effects, and γ_t is the time series effects of the model. Furthermore, x_{it} is the independent variable, and ε_{it} is taken as error term effect and has a zero mean constant variance. For analytical purposes, this study adopts panel data static models (fixed and random effects models) to examine the association among the selected variables. The fixed effects model is a panel data model in which the parameters are fixed quantities, whereas in the random effects model, the parameters are not fixed and have random quantities (Abdul Razak et al., 2018).

This study adopts the Breusch–Pagan Lagrange Multiplier (BP LM) test, that is presented by Breusch and Pagan (1980) to check which static model of panel data, either random or pooled effects, is suitable to test the selected variables. Principally, the BP LM test uses the Hausman test’s (Hausman, 1978) ‘m’ statistics to check the hypothesis. The null hypothesis of the BP LM test confirms the acceptance of the pooled model (H_0 : pooled OLS is accepted). However, if H_0 is rejected, then we accept the random effects model (H_1 : random effects is accepted). Subsequently, if the null hypothesis of the acceptance of the pooled OLS is rejected then the Hausman test is used to check the acceptance of the fixed or random effects models (Breusch & Pagan, 1980).

Technically, the Hausman test compares both the fixed and random effects models. The null hypothesis of the Hausman test confirms the acceptance of random effects model (H_0 : random effects exist). However, if the alternative hypothesis is selected, then the fixed effects model is preferred. Statistically, if the value of the Hausman test result is less than the significant value, the null hypothesis is rejected (Abdul Razak et al., 2018; Hernawati et al., 2021). The equation of the test is set out below:

$$H = (b_1 - b_0) (Var(b_0) - Var(b_1)) (b_1 - b_0) \tag{6}$$

Here, H refers to the Hausman test, b_0 represents the null hypothesis related to the random effects model (REM) being the best model for the study, while b_1 represents the alternative hypotheses, which is related to the fixed effects model (FEM) being the best model for the study. Technically, the FEM controls the issues of heterogeneity and autocorrelation that generally exist in the PDM model. The equation of the model is given as follows:

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + u_{it} \tag{7}$$

In the equation above, subscript i represents the individual country on the basis of their different characteristics. The estimation equation for the FEM using the study’s constructs is as follows:

$$GINII_{it} = \beta_{1i} + \beta_2 GI_{it} + \beta_3 HTE_{it} + \beta_4 GDP_{it} + \beta_5 NNI_{it} + u_{it} \tag{8}$$

Importantly, this study also tests the relationship among the study’s variables by using a robust standard error model. This model is used because it adjusts the heterogeneity issues that generally exist in the PDM. Moreover, this model also provides the best estimations, even with data that have heteroscedasticity and autocorrelation issues, because it adjusts the adverse effects of these issues (Abdul Razak et al., 2018). The estimation equation for the model is as follows:

$$GINII_{it} = \beta_1 GI_{it} + \beta_2 HTE_{it} + \beta_3 GDP_{it} + \beta_4 NNI_{it} + \varepsilon_{it} \tag{9}$$

4. Findings

The current study has run the descriptive statistics that exposed the variables details, such as mean and standard deviation, and also showed the minimum and maximum values along with the number of observations. The results indicate that the mean value of GINII is 44.922, and the average value of GI is 47.936. In addition, the results also show that the average value of HTE is 32.873, the mean value of GDP is 5.673%, and the mean value of NNI is 3.637%. The descriptive statistics are detailed in Table 2.

Table 2. Descriptive statistics.

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
GINII	200	44.922	2.349	25.982	55.493
GI	200	47.936	4.873	43.746	64.637
HTE	200	32.873	1.652	22.763	35.627
GDP	200	5.673	1.704	4.657	10.627
NNI	200	3.637	2.763	2.763	9.872

Moreover, this study also ran the correlation matrix that shows the relationship among the studied variables. The figures indicate that GI, HTE, GDP, and NNI have a negative association with the GINI Index, which means the predictors reduce the income inequality in the country. Table 3 shows the association among the variables in the correlation matrix.

Table 3. Matrix of correlations.

Variables	GINII	GI	HTE	GDP	NNI
GINII	1.000				
GI	-0.543	1.000			
HTE	-0.435	0.548	1.000		
GDP	-0.487	0.442	0.654	1.000	
NNI	-0.342	0.322	0.622	0.329	1.000

In order to check the multicollinearity issue, the VIF test was run. Table 4 highlights that all the VIF values are lower than 10, which indicates the absence of multicollinearity in the executed model.

Table 4. Variance inflation factor.

Variables	VIF	1/VIF
GI	3.763	0.266
HTE	2.983	0.335
GDP	2.632	0.379
NNI	3.909	0.256
Mean VIF	3.322	

Table 5 presents the results obtained from the Breusch–Pagan LM test. Clearly, the p-values confirm the acceptance of the alternative hypothesis ($p < 0.05$). Hence, the outcome indicates that the random effects model is more effective than the pooled OLS model.

Table 5. Breusch–Pagan test.

H ₀ : Pooled OLS is accepted.	
H ₁ : Random effects is accepted.	
m Value	Pr > m
7333	0.0001*

Note: * denotes significance at the 5% level.

Next, this study executes the Hausman test to examine the best model for the empirical investigation. The outcome (see Table 6) shows that the probability value is lower than 0.05. Thus, the result clearly indicates that the fixed effects model (FEM) is suitable for this analysis.

Table 6. Hausman test.

H ₀ : Random effects model is accepted.	
H ₁ : Fixed effects model is accepted.	
Test	Coeff.
Chi-square test value	7.093
P-value	0.000

The results in Table 7 relate to the fixed effects model outcomes. The results indicate that globalization, technology adoption, and economic development have a negative association with the GINI index. Evidently, the studied variables play a significant role in reducing income inequality in developing nations. Notably, the R-squared value is less than 0.564, which indicates that the overall variation of the model is low. Generally, in static panel modelling, a low R-squared value is not a serious issue. Technically, when a panel data static model is more dominant by cross-section observations, the R-squared is considered low (Frank & Goyal, 2009).

Table 7. Fixed effects model (FEM).

GINII	Beta	S.D.	t-value	p-value	L.L.	U.L.	Sig.
GI	-0.546	0.283	-1.93	0.045	-1.331	-0.238	**
HTE	-1.876	0.763	-2.46	0.034	-1.540	-0.540	**
GDP	-0.453	0.187	-2.42	0.036	-1.333	-0.234	**
NNI	-0.564	0.223	-2.53	0.029	-1.549	-0.658	**
Constant	26.983	4.872	5.54	0.000	20.326	31.333	***
R-squared	0.564		Number of obs.		200		
F-test	2.432		Prob. > F		0.031		

Note: *** p < .01, ** p < .05.

Table 8 displays the robust standard error findings, indicating that globalization, technology adoption, and economic development have a negative link with the GINI index, which means these factors play a significant role in reducing income inequality in developing nations.

Table 8. Robust standard error.

GINII	Beta	S.D.	t	P > t	L.L.	U.L.
GI	-0.645	0.289	-2.232	0.022	-2.559	-0.275
HTE	-1.093	0.463	-2.361	0.019	-2.347	-1.943
GDP	-2.873	1.221	-2.353	0.020	-1.536	-0.513
NNI	-5.473	2.712	-2.018	0.036	-1.280	-0.939
CONS	6.040	1.321	-4.572	0.000	3.221	8.358

5. Discussion

The results show that globalization has a negative impact on income inequality. These results are supported by Haseeb, Suryanto, Hartani, and Jermstiparsert (2020), who revealed that if there is income inequality in some regions, the population has potential opportunities to grow, succeed, earn more, and improve their living standards, while on the other hand, the situation is quite the opposite. Globalization, which allows the transportation of people and goods from one region to another, reduces income inequality. These results are in line with the findings of Law, Naseem, Lau, and Trinugroho (2020), who highlighted that when there is a difference in the labor wages because of a difference in area, education, or social prestige, globalization enables individuals to offer their services for desired wages, thus minimizing income inequality. Moreover, the results also show that high technology exports have a negative impact on income inequality. These results are in line with the findings of Saraswati, Maski, Kalug, and Sakti (2020), who revealed that sometimes a small group of people contains a larger portion of the national wealth because of the enhanced earnings opportunities through the use of high-quality resources, which they can afford on

account of their economic power. However, the facility to export high technology at an affordable price removes inequality in income distribution because it gives equal chances to grow economically at all levels.

The results also reveal that GDP has a negative impact on income inequality. In comparison, these findings are in line with the outcomes of the study by Gunasinghe, Selvanathan, Naranpanawa, and Forster (2020), who suggested that the government should increase the GDP to raise their rank among other countries, resulting in the reduction of income inequality. Similarly, the results also match with the findings of Chang, Gupta, and Miller (2018), who stated that if a country is achieving high GDP, the government has a large number of revenues from commercial taxes. Thus, the increased revenues enable the government to offer incentives to the lower circle of the population. This reduces income inequality and provides equal opportunities to the public to raise their living standards. Furthermore, the results also declare that NNI has a negative impact on income inequality. These results are in line with the findings of Chancel and Piketty (2019), who revealed that an increase in the national income of a country is helpful to control income. Evidently, increases in the NNI results in minimizing income inequality.

6. Conclusions

This study addresses the issue of income inequality in developing Asian nations and analyzes the role of globalization, technology adoption, and economic development in reducing income inequality. For this purpose, a quantitative research technique was adopted, and the impacts of globalization, high technology exports, GDP, and NNI on income inequality in developing countries were analyzed. The outcomes indicate that globalization, high technology exports, GDP, and NNI have a negative relation with income inequality. The results show that if there is income inequality, in some locations, people have more opportunities to grow and have high living standards compared to others where the situation is totally different. Globalization, which permits the transportation of people and goods from one place to another, reduces income inequality. The results show that the ability to export sophisticated high technology at a reasonable price reduces income inequality by providing equitable opportunities that contribute to economic prosperity. The results also revealed that if a country's GDP is high, the revenue from commercial taxes is considerable and allows the government to provide incentives for people in the lowest socioeconomic strata to rise up and contribute to economic progress. Hence, this ultimately eliminates income inequality. Similarly, when a country has high NNI, economic activities and developmental work are at a peak, and the chances of income inequality are minimal.

7. Implications

This study offers distinct additions to economic-based literature. Many renowned scholars have taken income inequality as the subject of their research and analyzed the impacts of globalization, high technology exports, GDP, and NNI on income inequality, but hardly any studies have addressed globalization, high technology exports, GDP, and NNI simultaneously as the indicators of income inequality. Technology adoption is considered a part of economic development in most of the studies. Here, the separate use of the two terms for analyzing income inequality contributes to the literature. The present study is relevant to developing countries where income inequality is one of the major issues. It guides the government and reformers on how to reduce and potentially eliminate income inequality. It suggests that with the increase in globalization, technology adoption, and economic development, income inequality can be controlled.

8. Limitations and Future Recommendations

A number of limitations are associated with this study but can be removed in future studies. This study only examines the impact of globalization, technology adoption, and economic development on the income inequality in a country. However, education, inflation, government policies, and developmental activities also play a great role. Authors of future studies should include these factors for a better determination of aspects that influence income inequality. This study only addressed the relation of globalization, technology adoption, and economic development with income inequality in developing countries and did not include developed or fast emerging economies, so the study lacks generalizability and validity. Therefore, future studies should also address the issue of income inequality and globalization, technology adoption, and economic development in developed or fast emerging countries.

References

- Abdul Razak, A. H., Rehan, R., Zainudin, Z., & Hussain, H. I. (2018). Capital structure determinants of Shariah and Non-Shariah companies at Bursa Malaysia. *Opcion*, 34(16), 678-695.
- Akinwande, M. O., Dikko, H. G., & Samson, A. (2015). Variance inflation factor: As a condition for the inclusion of suppressor variable (s) in regression analysis. *Open Journal of Statistics*, 5(7), 754-767.
- Aluko, O. A., Ibrahim, M., & Atagbuzia, M. O. (2021). On the causal nexus between FDI and globalization: Evidence from Africa. *The Journal of International Trade & Economic Development*, 30(2), 203-223. Available at: <https://doi.org/10.1080/09638199.2020.1823460>.
- Arlotti, M., & Sabatinelli, S. (2017). Assessing income support where no national minimum income scheme exists. Is it possible to apply the model family method to the Italian case? *International Review of Sociology*, 27(1), 142-159. Available at: <https://doi.org/10.1080/03906701.2016.1259125>.
- Asongu, S. A., & Odhiambo, N. M. (2019). How enhancing information and communication technology has affected inequality in Africa for sustainable development: An empirical investigation. *Sustainable Development*, 27(4), 647-656. Available at: <https://doi.org/10.1002/sd.1929>.
- Asteriou, D., Dimelis, S., & Moudatsou, A. (2014). Globalization and income inequality: A panel data econometric approach for the EU27 countries. *Economic Modelling*, 36, 592-599. Available at: <https://doi.org/10.1016/j.econmod.2013.09.051>.
- Atif, S. M., Srivastav, M., Sauytkbekova, M., & Arachchige, U. K. (2012). Globalization and income inequality: A panel data analysis of 68 countries.
- Auguste, D. (2018). Income inequality, globalization, and the welfare state: Evidence from 23 industrial countries, 1990-2009. *Sociological Forum*, 33(3), 666-689. Available at: <https://doi.org/10.1111/sof.12437>.
- Bauer, J. M. (2018). The Internet and income inequality: Socio-economic challenges in a hyperconnected society. *Telecommunications Policy*, 42(4), 333-343. Available at: <https://doi.org/10.1016/j.telpol.2017.05.009>.
- Bolarinwa, S. T., & Akinlo, A. E. (2021). Is there a nonlinear relationship between financial development and income inequality in Africa? Evidence from dynamic panel threshold. *The Journal of Economic Asymmetries*, 24, e00226. Available at: <https://doi.org/10.1016/j.jeca.2021.e00226>.
- Breusch, T. S., & Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies*, 47(1), 239-253.
- Bukhari, M., & Munir, K. (2016). Impact of globalization on income inequality in selected Asian countries.
- Chancel, L., & Piketty, T. (2019). Indian income inequality, 1922-2015: From British Raj to Billionaire Raj? *Review of Income and Wealth*, 65(S1), S33-S62. Available at: <https://doi.org/10.1111/roiw.12439>.

- Chang, S., Gupta, R., & Miller, S. M. (2018). Causality between per capita real GDP and income inequality in the US: Evidence from a wavelet analysis. *Social Indicators Research*, 135(1), 269-289. Available at: <https://doi.org/10.1007/s11205-016-1485-0>.
- Crane, A., Husted, B. W., Bapuji, H., & Derry, R. (2014). *Income inequality in business and society research*. Paper presented at the In Proceedings of the International Association for Business and Society (Vol. 25, pp. 1-7).
- Dorn, F., Fuest, C., & Potrafke, N. (2018). Globalization and income inequality revisited. *Social Science Research Network*, 23, 6859-6871. Available at: <https://doi.org/10.2139/ssrn.3143398>.
- Elgar, F. J., Stefaniak, A., & Wohl, M. J. (2020). The trouble with trust: Time-series analysis of social capital, income inequality, and COVID-19 deaths in 84 countries. *Social Science & Medicine*, 263, 113365. Available at: <https://doi.org/10.1016/j.socscimed.2020.113365>.
- Faustino, H. C., & Vali, C. (2013). The effects of globalization and economic growth on income inequality: Evidence for 24 OECD countries.
- Frank, M. Z., & Goyal, V. K. (2009). Capital structure decisions: Which factors are reliably important? *Financial Management*, 38(1), 1-37.
- Giri, A. K., Pandey, R., & Mohapatra, G. (2021). Does technological progress, trade, or financial globalization stimulate income inequality in India? *The Journal of Asian Finance, Economics, and Business*, 8(2), 111-122.
- Gozgor, G. (2017). The impact of globalization on the structural unemployment: An empirical reappraisal. *International Economic Journal*, 31(4), 471-489. Available at: <https://doi.org/10.1080/10168737.2017.1408666>.
- Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics* (5th ed.). USA: McGraw-Hill.
- Gunasinghe, C., Selvanathan, E., Naranpanawa, A., & Forster, J. (2020). The impact of fiscal shocks on real GDP and income inequality: What do Australian data say? *Journal of Policy Modeling*, 42(2), 250-270. Available at: <https://doi.org/10.1016/j.jpolmod.2019.06.007>.
- Hailেমariam, A., Dzhumashev, R., & Shahbaz, M. (2020). Carbon emissions, income inequality and economic development. *Empirical Economics*, 59(3), 1139-1159. Available at: <https://doi.org/10.1007/s00181-019-01664-x>.
- Haseeb, M., Suryanto, T., Hartani, N. H., & Jermisittiparsert, K. (2020). Nexus between globalization, income inequality and human development in Indonesian economy: Evidence from application of partial and multiple wavelet coherence. *Social Indicators Research*, 147(3), 723-745. Available at: <https://doi.org/10.1007/s11205-019-02178-w>.
- Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 46(6), 1251-1271.
- Hayduk, T. M. (2020). Do the rich get richer? Exploring disparate effects of hosting sport mega events on high technology exports for developed and developing nations. *The Journal of International Trade & Economic Development*, 29(8), 973-994. Available at: <https://doi.org/10.1080/09638199.2020.1782973>.
- Hernawati, E., Hadi, A. R. A., Aspiranti, T., & Rehan, R. (2021). Non-performing financing among Islamic Banks in Asia-Pacific region. *Economy Notebooks*, 44(126), 1-9.
- Heshmati, A. (2007). The relationship between income inequality, poverty and globalization. In *The Impact of Globalization on the World's Poor* (pp. 59-93). London: Palgrave Macmillan.
- Idris, Z. Z., Ismail, N. W., Ibrahim, S., & Hamzah, H. Z. (2021). The impact of high-technology trade on employment. *The Journal of International Trade & Economic Development*, 30(4), 512-529. Available at: <https://doi.org/10.1080/09638199.2020.1852301>.
- Kennedy, P. (2008). *A guide to econometrics* (6th ed.). Malden: Wiley-Blackwell.
- Khan, H., Shehzad, C. T., & Ahmad, F. (2021). Temporal effects of financial globalization on income inequality. *International Review of Economics & Finance*, 74, 452-467. Available at: <https://doi.org/10.1016/j.iref.2021.03.012>.
- Khan, A. Q., Saleem, N., & Fatima, S. T. (2018). Financial development, income inequality, and CO2 emissions in Asian countries using STIRPAT model. *Environmental Science and Pollution Research*, 25(7), 6308-6319. Available at: <https://doi.org/10.1007/s11356-017-0719-2>.
- Lalwani, V., & Chakraborty, M. (2020). Aggregate earnings and gross domestic product: International evidence. *Applied Economics*, 52(1), 68-84. Available at: <https://doi.org/10.1080/00036846.2019.1640859>.
- Law, S. H., Naseem, N., Lau, W. T., & Trinugroho, I. (2020). Can innovation improve income inequality? Evidence from panel data. *Economic Systems*, 44(4), 100815. Available at: <https://doi.org/10.1016/j.ecosys.2020.100815>.
- Li, X., & Chen, X. (2019). Sino-US trade balance from national income perspective and global income chains. *Journal of Chinese Economic and Business Studies*, 17(4), 389-402. Available at: <https://doi.org/10.1080/14765284.2020.1712885>.
- Liang, Y. (2021). Functional income distribution, demand driven growth and the middle income trap: The case of China. *Forum for Social Economics*, 50(4), 386-397. Available at: <https://doi.org/10.1080/07360932.2020.1787186>.
- Milanovic, B. (2016). *Global inequality: A new approach for the age of globalization*: Harvard University Press.
- Mollalo, A., Vahedi, B., & Rivera, K. M. (2020). GIS-based spatial modeling of COVID-19 incidence rate in the continental United States. *Science of The Total Environment*, 728, 138884. Available at: <https://doi.org/10.1016/j.scitotenv.2020.138884>.
- Morisset, J. (2003). Does a country need a promotion agency to attract foreign direct investment?: A small analytical model applied to 58 countries (Vol. 3028): World Bank Publications.
- Nolan, B., Richiardi, M. G., & Valenzuela, L. (2019). The drivers of income inequality in rich countries. *Journal of Economic Surveys*, 33(4), 1285-1324.
- Nugent, W. R., & Conway, A. (2021). Violent political rhetoric, generalized imitation, income inequality, gun ownership, changes in gross domestic product, and mass shootings. *Journal of Social Service Research*, 47(5), 694-713. Available at: <https://doi.org/10.1080/01488376.2021.1902456>.
- Oronce, C. I. A., Scannell, C. A., Kawachi, I., & Tsugawa, Y. (2020). Association between state-level income inequality and COVID-19 cases and mortality in the USA. *Journal of General Internal Medicine*, 35(9), 2791-2793.
- Perugini, C., & Tekin, İ. (2022). Financial development, income inequality and governance institutions. *Panoeconomicus*, 69(3), 353-379.
- Roy-Mukherjee, S., & Udeogu, E. (2021). Neo-liberal globalization and income inequality: Panel data evidence from OECD and Western Balkan countries. *Journal of Balkan and Near Eastern Studies*, 23(1), 15-39. Available at: <https://doi.org/10.1080/19448953.2020.1852004>.
- Saraswati, B. D., Maski, G., Kalug, D., & Sakti, R. K. (2020). Does financial technology affect income inequality in Indonesia? *KnE Social Sciences*, 8, 151-161. Available at: <https://doi.org/10.18502/kss.v4i7.6850>.
- Sultanuzzaman, M. R., Fan, H., Mohamued, E. A., Hossain, M. I., & Islam, M. A. (2019). Effects of export and technology on economic growth: Selected emerging Asian economies. *Economic Research*, 32(1), 2515-2531. Available at: <https://doi.org/10.1080/1331677x.2019.1650656>.
- Taylor, R. (1990). Interpretation of the correlation coefficient: A basic review. *Journal of Diagnostic Medical Sonography*, 6(1), 35-39. Available at: <https://doi.org/10.1177/875647939000600106>.
- Untari, R., Priyarsono, D. S., & Novianti, T. (2019). Impact of information and communication technology (ICT) infrastructure on economic growth and income inequality in Indonesia. *International Journal of Scientific Research in Science, Engineering and Technology*, 6(1), 109-116. Available at: <https://doi.org/10.32628/ijsrset.196130>.
- Vladušić, L., Dragović, V., & Bašić, D. (2018). Growth and relation of private savings and gross domestic product in Bosnia and Herzegovina. *Journal of Balkan and Near Eastern Studies*, 20(5), 477-494. Available at: <https://doi.org/10.1080/19448953.2018.1406694>.
- Wu, X., & Li, J. (2017). Income inequality, economic growth, and subjective well-being: Evidence from China. *Research in Social Stratification and Mobility*, 52, 49-58.