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The effect of remittances and FDI inflows on income distribution in developing economies

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Abstract

This study aims to examine empirically the effect of remittance inflows, FDI, and economic growth on income inequality. We include financial development and trade openness as potential determinants of income inequality. We utilise annual data from 1980 to 2016 and consider a sample of 20 major remittance-receiving developing economies. The empirical results from the panel cointegration models confirm the presence of a long-run equilibrium relationship among the variables. Our results on long-run elasticities suggest that increase in FDI inflows and remittances raise income inequality, while economic growth reduces. The findings also establish unidirectional causality from economic growth to income inequality. Given these findings, we suggest that policy makers frame appropriate policies for the effective use of remittances and FDI inflows to reduce income inequality in developing economies.

JEL classification: F21, F24, O15, O47

Keywords: Remittances; FDI inflows; economic growth; income inequality; developing economies; panel data analyses

1. Introduction

Over the last two decades, foreign capital inflows comprising remittances and foreign direct investment (FDI) have been increasing rapidly and have become a significant source of external finance for developing countries. Von Ehrlich and Seidel (2015) argue that better access to external funds not only increases economic activities, but also income distribution. The inflow of remittances to developing countries increased from US\$ 56 billion in 1995 to US\$ 334 billion in 2010 (World Bank). Accordingly, the World Bank projected that the inflow of remittances to developing countries would be US\$ 440, US\$ 459, and US\$ 479 billion by 2015, 2016, and 2017, respectively. The top five recipients of remittances in 2014 were India (US\$ 71 billion), China (US\$ 64 billion), the Philippines (US\$ 28 billion), Mexico (US\$ 24 billion), and Nigeria (US\$ 21 billion). Interestingly, India and China combined account for one-third of the total remittance inflows to developing economies.

From a macroeconomic perspective, remittances can improve the balance of payments for developing countries as well as enhance economic growth by increasing consumption and investment. Remittances can also improve the welfare of receiving households by increasing their consumption and investment at the micro level. Recognising the importance of remittances in reducing income inequality, there has been an upsurge of empirical studies to verify the relationship between remittances and income inequality in different countries and regions. The most important issue is whether the rapid inflow of remittances can increase or decrease income inequality in developing countries. It has been argued that income inequalities can increase if remittances are received by high-income households and vice versa. However, most of the previous studies establish a negative relationship between remittances and income inequality at the macro level (e.g. Acosta, Calderón, Fajnzylber, and Lopez, 2008; Portes, 2009).

Similarly, FDI is another source of external finance for developing economies. In 2014, FDI inflows to developing economies reached US\$ 700 billion, accounting 56% of global FDI inflows. According to the UNCTAD (2015), China, Brazil, and India were the only developing economies worldwide among the top 10 FDI recipients in 2014. China, Brazil, and India occupied the first, sixth, and ninth positions with US\$ 129 billion, US\$ 62 billion, and US\$ 34 billion, respectively. FDI has been playing a major role in the economic development of the host countries through capital accumulation, technology transfer, innovations in the production process, production efficiency, labour training, and employment creation. Rapid FDI inflows have caused the link between FDI and income inequality and attracted the attention of policy makers and economists worldwide. For instance, FDI increases wage inequality between skilled and unskilled labour and widens regional disparity by concentrating production activities in only a few specific places or regions in the host countries. The evidence from Feenstra and Hanson (1997) document that FDI inflows have a negative impact on Mexican income distribution due to higher demand for only skilled labour. Zhang and Zhang (2003) argue that FDI inflows and trade are the main factors in widening the regional inequality in China. Similarly, some other studies have also found a greater positive relationship between FDI and income inequality (e.g. Pan-Long, 1995; Lee, 2006). Few studies have found no relationship between FDI and income inequality (See Franco and Gerussi, 2012; Sylwester, 2005).

Income inequality signifies the disparities in income distribution. In a positive sense, it generates incentives to divert resources into efficient uses, which leads to saving and capital accumulation and hence promotes economic growth. On the other hand, income inequality increases social discontent, fuels social unrest, and negatively affects investment, thus reducing economic growth. Although, multiple factors are likely to affect income inequality, growth factors

continue to receive great attention. However, in the recent past, highly unequal asset distribution, inadequate employment generation, and differential regional growth rates have been the focus of economists in empirically examining the link between income inequality and economic growth. Numerous studies have attempted to examine the nexus between income inequality and economic growth. Many previous studies (e.g. Forbes, 2000; Huang and Yeh, 2011) have established a positive relationship between economic growth and income inequality, while other studies (e.g. Choi, 2006; Brueckner, Dabla, Norris, and Gradstein, 2015; Alam and Paramati, 2016) have reported that economic growth reduces income inequality.

This implies that previous studies mostly used household survey data to analyse the effect of remittances on income inequalities. The weakness of these studies is that they did not capture the dynamic impact of remittances on income inequality (Adams, 1989; Barham and Boucher, 1998; Gustafsson and Makonnen, 1993). Moreover, previous studies failed to use the multivariate framework to examine the effect of remittances, FDI inflows, and economic growth on income inequality. Similarly, previous studies did not focus on developing economies, particularly the countries that have been receiving the highest remittances for the past 30 years. These factors motivate us to examine the effect of remittances, FDI inflows, and economic growth on income inequalities. This study also accounts for other potential determinants of income inequalities, such as financial development and trade openness, in the model. This study uses annual data from 1980 to 2016 and employs several robust panel econometric techniques.

The present study contributes significantly to the body of knowledge and provides important policy implications. Specifically, this study contributes to the literature by exploring the dynamic impact of remittances, FDI inflows, and economic growth on income inequality in developing economies. Further, this study contributes to the literature by addressing the issues of

cross-sectional dependence and heterogeneity in the analysis. Finally, the findings derived from this study will have significant policy implications, specifically regarding the efficient use of remittances and FDI inflows to mitigate income inequalities. These factors play an important role in improving income distribution among individuals and eventually reducing income inequalities in developing economies.

This paper is divided into five sections. Section 2 presents a critical review of the literature, including methods and their findings. Section 3 discusses the nature of the data, model specification and preliminary statistics. Section 4 reports the empirical results of the study. Finally, section 5 presents the conclusion and policy implications arising from this study.

2. Literature Review

The association between remittances, FDI, economic growth, and income inequality has attracted the attention of policy makers and economists worldwide. Therefore, many empirical studies have explored the relationship between these variables using cross-country, time-series, and panel analyses. This paper reviews the literature under three sub-sections, namely, (a) remittances and income inequality, (b) FDI and income inequality, and (c) economic growth and income inequality. The following sub-sections provide a detailed literature review on the mentioned variables.

2.1 Remittances and income inequality

Income inequality increases when remittances are received by the members of rich households. On the other hand, income inequality reduces when remittances are received by the poor and middle-class people. Over the past few decades, numerous studies have examined the impact of remittances on income inequality in both the developed and the developing world. However, the empirical findings are inconclusive. Many studies have documented that remittances reduce

income inequality. For example, in a micro-level study, Gustafsson and Makonnen (1993) collected 7,680 household samples during 1986-1987 and found that remittances reduce income inequality in Lesotho. Similarly, Adams (1989) obtained 1,000 household samples during 1986-1987 and found that remittances have a significant negative impact on income distribution in three Egyptian villages. However, Barham and Boucher (1998) collected 152 household samples in 1991 and found that when remittances are taken as an exogenous factor, they have a negative impact on income inequality, while they have a positive impact on income inequality when they were taken as an endogenous factor in three coastal communities in Nicaragua.

At the macro level, Acosta et al. (2008) examined the effect of remittances on income inequality and poverty across a panel of Latin American and Caribbean countries. Their findings indicate that remittances play a significant role in promoting economic growth and reducing poverty and income inequalities across the considered sample countries. Koechlin and Leon (2007) reported that while higher remittance inflows increase inequality up to a certain point, it reduces after that. Authors argue that an inverted U-shaped relationship between remittances and income inequality exists based on data from 78 countries from 1970-2001. Portes (2009) investigated the impact of remittances on income distribution in a panel of 46 countries, covering the annual data from 1970 to 2000. The author found that remittances significantly reduce income inequalities. Further, the author suggests that the inflow of remittances positively affects the poor's income, while it has an adverse impact on the income of the rich. However, Adams (1992) showed a neutral relationship between remittances and inequality in rural Pakistan.

In addition, remittance may also affect poverty. Poverty reduction is one of the goals of many developing countries. Remittances create additional income, smooth and expand household consumption, and improve health and education, which eventually improves the living standards

of the people. In this context, at the macro level, a few studies have concluded that remittances reduce poverty in developing countries. For instance, Adams and Page (2005) explored the effect of international migration and remittances on poverty in a sample of 71 developing economies worldwide. The authors found that both international migration and remittances play a considerable role in reducing the level, depth, and severity of poverty in developing economies. Jongwanich (2007) also investigated the impact of remittances on growth and poverty in a sample of 17 countries from the Asia-Pacific region. The author utilised annual data from 1993 to 2003 and found that remittances play a significant role in reducing poverty in the region. Gupta et al. (2009) also had similar findings. Specifically, the authors argued that remittances help mitigate poverty levels along with promoting financial development in sub-Saharan Africa. A report by the UN (United Nations, 2011) also confirmed that the significant inflow of remittances to developing economies helps reduce the poverty level.

Similarly, Anyanwu and Erhijakpor (2010) examined the effect of international remittances on poverty in a sample of 33 African countries using data from 1990 to 2005. The findings of this study confirm that remittance inflows reduce the poverty level in African countries. The effect of remittances on economic growth and poverty was examined by Vargas-Silva et al. (2009) in a sample of Asian countries. The authors documented that the inflow of remittances significantly contributes to higher economic growth and thus assists those Asian countries reduce poverty. Gaaliche and Zayati (2014) investigated the causal relationship between remittances and poverty in a sample of 14 emerging and developing economies. Using annual data from 1980 to 2012, the authors found significant bidirectional causality between poverty and remittances. Imai et al. (2014) documented that remittance inflows promote economic growth and reduce poverty in 24 Asian and Pacific countries. The authors argued that although remittances have a positive

impact on economic growth, they are also a source of output shocks. In another study, Satti et al. (2016) empirically examined the effect of remittances and economic growth on poverty in Pakistan. Their findings indicate that both economic growth and remittance inflows contribute to reducing poverty in Pakistan. However, Stahl (1982) found that remittance has no significant impact on the lives of poor people. The author argued that as migration is an expensive process, only better-off households are able to migrate and seek better jobs in foreign countries, and hence receive remittances. Therefore, poor households would not receive such benefits from remittance inflows. Hence, remittance inflow helps rich people rather than poor people, and thereby generates inequality and poverty.

2.2 FDI and income inequality

FDI is another important capital inflow for developing economies. Much of the earlier studies have examined the relationship between FDI inflows and economic growth. However, in the recent time, some studies have also investigated the impact of FDI inflows on income inequality, and the results are ambiguous. One group of studies reports a positive relationship between FDI inflows and income inequality. For instance, Zhang and Zhang (2003) argued that FDI inflows are the main cause for widening regional inequality in China. Pan-Long (1995) also documented a significant positive relationship between FDI inflows and income inequality in East and South Asian countries. Similar results were also reported by Lee (2006) for 14 European countries over the period 1951-1992. Herzer, Hühne, and Nunnenkamp (2014) suggested that FDI has a positive and significant impact on income inequality in 23 Latin American countries. Recently, Alam and Paramati (2016) also confirmed that FDI inflows positively contribute towards income inequalities in a sample of 49 developing economies around the world.

However, another stream of studies establishes a negative relationship between FDI inflows and income inequality. For instance, Feenstra and Hanson (1997) documented that FDI inflows have a negative impact on Mexican income distribution due to higher demand for only skilled labour. However, Wu and Hsu (2012) argued that FDI inflows negatively affect the income distribution of host countries if they possess low levels of absorptive capacity. On the other hand, FDI inflow has less effect when countries have better absorptive capacity.

There are also some studies which could not establish any significant relationship between FDI inflows and income inequality. For example, Sylwester (2005) examined the effect of FDI inflows on income inequality. The study used data from 1970 to 1989 with a sample of 29 developing economies. The findings of this study confirm that FDI inflows have no significant impact on income inequalities. Similarly, Franco and Gerussi (2012) reported no relationship between FDI inflows and income inequality in 17 transition countries. Lessmann (2013) explored the impact of FDI inflows on income inequalities across 55 high-, middle-, and low-income countries. The author documented that FDI inflow has a positive effect on income inequality in middle- and low-income countries while it has no impact in high-income countries. Some other studies explored the direction of causality between FDI inflows and income inequality. For instance, Herzer and Nunnenkamp (2013) found unidirectional causality from inward and outward FDI flows to income inequality in the long- and short-term for 8 European countries. Further, Herzer et al. (2014) revealed unidirectional causality from FDI to income inequality in 23 Latin American countries spanning the period 1980-2011. Overall, these studies show a significant association between FDI inflows and income inequalities.

2.3 Economic growth and income inequality

Since the pioneering works of Kaldor (1955) and Kuznets (1955), there has been a great deal of interest to understand the nexus between income inequality and economic growth, both theoretically and empirically. Kaldor (1955) argued that higher inequality improves savings and hence increases economic growth. On the contrary, Kuznets (1955) documented that inequality appears only at the early stages of economic development; once economic development reaches an advanced stage, inequality disappears. Voitchovsky (2005) documented that inequality has a positive impact on economic growth when the top end of the income distribution is considered, while it has a negative relationship with economic growth when the low end of the income distribution is considered. Using a stochastic optimal growth model, Shin (2012) reported that higher inequality slows economic growth in the early stage of economic development. Further, the author highlighted that higher income tax is not always evidence of reduction in income inequality.

Few studies have documented a positive relationship between income inequality and economic growth, particularly in developed countries. The underlying intuition is that the rich people have a higher saving rate than poor people do. Therefore, the distribution of income from the rich to the poor reduces the saving rate and subsequently slow economic growth. For instance, Forbes (2000) reported a positive relationship between income inequality and economic growth in 24 countries, and Huang and Yeh (2011) found a positive and significant relationship between the two variables in the US over the period 1945-2004.

Other studies have established a negative relationship between income inequality and economic growth. In developing countries, the financial systems are yet to be fully developed in terms of efficiency and functioning, and therefore the poor individuals have severe financial

constraints, as they are unable to access necessitate financial services. In rural areas especially, people lack sufficient access to banking services; hence, they are unable to deposit or borrow money from banks, which significantly affects economic growth. In some cases, income inequality leads to political instability and social unrest, which harms economic growth (Alesina and Perotti, 1996). Galor and Zeira (1993) documented that higher inequality has a negative impact on economic growth in developed countries, while it has a positive effect in developing countries. Similar results were reported by Deininger and Squire (1998) in 103 countries over the period 1960-1990. However, Barro (2000) argued that income inequality has a significant negative effect on economic growth in less developed countries, but a positive impact in rich countries.

Similarly, a few studies have documented the reverse relationship between income inequality and economic growth. For instance, Choi (2006) found that economic growth reduces income inequality in 119 countries over the period 1993-2002. Similarly, Brueckner, Dabla Norris, and Gradstein (2015) arrived at the same results in 154 countries over the period 1960-2007. Alam and Paramati (2016) investigated the effect of economic growth, along with FDI inflows, tourism development, and trade openness, on income inequalities in a sample of 49 developing economies worldwide. The findings of this study show that economic growth significantly reduces income inequalities. A recent study by Shi, Paul and Paramati (2020) showed that the economic growth reduces income inequality in Australia. However, Paramati and Thanh (2018) documented that economic growth further escalates income inequality in emerging economies, while it has a mitigating effect in developed countries. Contrarily, Rehme (2007) found no relationship between income inequality and economic growth.

This literature survey suggests that income inequality is a growing concern, particularly in developing economies. However, previous studies failed to examine the impact of remittances on

income inequality in major remittance-receiving developing economies by taking into account of FDI inflows, financial development, trade and economic growth. Given the significance of the issue, this study empirically examines the effect of remittances, FDI inflows, and economic growth on income inequality using annual data from 1980-2016 on 20 major remittance-receiving developing economies across the globe.

3. Data and methodology

3.1 Description on the variables and sample selection

In this section, we discuss the selection of the sample countries, variables, and their measurement. The sample countries were selected based on which countries (developing economies) have higher remittance inflows and the availability of annual data for the relevant period. The study used annual data from 1980 to 2016 and constructed an unbalanced panel data set. We selected 20 developing economies, namely, Bangladesh, Brazil, China, Colombia, Dominican Republic, Ecuador, Egypt, El Salvador, Guatemala, India, Indonesia, Jordan, Mexico, Morocco, Nigeria, Pakistan, the Philippines, Sri Lanka, Thailand, and Turkey. The measurement of the variables is described below.

The income inequality (IIE) is measured using the Gini index (based on disposable income); higher Gini values indicate higher income inequality in the country, and vice versa. Financial development (FD) is measured through domestic credit to the private sector as a percentage of GDP. Foreign direct investment (FDI) net inflows are measured as a percentage of GDP. Gross domestic product per capita (PI) is measured in constant 2010 US dollars. Remittance inflows (REM) are measured as total personal remittances received as a percentage of GDP. Finally, trade openness (TO), that is, total exports and imports, is measured as a percentage of

GDP. The considered time series data on FD, FDI, PI, REM, and TO were obtained from the World Development Indicators (WDI) online database published by the World Bank, while data on IIE were sourced from the Standardised World Income Inequality Database (SWIID). Given the nature of our variables, we converted all the variables into natural logarithms before estimation.

3.2 Empirical approach

Given the objective of this study, income inequality served as a dependent variable, while FD, FDI inflows, GDP per capita, remittances, and trade openness served as independent variables in the model. The basic and general framework for identifying the potential determinants of income inequality can be written as follows:

$$IIE_{it} = f(FD_{it}, FDI_{it}, PI_{it}, REM_{it}, TO_{it}, v_i) \quad (1)$$

Eq. (1) can be parameterised, as shown below.

$$IIE_{it} = FD_{it}^{\beta_{1i}} FDI_{it}^{\beta_{2i}} PI_{it}^{\beta_{3i}} REM_{it}^{\beta_{4i}} TO_{it}^{\beta_{5i}} v_i \quad (2)$$

The following equation can be derived by taking the natural logarithms of Eq. (2). Lowercase letters denote the natural log of uppercase letters and adding a random error term can produce the following equation:

$$iie_{it} = \beta_{1t}fd + \beta_{2i}fdi_{it} + \beta_{3i}pi_{it} + \beta_{4i}rem_{it} + \beta_{5i}to_{it} + v_i + \varepsilon_{it} \quad (3)$$

In Eq. (3), countries are denoted by the subscript i ($i = 1, \dots, N$) and t denotes time period ($t = 1, \dots, T$). This equation is a fairly general specification, which accounts for individual country fixed effects (v) and a stochastic error term (ε). The discussion on empirical methods are provided below.

To investigate the long-run relationship among income inequality, FD, FDI inflows, GDP per capita, remittances, and trade openness across a panel of 20 developing economies, we utilise the approach that is suggested by Maddala and Wu (1999). The Fisher-type panel cointegration methodology of Maddala and Wu (1999) provides more reliable estimates as compared to other conventional panel cointegration tests. Similarly, the long-run elasticities are estimated using panel dynamic OLS (DOLS) method based on the approach suggested by Mark and Sul (2003). This technique uses leads and lags in the estimation process and provides reliable long-run estimates. Several researchers (e.g. Wagner and Hlouskova (2009) have argued in favour of the DOLS estimator as it outperforms other models, even with large samples. Given that, we apply the panel DOLS method to estimate long-run income inequality elasticities. Finally, the short-run bivariate panel causality among income inequality, FD, FDI, GDP per capita, remittances, and trade openness by using a test that supports for heterogeneity across the cross-sections. Specifically, we use the framework that is recommended by Dumitrescu and Hurlin (2012). These selected methods are expected to provide reliable findings on long-run cointegration relationship, long-run elasticities and short-run causalities among the variables.

3.3 Preliminary analysis

Figure 1 shows the average personal remittance inflow to selected sample countries during the period 1980-2016, measured in the current US billion dollars. Among these developing economies, India has the highest average receipt of remittances (US\$ 22.03), followed by Mexico (US\$ 11.46), and the Philippines (US\$ 9.93). among these countries, the lowest recipients of remittances were Ecuador (US\$ 1.42), Brazil (US\$ 1.69), El Salvador (US\$ 1.80), Guatemala (US\$ 1.88), Dominican Republic (US\$ 1.90), and Sri Lanka (US\$ 1.97). These statistics suggest that India is

the highest personal remittance receiver and it accounts for more than 20% of remittances among these developing economies.

[Insert Figure 1 here]

Table 1 presents the average income inequality, financial development, foreign direct investment inflows, GDP per capita, remittance inflows, and trade openness for the selected developing economies over the period 1980-2016. However, here we focus only on income inequality, FDI, GDP per capita, and remittances. The table indicates that on average, Bangladesh, Pakistan, and Morocco have the lowest income inequality, while Colombia, Brazil, and Sri Lanka have the highest inequality. Similarly, FDI inflows as a percentage of GDP are highest for Jordan (5.038%), Nigeria (3.679%), and Dominican Republic (3.057%), while they are lowest for Bangladesh (0.294%), India (0.760%), Guatemala (0.922%), Pakistan (0.943%), and Indonesia (0.985%). Among the considered sample countries, the average per capita GDP during the sample period is higher than US\$ 5000 only in Brazil, Turkey, Mexico, and Colombia; the average per capita GDP in three of the South Asian (Bangladesh, India, and Pakistan) countries is less than US\$ 1000. Finally, the average remittance inflows as a percentage of the GDP are highest for Jordan (18.133%), El Salvador (14.268%), the Philippines (7.336%), and Egypt (7.137%), while in some countries, namely, China, Brazil, and Indonesia, it is less than 1%. These statistics suggest that income inequality vary significantly across the developing economies, and this issue is particularly alarming in the case of Colombia, Brazil, and Sri Lanka.

[Insert Table 1 here]

Further, Table 1 provides the consolidated statistics on all the variables. These summary statistics show that the average income inequality across the considered developing economies is

44.321. Similarly, the average FD and FDI inflows as a percentage of the GDP are 38.008% and 1.859%, respectively. The average per capita GDP across the sample countries is US\$ 3387.819, and it ranges from US\$ 351 to US\$ 14117. Finally, the average remittance inflows and trade openness as a percentage of the GDP are 4.474% and 53%, respectively. These statistics imply that the average income inequality across the countries is a serious issue, which needs to be addressed by looking at the impact of economic growth, FDI, and remittances inflows on it.

The degree of linkages among the variables can be explored using the unconditional correlation matrix, and the results are presented in Table 2. The table shows that income inequality is positively correlated with financial development, FDI, per capita income, and trade openness, while it is negatively correlated only with remittances. These correlation results indicate that growth in financial development, FDI inflows, per capita income, and trade openness increases income inequality, while remittance reduces it. However, we cannot conclude their relationship at this stage, so we need to conduct further rigorous analysis in the following sections to draw a conclusion of their long-run association.

[Insert Table 2 here]

4. Empirical results and discussion

4.1 Panel Cointegration test results

The panel unit root test results¹ confirmed that all the variables have the same order of integration, i.e. I(1). Therefore, in this section, we examine the long-run cointegration relationship among the

¹ We applied a number of panel unit root tests and all of them confirmed that the selected variables are non-stationary at their level data and stationary in their first order differences. We haven't provided results in the paper to save the space.

variables using a panel cointegration approach, i.e. Fisher-Johansen (Maddala and Wu, 1999) cointegration test. This approach is based on Johansen's trace and Max-Eigen tests. We explore the long-run relationship among the variables for the full sample, excluding India² and excluding the global financial crisis (GFC) period (2008-2016)³. These results are displayed in Table 3. Based on trace statistics and Max-Eigen test values, we reject the null hypothesis of no cointegration at the 1% significance level for the full sample, excluding India and the GFC period. These findings indicate that there is a significant long-run equilibrium relationship, across the models, among income inequality, financial development, FDI, GDP per capita, remittances, and trade openness in developing economies. The evidences suggest that these variables share a common stochastic trend in the long run. However, this analysis does not indicate whether financial development, FDI inflows, GDP per capita, remittances, and trade openness increase or decrease income inequality in these developing economies. Therefore, further analysis is required, which is covered in the following section.

[Insert Table 3 here]

4.2 Analysis of long-run income inequality elasticities

To understand the long-run impact of financial development, FDI inflows, per capita income, remittances, and trade openness on income inequality, we applied a single cointegration vector model, namely, the panel DOLS estimator. This is a robust technique, as it accounts for

² We excluded India from the analysis because India accounts for more than 20% of the remittances received by the sample countries. Therefore, we wanted to check whether excluding India from the analysis would produce different results.

³ As most countries were affected by the global financial crisis since late 2007, so we excluded the data from 2008 in the analysis. The previous literature (e.g. Ahmed et al., 2021; Paramati et al., 2015; 2016) considered the GFC period around 2007-09 but these studies were mostly Australian specific.

heterogeneity in the long-run variances by using leads and lags in the analysis. The panel DOLS results are presented in Table 4.

- A 1% increase in financial development, FDI inflows, remittances, and trade openness raises income inequality by 0.035%, 0.053%, 0.014%, and 0.034%, respectively, while a 1% increase in GDP per capita decreases income inequality by 0.083%.

The full sample results on long-run income inequality elasticities show that financial development, FDI inflows, remittances, and trade openness have a significant positive impact on income inequality in developing economies. These findings indicate that a further rise in financial development, FDI inflows, remittances, and trade openness seems to increase income disparity between the rich and poor in developing economies. For the purpose of discussion, we mainly focus on FDI inflows, remittances, and economic growth.

First, our results have established that the FDI inflows increase income inequality. This becomes possible if the FDI inflow is concentrated in a particular sector or region, where it may be providing employment opportunities only for skilled labour. Hence, FDI inflow might be increasing income disparity in these developing economies. Theoretically, it can be argued that FDI inflows bring additional capital, new technology, and innovations to the host country, and provide training facilities to the unskilled labour. All these factors may contribute towards additional employment opportunities for local individuals. However, if FDI inflows are not properly managed and spread across regions and sectors, only skilled people will benefit and not the unskilled. Therefore, we advise policy makers to initiate additional favourable policies towards attracting more FDI inflows, and divert these FDI inflows to sectors and regions where abundant labour is available for the work. Thus, FDI inflows can reduce income inequality; otherwise, FDI

inflow may further increase economic disparity between the regions within a country. Our findings are consistent with previous studies (e.g. Pan-Long, 1995; Feenstra and Hanson, 1997; Zhang and Zhang, 2003; Lee, 2006) that documented that FDI inflows have a significant positive impact on income inequality.

Second, our results suggest that growth in remittances increases income inequality in developing economies. This means that remittance inflows are not in favour of reducing inequality. Given this finding, we argue that the remittances received in these countries might be the high-income households. This can be further attributed to the fact that most of the migrants from developing countries are usually from high-income households; hence, their remittances may further escalate economic disparity between the rich and the poor in those developing countries. This argument is consistent with the previous literature (Adams et al., 2008; Möllers and Meyer, 2014), which has documented that remittances increase income inequality. On the other hand, we can also argue that remittances may be increasing income inequality directly but reducing it indirectly. For instance, if high-income households receive more remittances, then eventually their savings and investments will increase significantly. These increased savings and investments will promote economic activities, which create additional employment opportunities for the unemployed labour force. This will therefore improve income distribution in the economy. Thus, these remittances can reduce income inequality indirectly if received remittances are effectively converted into investments. This argument can be supported with the following evidence.⁴

⁴ A number of previous studies (e.g. Acosta et al., 2008; Koehlin and Leon, 2007; Portes, 2009) have documented that remittances decrease income inequality. However, these studies mainly focused on a particular region or considered both the developed and developing economies in their analysis. On the other hand, in our case, we focused mainly on developing economies, which have higher remittances inflows, and we used the latest data in our analysis.

Third, our results indicate that a 1% increase in GDP per capita reduces income inequality by 0.083%. This result offers important policy implications. This finding implies that increasing economic growth in developing economies significantly decreases income inequality. This means that increasing economic activities may provide more income opportunities for the unemployed and unskilled labour force. Consequently, economic growth may be reducing income inequality across these developing economies. This finding is consistent with Choi (2006), Brueckner et al. (2015) and Shi et al. (2020), who argued that increasing GDP per capita significantly reduces income inequality. However, our findings are opposite to the evidence provided by Fang et al. (2020), who documented that the increase in per capita income further widens income disparity both in developed and developing countries. Overall, the long-run elasticities on the panel data set suggest that FDI inflows and remittances increase income inequality, while economic growth reduces it.

It is evident from Figure 1 that India receives the highest remittance inflows among the sample countries. Therefore, now the question is, do the results change if we exclude India from the analysis? To answer this question, we re-estimated the long-run elasticities. The results still show that growth in financial development, FDI inflows, remittances, and trade openness plays a major driving role in increasing income inequalities, while growth in GDP per capita reduces it. Further, the recent global financial crisis had a considerable effect on capital mobility, productivity, remittance inflows, and exports and imports. Given that, we estimated long-run elasticities by excluding the GFC (2008-2016) period. Our results confirm that the nature of the effect of financial development, FDI inflows, per capita income, remittances, and trade openness on income inequality remains the same and that all of these variables are statistically significant, with the exception of remittances.

[Insert Table 4 here]

For the robustness check, we estimated long-run income inequality elasticities using the panel fully modified ordinary least squares (FMOLS)⁵ method, which uses a non-parametric approach and provides reliable long-run elasticities. The findings of the panel FMOLS model are displayed in Table 5. The results indicate that GDP per capita has a substantial negative effect on income inequality, while financial development, FDI inflows, remittances, and trade openness have a significant positive impact. Given that, these results are also consistent with the results of the panel DOLS method. Hence, we conclude that both the panel DOLS and FMOLS techniques produce consistent results in our case.

[Insert Table 5 here]

We also estimate the model by replacing FDI and TO with the economic globalisation index (EGLB) (Dreher, 2006; Gygli et al., 2019) to check whether its impact on income inequality is same as those of FDI and TO. The economic globalisation index also accounts for various dimensions of foreign direct investments and internationalisation of trade (exports and imports). Hence, we expect economic globalisation to have an impact similar to those of FDI and TO on income inequality. The results are reported in Table 5. The findings demonstrate that economic globalisation has a significant positive impact on income inequality and its effect on inequality is consistent with those of FDI and TO in terms of nature and degree of impact. As expected, financial development continues to have a positive impact on inequality, while increase in per capita income reduces the disparity. The impact of remittances is also positive but statistically insignificant.

⁵ We used the approach suggested by Pedroni (2000) and Kao and Chiang (2000).

These evidences therefore confirm that regardless of whether we use FDI and TO or the economic globalisation index in the model, the results remain consistent.⁶

4.3 Results of the heterogeneous panel non-causality test

We further investigated the direction of causality between income inequality, financial development, FDI inflows, remittances, GDP per capita, and trade openness in developing economies by employing Dumitrescu and Hurlin's (2012) panel non-causality test. The significance of this approach is that it considers heterogeneity by allowing all coefficients to vary across cross-sections. Therefore, this test provides more reliable and robust results when compared with the traditional Granger causality test. We applied this test to the first difference of the data series. The results of short-run heterogeneous panel non-causality test are displayed in Table 6. The results show evidence of unidirectional causality between GDP per capita and income inequality. More precisely, causality runs from GDP per capita to income inequality and no evidence of reverse causality was found. Further, we could not establish any causal relationship between income inequality, FDI inflows, and remittances in the short run. Our results are consistent with the previous findings of Risso and Carrera (2012), who documented that economic growth Granger causes income inequality. It is also important to note that the absence of causality among most indicators might be due to the fact that there may not be a strong nexus between these variables in the short-run; but these variables have a considerable impact on income inequality in the long-run.

[Insert Table 6 here]

⁶ A recent study (Fang, Gozgor, and Yan, 2021) provides evidence on the impact of globalisation on political and social polarisation.

4.4 Country-specific long-run income inequality elasticities

Finally, we explored the long-run income inequality elasticities for individual countries. These results are presented in Table 7. The results show that financial development has a positive impact on income inequality in six countries, while it has a negative effect in five countries. Similarly, growth in FDI inflows reduces income inequality in two countries, namely, China and Turkey, while it increases in five countries, namely, Colombia, Dominican Republic, Mexico, the Philippines, and Thailand. Similarly, growth in per capita income also has both positive and negative impacts on income inequality. To be precise, increase in per capita income raises income inequality in India, Indonesia, Sri Lanka, and Turkey, while it reduces income inequality in Brazil, Dominican Republic, El Salvador, Guatemala, Jordan, and Mexico. Further, our results show that increase in remittances contributes to improving income distribution in countries like Bangladesh, Egypt, Indonesia, Mexico, and Thailand, whereas it increases income inequality in Brazil, Dominican Republic, India, Morocco, and Nigeria. Finally, trade openness reduces inequality in four countries, while it increases inequality in four countries as well. These results indicate that the impact of FDI inflows, economic growth, and remittances on income inequality is not uniform across the developing economies.

[Insert Table 7 here]

5. Conclusion with policy implications

Economic growth literature has emphasised the importance of foreign direct investment, financial development, and trade openness in addressing the issue of income inequality across developed and developing economies. Over the last few decades, remittances have become a major source of income for many families in developing economies. High inflow of remittances has significantly

increased consumption, savings, and investments at local and national levels. Further, it has also boosted foreign exchange reserves and has played an important role in solving balance of payment deficit issues for developing economies. However, the impact of remittances on income inequality in developing economies has been largely disregarded. Therefore, in this study we aimed to examine the impact of remittance inflow, FDI, and economic growth on income inequality in 20 major remittance-receiving developing economies over the period 1980-2016. We also accounted for the effect of financial development and trade openness on income inequality in the model and used a number estimation procedures for the investigation.

Our results establish the long-run equilibrium relationship between income inequality, financial development, FDI inflows, economic growth, remittances, and trade openness. Further, our findings on long-run elasticities suggest that FDI inflows and remittances, along with financial development and trade openness, have a significant positive impact on income inequality, while economic growth reduces it in the long run. These findings have significant policy implications. For instance, FDI inflows are significantly increasing income inequality. This finding can be attributed to the fact that FDI inflows might be concentrated only in a particular region or sector. Therefore, FDI inflows are increasing income inequality in developing economies. However, if FDI inflows were to be spread across regions and industries, then they should help reduce income inequality in developing economies. Similarly, the inflow of remittances seems to be adversely affecting income distribution in developing economies. This means that remittances are increasing the disparity between the rich and the poor. It further implies that the remittances are received mostly by higher-income households. However, remittances may be indirectly reducing income inequality by increasing savings and investment, which eventually promotes more economic activities and reduces income inequalities, as our findings show that economic development

significantly reduces income inequality. Based on these findings, we urge the policy makers and government officials of these developing economies to utilise these significant inflows of FDI and remittances more effectively for economic development. This would ultimately reduce income inequality in these developing economies. Finally, policy makers should also develop efficient financial services to reduce the cost of transactions to attract more remittances into these countries and eventually help improve income distribution.

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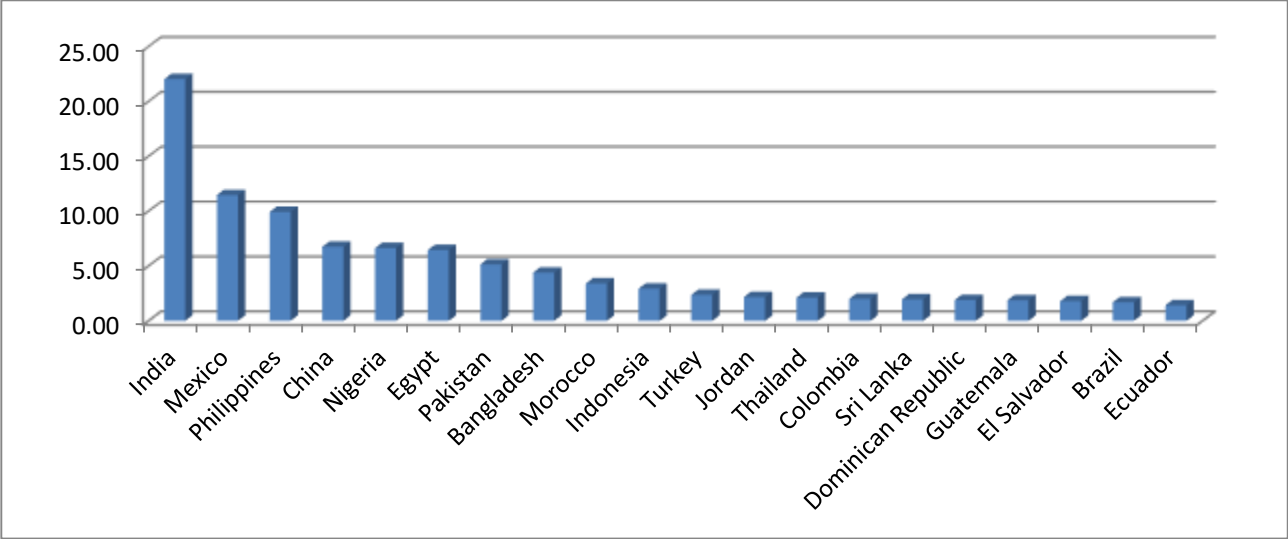


Figure 1: Average personal remittance inflows to the sample countries, 1980-2016 (current US\$ in billions)

Table 1: Summary statistics

Country	IIE	FD	FDI	PI	REM	TO
Bangladesh	35.548	19.997	0.294	482.002	4.263	26.026
Pakistan	35.753	24.369	0.943	827.670	4.880	34.263
Morocco	36.135	39.423	1.366	2134.161	6.414	61.375
Nigeria	39.173	15.207	3.679	1504.730	3.879	56.621
Indonesia	39.864	31.993	0.985	2324.742	0.597	51.608
Jordan	42.233	70.523	5.038	2980.673	18.133	122.918
China	43.415	98.874	2.946	2139.115	0.166	38.541
Turkey	43.793	29.050	1.107	9134.089	1.124	43.856
El Salvador	44.112	38.589	1.896	3132.218	14.268	65.177
India	44.700	31.181	0.760	742.415	2.142	27.195
Thailand	46.088	97.017	2.362	3298.472	1.231	94.382
Guatemala	46.321	21.144	0.922	2474.359	4.901	49.407
Mexico	46.540	19.369	2.052	8123.574	1.489	44.766
Philippines	47.042	30.908	1.260	1744.295	7.336	73.138
Ecuador	47.241	20.022	1.466	4194.668	3.146	51.033
Dominican Republic	47.327	24.710	3.057	4025.630	6.653	70.174
Egypt	47.328	35.082	2.382	1883.395	7.137	51.862
Sri Lanka	48.335	24.897	1.110	1727.102	6.448	69.755
Brazil	50.158	53.215	2.060	9154.226	0.180	21.360
Colombia	51.159	34.446	2.632	5063.291	1.364	33.790
Consolidated						
Mean	44.321	38.008	1.859	3387.819	4.474	53.108
Maximum	53.100	166.504	23.537	14116.980	22.842	149.453
Minimum	31.800	5.771	-5.007	351.376	0.001	12.352
Std. Dev.	5.239	27.522	2.129	2770.391	4.753	26.499

Notes: The above variables are measured as follows: IIE – GINI index (based on disposable income); PI – GDP per capita (constant 2010 US\$); FD – domestic credit to private sector (% of GDP); FDI – foreign direct investment, net inflows (% of GDP); REM – personal remittances received (% of GDP); and TO – trade (% of GDP).

Table 2: Correlations for the panel data set

Variable	IIE	FD	FDI	PI	REM	TO
IIE	1.000	0.162	0.154	0.571	-0.097	0.099
FD		1.000	0.293	0.203	-0.130	0.243
FDI			1.000	0.283	0.040	0.305
PI				1.000	-0.208	0.185
REM					1.000	0.493
TO						1.000

Note: Calculated using log data.

Table 3: Fisher-type Johansen panel cointegration test results

Hypothesised	Fisher Statistics				
	No. of CE(s)	trace test	Prob.	max-eigen test	Prob.
<i>IIE = f(FD, FDI, PI, REM, TO)</i>					
Full sample					
None		459.600***	0.000	280.200***	0.000
At most 1		226.900***	0.000	118.700***	0.000
At most 2		130.400***	0.000	82.510***	0.000
At most 3		71.160***	0.002	48.540	0.167
At most 4		50.650	0.121	45.690	0.248
At most 5		51.050	0.113	51.050	0.113
Excluding India					
None		447.200***	0.000	275.000***	0.000
At most 1		219.100***	0.000	116.500***	0.000
At most 2		124.100***	0.000	79.710***	0.000
At most 3		66.630***	0.003	46.060	0.173
At most 4		47.000	0.150	41.380	0.326
At most 5		50.650	0.082	50.650	0.082
Excluding the GFC period					
None		697.700***	0.000	372.000***	0.000
At most 1		387.500***	0.000	201.800***	0.000
At most 2		228.300***	0.000	131.300***	0.000
At most 3		145.200***	0.000	107.200***	0.000
At most 4		88.200***	0.000	70.780***	0.002
At most 5		71.990***	0.001	71.990***	0.001

Note: *** denotes the rejection of the null hypothesis of no cointegration at the 1% significance level.

Table 4: Panel data analysis of long-run income inequality elasticities

Variable	Full sample			Excluding India			Excluding the GFC period		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
FD	0.035***	6.273	0.000	0.023***	3.481	0.001	0.029***	8.669	0.000
FDI	0.053***	3.195	0.002	0.035**	2.297	0.023	0.028**	2.499	0.014
PI	-0.083***	-4.623	0.000	-0.062***	-3.285	0.001	-0.067***	-4.758	0.000
REM	0.014***	4.374	0.000	0.011***	3.092	0.002	0.003	1.294	0.199
TO	0.034***	4.494	0.000	0.035***	3.588	0.000	0.033***	3.462	0.001

Notes: Models were estimated using the panel DOLS method; ** and *** denote the significance levels at 5% and 1%, respectively.

Table 5: Robustness check: Long-run income inequality elasticities (full sample)

Variable	Full sample			With economic globalisation index		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
	With FDI and TO			With economic globalisation index		
FD	0.110***	4.536	0.000	0.092***	3.733	0.000
FDI	0.065*	1.677	0.094			
PI	-0.157***	-7.197	0.000	-0.159***	-7.367	0.000
REM	0.051*	1.695	0.091	0.014	0.469	0.639
TO	0.062**	2.233	0.026			
EGLB				0.066**	2.505	0.013

Notes: Estimated using the panel FMOLS method; *, **, and *** denote the significance levels at 10%, 5%, and 1%, respectively.

Table 6: Heterogeneous panel non-causality test

Null Hypothesis:	Zbar-Stat.	Prob.
FD does not homogeneously cause IIE	-0.762	0.446
IIE does not homogeneously cause FD	-0.991	0.322
FDI does not homogeneously cause IIE	0.577	0.564
IIE does not homogeneously cause FDI	-0.316	0.752
PI does not homogeneously cause IIE	2.615***	0.009
IIE does not homogeneously cause PI	0.526	0.599
REM does not homogeneously cause IIE	0.451	0.652
IIE does not homogeneously cause REM	1.327	0.184
TO does not homogeneously cause IIE	-0.262	0.793
IIE does not homogeneously cause TO	1.500	0.134

Note: *** denotes the rejection of the null hypothesis at the 1% significance level.

Table 7: Time series analysis of long-run income inequality elasticities

Country		Constant	FD	FDI	PI	REM	TO	R-squared
Bangladesh	Coefficient	1.536	0.100*	-0.326	0.381	-0.166**	0.112	0.997
	Prob.	0.200	0.080	0.193	0.044.206	0.012	0.154	
Brazil	Coefficient	7.309***	-0.028	0.064	-0.333***	0.014***	-0.127**	0.979
	Prob.	0.000	0.206	0.424	0.001	0.006	0.014	
China	Coefficient	0.377	0.808**	-0.195*	-0.082	-0.003	0.184***	0.997
	Prob.	0.431	0.016	0.069	0.241	0.882	0.005	
Colombia	Coefficient	3.901***	-0.128**	0.219***	-0.086	-0.029	0.189***	0.940
	Prob.	0.000	0.049	0.001	0.241	0.159	0.006	
Dominican Republic	Coefficient	5.172***	-0.052***	0.289***	-0.228***	0.121***	-0.056*	0.996
	Prob.	0.000	0.002	0.000	0.000	0.000	0.064	
Ecuador	Coefficient	6.504**	-0.043	0.167	-0.387	0.039	0.063	0.986
	Prob.	0.030	0.679	0.652	0.179	0.265	0.803	
Egypt	Coefficient	5.138***	-0.185	0.031	-0.107	-0.252**	0.152*	0.918
	Prob.	0.000	0.162	0.813	0.265	0.047	0.063	
El Salvador	Coefficient	9.526**	-0.174	0.119	-0.906*	-0.105	0.523	0.999
	Prob.	0.035	0.545	0.150	0.098	0.332	0.160	
Guatemala	Coefficient	8.532***	0.094	-0.089	-0.614*	0.007	0.006	0.925
	Prob.	0.002	0.328	0.196	0.061	0.690	0.944	
India	Coefficient	3.331***	0.045*	-0.050	0.067**	0.028*	-0.005	0.996
	Prob.	0.000	0.063	0.568	0.012	0.053	0.818	
Indonesia	Coefficient	1.122**	-0.089***	-0.051	0.399***	-0.053***	-0.045	0.994
	Prob.	0.014	0.000	0.680	0.000	0.000	0.441	
Jordan	Coefficient	5.765***	-0.096*	-0.010	-0.191***	-0.015	-0.004	0.982
	Prob.	0.000	0.072	0.568	0.000	0.307	0.818	
Mexico	Coefficient	4.073***	0.041***	0.351***	-0.135***	-0.021**	0.001	0.969
	Prob.	0.000	0.000	0.000	0.001	0.015	0.932	
Morocco	Coefficient	3.594***	0.012***	-0.001	-0.008	0.039***	-0.015**	0.991
	Prob.	0.000	0.000	0.933	0.310	0.000	0.026	
Nigeria	Coefficient	4.310***	0.004	-0.014	-0.077	0.011**	-0.018	0.996
	Prob.	0.005	0.842	0.651	0.139	0.040	0.317	
Pakistan	Coefficient	3.230***	-0.024	0.106	0.004	-0.007	0.036	0.656
	Prob.	0.005	0.827	0.716	0.971	0.578	0.804	
Philippines	Coefficient	3.004***	0.009	0.167**	0.025	-0.028	0.067	0.960
	Prob.	0.000	0.480	0.015	0.667	0.196	0.142	
Sri Lanka	Coefficient	2.345***	0.004	-0.135	0.157**	0.107	0.119**	0.992
	Prob.	0.000	0.822	0.619	0.025	0.339	0.044	
Thailand	Coefficient	3.857***	0.032**	0.125*	0.015	-0.026***	-0.137*	0.984
	Prob.	0.000	0.030	0.093	0.809	0.004	0.077	
Turkey	Coefficient	2.575**	-0.164***	-0.324*	0.300**	0.026	-0.056	0.992
	Prob.	0.035	0.002	0.068	0.044	0.165	0.272	

Notes: The models were estimated using the DOLS method; *, **, and *** denote the significance levels at 10%, 5%, and 1%, respectively.