Export Dynamics and Income Inequality: New Evidence on Export Quality

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Abstract
Previous literature has highlighted the relationship between export diversification and income inequality. The present study attempts to explore the influence of export quality on income inequality. A global sample of 92 economies consisting of 30 low- and lower-middle-income economies (LMEs), 21 upper-middle-income economies (UMEs), and 41 high-income economies (HIEs) over the period 2002–2014, is collected to create a balanced set of panel data. Using econometric techniques for balanced panel data to deal with cross-sectional dependence, heteroscedasticity, and endogeneity, we first find that the effect of export quality is negative and significant on the Gini index pre-tax and pre-transfer in LMEs and UMEs, implying that export quality reduces income inequality. Second, export quality has a positive and significant impact on income inequality in HIEs. Our findings imply that different economic policies should be considered for dealing with income inequality among different income groups of economies.

Keywords Export quality · Income inequality · Global · Panel data

JEL Classification D63 · F14 · F16

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1 Introduction

The relationship between trade and income inequality is an interesting topic in the literature. The theoretical background for explaining this relationship is the Stolper–Samuelson (SS) theorem in Heckscher–Ohlin (HO) trade theory. The SS theorem predicts that trade liberalisation reduces income inequality in developing countries. This is because trade leads to an increase in real return on these countries’ abundant resources, such as unskilled workers. Unfortunately, increased income inequality has been witnessed extensively in developing countries (Kanbur 2015; Bergh and Nilsson 2010; Anderson 2005; Egger and Etzel 2012). This fact drives economists into navigating the dynamics of export, characterised by export quality, in order to explain relations of export quality with income inequality.

Previous studies have shown the effects of export diversification on income inequality. For instance, Fischer (2001) indicates that countries with export diversification based on taking advantage of land abundance would see increases in income inequality under the process of trade liberalisation. However, if countries focus on labour-abundant products, income inequality is decreased under the process of trade liberalisation. Studying in a sample of 52 Asian and Western countries over the period 1988–2014, Blancheton and Chhorn (2019) reveal that sectoral export diversification appears as a leading driver of income inequality, especially in high-income Asian countries and European Union (EU) member states. Recently, Le et al. (2020) find evidence of an inverted-U shaped relationship between export diversification and income inequality in a sample of 90 countries from 2002 to 2014.

It is important to note that export diversification and export quality are two important features of trade liberalisation (Canh & Dinh Thanh, 2020; Osakwe et al., 2018). Export diversification is defined as the increase in distinct export products and trading partners (Marian & Milne, 1987), which seems to go against trade theory (i.e., comparative advantage) on specialisation in production (Giri et al., 2019). Meanwhile, export quality represents the quality of export products of a country. According to Chiang and Masson (1988), a product is perceived to be of higher quality if buyers prefer it over others of the same general type and equal price. The literature mostly agrees to use unit values of exports, technically the trade value per quantity, (e.g., see Schott (2004); Hummels and Klenow (2005)) as an appropriate measurement of export quality. More importantly, the dynamics of export quality can reflect insights about the development process of an economy under the process of globalisation (Krishna & Maloney, 2011), especially the specialisation strategy (Alcalá, 2016). As such, understanding the influences of export quality on income inequality may help to fulfil the literature on export dynamics and trade strategy on income inequality.

Acharyya and Jones (2001) explain that although direct regulation to improve export quality has an associated cost, it may have desirable consequences for income redistribution. In line with the SS theorem, the influence of the dynamics of export on income inequality is also predicted through the wages/labour channel. That is, export quality could boost demand for skilled workers instead of unskilled workers, which leads to an increase in income inequality. In more detail; increased export quality may reflect a higher premium for skilled workers, leading to a greater gap in wages or greater income inequality (Acharyya & Jones, 2001).

1 In this study, income inequality, inequality, and wage inequality are used interchangeably.
However, since the proportion of unskilled workers is greater in developing countries, improvements in export quality lead to an increase in the income of unskilled workers, thus reducing income inequality in lower-income countries relative to higher-income countries (Robbins et al., 2000). This means that an increase in export quality may have mixed effects on income inequality, and should be analysed further. There may be different explanations in the economic conditions between countries, especially among income groups (e.g., low-income economies versus high-income economies) that may lead to heteroscedastic effects of export dynamics on income inequality (Le et al., 2020).

Taking a look at the data, Fig. 1 shows interesting facts about the dynamics of income inequality in the period 2002–2014 for the three income groups. Figures 1a,b depict a decrease in the Gini index (pre-tax and pre-transfer) in most of the LMEs and UMEs, while Fig. 1c shows an opposite trend for HIEs. Interestingly, Fig. 2 illustrates the relationship between the export quality index and the Gini index, and shows a weak negative correlation which needs to be further examined by controlling other important determinants.

This study contributes to the literature in three ways. First, the study adds to the literature on export dynamics and its influence on income inequality. This study elucidates the effects of export quality on income inequality. Furthermore, previous studies (e.g., Krishna and Maloney, 2011; Fan et al., 2015; Rankin and Schöer, 2013 among others) mostly focus on a specific country or small region. This study encompasses a global sample of 92 economies to provide a universal view of export quality and income inequality. Second, the analysis is carried out for three subsamples by income level to detect any differences in the influence of export quality on income inequality depending on economic development level. This deeper analysis endeavours to contribute to policy formulation, and also helps to explain the benefits and costs of export growth policies in developing countries. Third, the study uses two indices of income inequality; namely, the Gini index pre-tax and pre-transfer, and the Gini index post-tax and post-transfer, to help understand the effectiveness of government policies on income inequality under the dynamics of export quality.

As data on export quality is available up to 2014, and data on institutional quality (one of the important control variables) is available from 2002, the period 2002–2014 is employed as the best sample. To provide robust results, several estimators for panel data to deal with cross-sectional dependence, heteroscedasticity, endogeneity, and fixed effects, are applied to the global sample and three subsamples, which include 30 LMEs, 21 UMEs, and 41 HIEs. Export quality is found to have a significant negative impact on the Gini index. This effect is consistent and robust across estimators, implying a decreasing effect of export quality on income inequality.

The results add new evidence to the findings in previous literature on the relationship between export dynamics and income inequality. Previous studies have documented the important role of export diversification in the evolution of income inequality (see Le et al., 2020), and this study further shows that export quality is an important driver of income inequality. In particular, this study finds the negative impact of export quality on income inequality in low- and middle-income economies, which gives policymakers a new way of combating income inequality. Meanwhile, export quality has a positive impact on income inequality in HIEs. This finding highlights the challenge of identifying the most appropriate measures for tackling income inequality in LMEs, UMEs, and HIEs; that is, LMEs and UMEs may want to support firms in upgrading product quality in the process.

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2 We only illustrate the data in our samples. The details of samples and countries are in Sect. 3.
Fig. 1  The Gini index (pre-tax and pre-transfer) in 2002, 2014 and the changes. Source: The Standardized World Income Inequality Database (SWIID) of Solt (2019)—version 8.2
of globalisation, while HIEs should focus more on tax and transfer policies to balance the increased effects of export quality on income inequality.

Our findings are checked for robustness and sensitivity in several ways. First, the control variables are added one by one to check for sensitivity. The results are not sensitive to different specifications, displaying consistent negative impacts of export quality on the Gini index. Second, different estimators such as panel-corrected standard errors (PCSE), feasible generalised least squares (FGLS), pooled ordinary least squares (pooled OLS), pooled OLS with year effects, robust pooled OLS, and two-step system generalised method of moments (GMM), respectively, are applied to check for robustness. Third, the above estimations are also applied for the logarithms of the Gini index as a different calculation of the dependent variable, revealing consistent findings. Lastly, the Gini index post-tax and post-transfer is also employed in two forms: (i) original index, and (ii) its logarithm.

The study is structured as follows. The next section is the literature review. The methodology and data are presented in Sect. 3. Section 4 sets out the empirical results and discussion. The conclusion is the final section.

2 Literature Review

Income inequality is one of the most concerning issues in economic development. Several reports from international organisations have raised alarm over the increasing income inequality around the world (e.g., see OECD (2018)). In this context, understanding the drivers of income inequality is very important for both the literature and policy formulation. Kuznets (1955) is considered to be the most influential pioneer of the theory of economic
development and income inequality. Kuznets proposes the theory of an inverted-U relationship between economic development and income inequality: the Kuznets curve. According to this theory, income inequality increases in the early stages of economic development until a certain level of GDP per capita is reached. From this tipping point, income inequality gradually decreases, along with industrialisation, democratisation, and improved welfare. Several studies have applied Kuznets curve theory in empirical investigations; however, the results are mixed (Canh et al., 2020; Le et al., 2020; Nguyen et al., 2020).

Recently, the literature has extended to the determinants of income inequality, such as equality of opportunity (Aiyar & Ebeke, 2020), tourism development (Nguyen et al., 2020), economic volatility (Chang et al., 2019), urban inclusiveness (Qiu & Zhao, 2019), economic complexity (Lee & Wang, 2020), and the consequences of the current pandemic (Covid-19) (Bonacini et al., 2020). More interestingly, a different strand of research, the Stolper–Samuelson (SS) model in Heckscher–Ohlin (HO) trade theory, provides the theoretical background for understanding the effect of trade on income inequality. In the same vein, economists have paid attention to the influences of trade liberalisation/trade openness, particularly in the process of globalisation (e.g., see Antràs et al. (2017), McCcalman (2018)). For example, Kanbur (2015) and Bergh and Nilsson (2010) find positive links between trade openness and inequality. Asteriou et al. (2014) show the equalising effect of trade liberalisation on income distribution. Furusawa et al. (2020) propose a model and prove that international trade causes income inequality. In a study of Vietnam, Vo and Nguyen (2020) indicate that trade liberalisation improves the income and expenditure of households, but rural households are more vulnerable to trade, and poor families get fewer benefits from trade.

Most studies document the links between trade openness and income inequality through the influence of openness on wage inequality amongst skilled and unskilled workers (see Wood (2002)). Recently, several studies have paid more attention to trade dynamics and income inequality. For instance, Anderson (2005) indicates that trade openness could increase demand for skilled workers in single-country studies, but cross-sectional country studies indicate that greater trade openness may not have a stronger influence on income inequality. Egger and Etzel (2012) reveal that fully symmetric partner countries involved in a process of trade openness see a reduction in union wage claims, thus improving employment and social welfare.

Export quality is an important feature of export diversification (Chiang & Masson, 1988). Much attention has been paid to export quality since the 1980s (e.g., see Donnenfeld and Mayer (1987)) with so-called differentiated products in trade competition. More recently, economists (see Schott, 2004; Hummels & Klenow, 2005) propose quantitative methods to measure export quality by using unit values of exports. By using export unit values, Krishna and Maloney (2011) find evidence of strong correlations between export quality and income level, indicating that export quality can provide insights into the evolution of economic development. Recently, Christian Henn et al. (2017) introduced a new measure of export quality by modifying the unit value measures of Hallak (2006). Moreover, Christian Henn et al. (2017) explain that they directly use unit values at the Standard International Trade Classification (SITC) 4-digit level rather than the 10-digit level, and

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3 See Christian Henn et al. (2017) for detailed discussion on the shortcomings in unit values method in Hallak (2006), i.e., it requires data on market shares of imports relative to corresponding domestic varieties or extensive data on tariffs that are not available for many developing countries, which stimulates them to modify that measure.
then normalise them into a price index for each 2-digit ‘sector’ to overcome the shortcomings of the method of Hallak (2006). A strength of the new dataset is that it offers a different way of studying export quality and income inequality. Based on this dataset, Le et al. (2020) document the influence of export diversification on income inequality. However, few studies have focused on the impact of export quality on income inequality.

The literature shows that a country will target its comparative advantages in the process of internationalisation (Sampson, 2016). That is, the process of trade openness may have distributive effects on domestic income through technological differentials and skills-bias (Meschi & Vivarelli, 2009). In connection with skills, gaining comparative advantage usually requires highly skilled workers, and demand causes an increase in the relative wage for these workers and leads to greater income inequality (Sampson, 2016). With technological differentials, the focus on comparative advantage has the effect of stimulating domestic producers to upgrade production technologies (or quality of products), which also requires highly skilled workers rather than unskilled or medium-skilled workers (Anderson, 2005). Some previous studies provide evidence supporting this idea. For instance, Meschi and Vivarelli (2009) find that trading activity with high-income countries induces higher income inequality in 65 developing countries over the period 1980–1999. Similarly, Anwar and Sun (2012) document evidence of the increasing effects of Chinese trade liberalisation on wage inequality between skilled and unskilled labour in the manufacturing sector from the 1980s. Overall, an improvement in export quality might cause greater income inequality. Thus, the first hypothesis is formed as follows:

**H1:** The improvement of export quality may increase income inequality.

However, the nature and evolution of income inequality seem to be different between areas or country groups (Sanso-Navarro & Vera-Cabello, 2020; Wan et al., 2020) and the effects of trade activities on income inequality may also be different between income groups, such as developed and developing countries (Anderson, 2005). The mixed effects of trade activities on income inequality have been documented in the literature. For example, Roine et al. (2009) show that trade liberalisation has no clear impact on income inequality in 15 advanced economies and India over the twentieth century. Chen et al. (2013) find that foreign and exporting firms hire more female workers than non-exporting firms, thus reducing gender income inequality in China. Castilho et al. (2012) show that trade openness increases urban income inequality in urban regions, but reduces rural income inequality in Brazil over the period 1987–2005. Notably, Anderson (2005) notices that the increasing effect of trade liberalisation on the relative demand for skilled labour exacerbates income inequality. However, Anderson (2005) further notices that the effects of trade liberalisation on income inequality are through different channels, such as factor price ratio, asset inequality, spatial inequality, and gender inequality. Thus, there are mixed conclusions in the previous literature.

According to Anderson (2005), the shift of labour demand from unskilled to skilled workers may be different between developing and developed countries under the dynamics of trade activities. In developed countries (mostly high-income economies), the economic development level is mostly advanced (Zhu & Li, 2017). More importantly, most high-income economies are characterised by high product quality (implying high export quality) (Hallak, 2006; Rankin & Schöer, 2013). Thus, an improvement in export quality will simultaneously incur high marginal costs (Acharyya & Jones, 2001) and demand for high-skilled labour (Anderson, 2005; Fan et al., 2015). As a result, an increase in export quality may then exacerbate income inequality in high-income economies due to the shift in labour demand towards high-skilled workers; that is, Hypothesis 1 might be effective in the case...
of high-income economies. The alternative hypothesis to H1 for high-income economies is then:

**H1a** The improvement of export quality can increase overall income inequality in high-income economies.

Meanwhile, the influences of export quality on income inequality in low- or middle-income economies (mostly developing countries) are not as straightforward. Improvements in export quality imply that learning and adapting new technologies induces demand for skilled labour (Pissarides, 1997); for example, new technologies (e.g., personal computers, mobile phones), which play an important role in improving product quality, require skilled labour to use them (Berman & Machin, 2000; Canh et al., 2020). Similarly, internationalisation has raised the average skills intensity of production, and thus demand for skilled labour (Feenstra & Hanson, 1997). These effects exist in every country, even in low- or middle-income economies. Thus, improvements in export quality might also increase income inequality in low- or middle-income economies. However, Anderson (2005) emphasises that the effects of trade activities on income inequality in developing countries depend on both the demand and supply of labour. Thanks to recent developments in technology, e.g., the Internet and mobile phones (Canh et al., 2020), developing countries have benefited from a huge advantage in the reduction of trade costs, and travel and communication costs in recent decades. As travel and communication costs reduce, high-quality sectors may shift from developed countries to developing countries (Wood, 2002). Recalling that relative wages of unskilled labour in developing countries are already low, demand for unskilled labour may be higher than the demand for medium-skilled labour in developing countries under the shift of production from developed to developing countries. That is, improvements in export quality may increase the demand for skilled labour in developing countries (albeit this demand is still small); however, unskilled workers are also reaping the benefits of likely more equal asset distribution, with the result that overall income inequality is reduced (E. Anderson, 2005). Hypothesis 1 is then adjusted for the case of low- and middle-income economies (mostly developing countries), as follows:

**H1b** The improvement of export quality might decrease overall income inequality in low- or middle-income economies.

### 3 Methodology and Data

The study aims to investigate empirically the influence of export quality \((EQ)\) on income inequality \((IE)\). Following Le et al. (2020), the study employs the empirical model as follows:

\[
IE_{it} = a_0 + \beta_1 Income_{it} + \beta_2 Income^2_{it} + \beta_3 Industry_{it} + \beta_4 HC_{it} + \beta_5 FDI_{it} + \\
\beta_6 Trade_{it} + \beta_7 ED_{it} + \beta_8 EQ_{it} + \epsilon_{it}
\]

(1)

\(^4\) Travel and communication costs imply the cost of learning and adapting to new technologies, which assumes that labour in developing countries must travel to or communicate with labour/producers in developed countries to learn new production or technologies (see Anderson (2005) for more detail).
in which: \( i \) and \( t \) are country \( i \) at year \( t \), respectively; \( a \) and \( \beta \) are coefficients; and \( \epsilon \) is the residual term. \( EQ \) is an independent variable as a major driver of income inequality. Following the study of Le et al. (2020), we use a set of control variables including: income level (Income) and its squares (Income\(^2\)); institutional quality (Inst); industrialisation (Industry); human capital (HC); FDI net inflows (FDI); trade openness (Trade); and export diversification (ED). The use of income level and its square is to control for the Kuznets hypothesis, stating a non-linear (inverted-U shape) relationship between income level and income inequality (Kuznets, 1955). Institutional quality is proxied for the institutional environment, indicating the role of the dynamics of income inequality (Lin & Fu, 2016). Other variables such as human capital, FDI inflows, trade openness, and industrialisation are documented as important determinants of income inequality in the literature (e.g., see D’Onofrio et al., 2017; Mehic, 2018; Cabral et al., 2016; Yang & Greaney, 2017). Export diversification is documented in the study of Le et al. (2020).

The study collects data from four main sources. The Gini index of inequality in equivalised (square root scale) household market (pre-tax, pre-transfer) income (\( Gini1 \)), and the Gini index of inequality in equivalised (square root scale) household market (post-tax, post-transfer) income (\( Gini2 \)), are collected from the Standardized World Income Inequality Database (SWIID) of Solt (2019). There are several ways of measuring income inequality, but SWIID appears to be the best choice for country-level, with the availability of a global sample over a long period from 1960–2018, in which \( Gini1 \) is used as the main dependent variable, and \( Gini2 \) is used for robustness check. The main reason for this choice is that \( Gini1 \) measures income inequality before tax and transfer, which excludes the impact of government policies (i.e., tax and transfer) on income inequality, which may lead to biased results. Moreover, the study takes \( Gini1 \) and \( Gini2 \) in logarithm form, which normalises the data to reduce heteroscedasticity and check for robustness.

The export diversification index and export quality index are collected from data from the IMF\(^5\) (direction of trade statistics) to proxy for export diversification and export quality, respectively. Both indices are available from 1960 to 2014. In fact, several studies have measured export quality using the unit values of exported products to estimate the impact of export quality on income inequality. This method was developed by (Hallak, 2006) and modified by Christian Henn et al. (2017). This measurement of export quality implies that a country with higher export quality exports products with a higher unit value along with a higher premium (or value-added) (Hummels & Klenow, 2005; Schott, 2004); therefore, the export quality index is used as a proxy for export quality. Meanwhile, the export diversification (ED) index implies a low level of diversification if the export diversification index is high; thus we use the reverse value of the export diversification index to transform this data, as a higher value refers to higher export diversification to proxy for export diversification.

The human capital index is collected from the Penn World Table version 9.1 (PWT)\(^6\) to proxy for human capital. This data is available from 1950 to 2017. Real GDP per capita (constant 2010 US$) is collected from the World Development Indicators of the World Bank (WDI), and logarithm form is taken to proxy for income level. Variables of industrialisation, measured by industry and construction value-added (% of GDP), FDI net inflows (% of GDP), and trade (% of GDP) are collected from the WDI and are available from 1960

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\(^5\) See https://data.imf.org/?sk=A093DF7D-E0B8-4913-80E0-A07CF90B44DB.

\(^6\) See https://www.rug.nl/ggdc/productivity/pwt/.
| Variables for robustness check | Calculations | Sources | Time availability | Obs | Mean | S.D | Min | Max | CD-test |
|-------------------------------|--------------|---------|-------------------|-----|------|-----|-----|-----|---------|
| Log of Gini1                  | Gini index of inequality in equivalised (square root scale) household market (pre-tax, pre-transfer) income | SWIID 8.2 | 1960–2018         | 1196 | 3.822 | 0.107 | 3.487 | 4.093 | 2.665*** |
| Gini2                         | Gini index of inequality in equivalised (square root scale) household market (post-tax, post-transfer) income | SWIID 8.2 | 1960–2018         | 1196 | 37.43 | 7.852 | 22.80 | 55.70 | 3.268*** |
| Log of Gini2                  | Gini index of inequality in equivalised (square root scale) household market (post-tax, post-transfer) income | SWIID 8.2 | 1960–2018         | 1196 | 3.599 | 0.217 | 3.127 | 4.020 | 3.475*** |
SWIID is The Standardized World Income Inequality Database (SWIID) of Solt (2019), version 8.2 (see https://fsolt.org/swiid/); WDI is the World Development Indicators database, World Bank (see https://databank.worldbank.org/source/world-development-indicators); WGI is the Worldwide Governance Indicators database, World Bank (see https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators); a: six institutional indicators from WGI are Control of Corruption, Government Effectiveness, Regulatory Quality, Rule of Law, Political Stability and Absence of Violence, Voice and Accountability; Export diversification and Export quality index are collected from the IMF database (see https://www.imf.org/external/np/res/dhimf/diversification.htm); PWT is the Penn World Table version 9.1 (see https://www.rug.nl/ggdc/productivity/pwt); In CD test: Under the null hypothesis of cross-section independence, CD~N(0,1), the statistical significance of CD-test indicates that data is correlated across panel groups; **, *** are significance levels at 5% and 1%, respectively.
to 2018. Finally, six institutional indicators: control of corruption; government effectiveness; regulatory quality; rule of law, political stability and absence of violence; voice and accountability, are collected from the Worldwide Governance Indicators database of the World Bank (WGI), and then calculated by mean value to proxy for overall institutional quality. These indicators are subject to some criticism, but are the best choice to proxy for the institutional environment, as suggested in previous studies (Canh et al., 2019; Nguyen et al., 2018). The institutional indicators are only available from 2002 to 2018.7

Due to the availability of institutional quality from 2002, and export quality to 2014, the period 2002–2014 is chosen as the best period for empirical estimation. After matching all variables together, we drop countries with missing data in main variables (e.g., Gini indices, human capital index, trade openness, and FDI net inflows) and come to a final sample of 92 economies in the form of balanced panel data as the best global sample. Table 1 presents detail of all variables and testing for cross-sectional dependence.

To consider whether the impact of export quality on income inequality is different between income groups of economies, we divide the whole sample into three subsamples (30 LMEs, 21 UMEs, and 41 HIEs), following the income classification of the World Bank (see Table 3, Appendix, for the list of countries).8 All three subsamples are formed in balanced panel data (see Table 4, for data descriptions of the three subsamples).

Since the study uses a data panel with 92 economies and a relatively short period (13 years, 2002–2014), the cross-sectional dependence test (CD-test) of Pesaran (2004) is employed to check for cross-sectional dependence.9 The results of the CD-tests are reported in the last column of Table 1, showing statistically significant evidence at 1% and confirming the existence of cross-sectional dependence in all variables. In terms of the existence of cross-sectional dependence, the panel-corrected standard error (PCSE) estimator is a proper estimator and is also suitable with balanced panel data with large \(N\) and short \(T\) (Bailey & Katz, 2011). Moreover, heteroscedasticity can exist in the sample, and thus the study employs feasible generalised least squares (FGLS) estimator (Liao & Cao, 2013) as a sensitivity check.

Importantly, the literature also emphasises that trade (or export) is endogenous in the decision of income levels as well as income inequality. That is, decisions on how much to trade/export are not randomly designated since there exists a feedback effect from income inequality to trade/export (Le et al. (2020). Similarly, possible feedback effects are going from income inequality to human capital and FDI inflows (J.-W. Lee & Lee, 2018; McCalm, 2018). Furthermore, country-specific factors also affect income inequality; i.e., fixed effects. From this perspective, the study applies the two-step system GMM method for estimating Eq. (1). T. W. Anderson and Hsiao (1982) are pioneers in solving possible endogeneity in panel data through the first-difference method, which combines first-differencing with instrumental variables. After that, Arellano and Bond (1991) introduce the generalised method of moments (GMM) method and show that it is more efficient. Arellano and Bover (1995) propose the system GMM estimator, and this is then extended by Blundell and Bond (1998) as the two-step system GMM estimator. The literature shows that the two-step system GMM is better in estimating panel data with large \(N\) and short \(T\)

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7 In fact, data from the WGI is available from 1996, but is not available annually until 2002.
8 See notes in Table 3, Appendix, for further explanation.
9 Since our sample ranges from 2002 to 2014 period (13 years), which is relatively short \(T\) panel data, we do not consider the stationarity of variables or cointegration among variables. We are grateful for the helpful comment of an anonymous reviewer.
Therefore, the study also uses the two-step system GMM estimate for robustness checks, to deal with the issue of endogeneity. In applying the two-step system GMM estimate, we follow the basic procedure of T. W. Anderson and Hsiao (1982) by using lagged endogenous (or predetermined) variables (HC, FDI, EQ, and ED) as GMM instruments. Moreover, to reduce bias due to fixed effects, we also include year and area in the instrument list to reduce the fixed effects. In addition, Windmeijer (2005) notices that the asymptotic standard errors of the two-step GMM estimate might be biased (downward) in small panel data. Windmeijer (2005) introduces the robust two-step system GMM estimate, which can correct the estimated variance approximating to the finite sample variance. Thus, this study also uses Windmeijer’s method as a robustness check for the two-step system GMM estimate. Lastly, Kripfganz (2017) recently proposed a new estimate as an extension of GMM; namely the sequential two-stage estimation of linear panel data model (SELPDM). This estimator is also recruited for robustness checks.

It is worth noting that this study carried out a series of robustness and sensitivity checks. First, different basic estimators for panel data, including pooled OLS, pooled OLS with year effects, and robust pooled OLS, are used as alternative estimations for sensitivity checks. Second, the study has a control strategy for empirical estimation to obtain unbiased results by adding control variables one by one in estimations. Third, the study uses two indices of Gini (Gini index pre-tax and pre-transfer, and Gini index post-tax and post-transfer) for robustness checks. Furthermore, the study estimates the results for both indices of Gini in two forms: the original form from the SWIID, and in logarithm form.

### 4 Results and Discussion

Table 2 reports the estimation results of the impact of export quality on income inequality proxied by the Gini index pre-tax and pre-transfer ($Gini_1$) for the full sample and three sub-samples (i.e., LMEs, UMEs, and HIEs). Columns 1–6 report the estimated results for the full samples. Columns 7–8, 9–10, and 11–12 report the estimated results for LMEs, UMEs, and HIEs, respectively.

It is worth noting some checks as follows. First, the study estimates the variance inflation factor (VIF) for independent variables in estimates with the full sample and three sub-samples. The results are reported in Table 5, Appendix, and show that there is no issue of multicollinearity in estimates as VIF values are smaller than 10. Second, to check for the potential existence of endogeneity, this study uses the Durbin-Wu-Hausman chi-sq test by Durbin (1954), Wu (1973) and Hausman (1978), while the stata code is developed by Baum et al. (2007). The results are reported in Table 6, Appendix. The results show that the Durbin-Wu-Hausman chi-sq tests are significant at 1%, which implies that potential endogeneity may exist. Third, as stated in the methodology section, the results of an endogeneity test suggest the need to check the sensitivity of the findings by different estimators to deal with endogeneity. These estimators are the two-step system GMM and SELPDM.

In particular, to check the sensitivity of the findings, the study has implemented different strategies. The results are firstly estimated by PCSE, FGLS, two-step system GMM, robust two-step system GMM, and SELPDM. The results of these estimates are presented in columns 1–6, Table 2. All results are consistent and robust. Next, the study estimates

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10 There are seven areas in our sample; including Europe & Central Asia, East Asia & Pacific, South Asia, Sub-Saharan Africa, Middle East & North Africa, Latin America & Caribbean, and North America.
the model with alternative proxies of income inequality, *Gini2* (Gini index post-tax and post-transfer), in which control variables are added one by one to check for the problem of omitted variables. The results of these checks are reported in Table 7, Appendix and show robust and consistent findings with the results in Table 2. The study also carries out additional checks by estimating the results for different forms of income inequality; the log of Gini indices. The results are reported in Table 8, Appendix and also show robust findings. A similar procedure is carried out for the estimates of three subsamples (i.e., LMEs, UMEs, and HIEs). The results are reported in Tables 9, 10, and 11, respectively, with a similar conclusion. Overall, the estimated results are consistent and robust across different estimating strategies and different forms of income inequality proxies, and likely have no issue of omitted variables.

Observations from Table 2 show that the effects of export quality have negative signs and are significant in income inequality in the full sample. Recalling that our sample includes 92 economies with 30 LMEs, 21 UMEs, and 41 HIEs, we cannot simply conclude that improvement in export quality reduces income inequality before examining the effects in the three subsamples. Columns 7–12 in Table 2 show interesting findings in the three subsamples. Columns 7–10 show significant negative impacts of export quality on the Gini index for LMEs and UMEs, while showing positive signs and significant impacts on the Gini index for HIEs. These results appear to be well-supported by the Gini index in both the original value and its logarithm, through different estimators and estimation strategies (see Tables 6, 7, 8 in the Appendix for detail of the robustness checks), suggesting that an increase in export quality could reduce income inequality for LMEs and UMEs, while potentially increasing income inequality for HIEs.

Thus, the results in Table 2 support our hypotheses (Hypotheses 1a and 1b) that improvements in export quality increase income inequality in high-income economies, but may benefit low- and middle-income economies through reduction of income inequality. The findings are consistent with the literature. In the case of HIEs, firms are mostly large in size, with the most advanced technology and production methods (Aldieri & Vinci, 2019; Poschke, 2018). Upgrading the export of products requires large capital investment and highly skilled workers (Lin, 2019), and cost (Acharyya & Jones, 2001). As in Aldieri et al. (2018), an increase in export quality for HIEs could bring benefits to large exporting companies, with advances in technology and increased demand for skilled workers. Therefore, increases in export quality shift labour demand towards high-skilled workers with a high salary premium (Anderson, 2005; Fan et al., 2015). Consequently, income inequality is exacerbated in HIEs under the improvement of export quality, which is consistent with the extensive literature on trade liberalisation and inequality (Anderson, 2005). In fact, most developed countries are experiencing rising income inequality, which has raised questions about the benefits of free trade and globalisation. As in Cobb (2016), the interaction of technology and education, as well as democratisation processes, in developed countries have reshaped trade union power, thus leading to an increase in income inequality. Given the increasing backlash against job losses related to the free movement of goods and people, governments of developed countries may review their policies to make economic growth more inclusive, and focus their efforts on how to distribute prosperity equitably. This implies that governments in developed countries could undertake policies and actions to promote economic growth that is not only strong, balanced, and sustainable—but also inclusive (Cobb, 2016).
In contrast, firms in LMEs and UMEs are mostly characterised by small and medium businesses (Nguyen & Canh, 2020; Nolan & Zhang, 2002), which still depend on lower labour costs for advantage. Moreover, the reduction in travel and communication costs in recent decades, together with the relatively low wages of labour (especially unskilled workers) in LMEs and UMEs, brings benefits to unskilled labour workers rather than medium-skilled workers in low- and middle-income economies under the shift of high-quality production to their countries (Anderson, 2005; Volpe Martincus & Carballo, 2012). That is, improvements in export quality (or quality of production) overall, reduce income inequality in low- or middle-income economies, especially in low-income economies that are mainly based on the agricultural sector, which provides low and unstable income for the labour force (Brenner, 2018). Thus, upgrading product quality through industrialisation and specialised production not only enhances the profitability of the agricultural sector, but also provides new employment for unskilled and less-skilled workers. As a result, a higher export quality brings higher unit values for every exported product, and in return, higher profit for domestic firms. A high proportion of small businesses would gain from this transition, as would unskilled or less-skilled workers. In other words, from the perspective of free trade and globalisation, governments in LMEs and UMEs could form a full set of policies that could promote inclusive growth and income inequality reduction through (i) creating an enabling environment for competition and export; (ii) adopting modern technology and spurring innovation to produce high-quality export goods (Anderson, 2005; Volpe Martincus & Carballo, 2012); (iii) facilitating structural transformation from agriculture to manufacturing, and from rural to urban (Brenner, 2018); and (iv) investing in human capital and creating income-earning opportunities for the poor (Anderson, 2005).

In summary, the empirical results show a reducing effect of export quality on income inequality in LMEs and UMEs, while export quality has a positive impact in HIEs. The results mean that the effects of export quality through labour demand with skill-bias exists in HIEs, but not in LMEs and UMEs.

5 Conclusion

The relationship between trade activities and income inequality has been the subject of great controversy in the literature (Razmi & Blecker, 2008). This study adds to a growing body of literature on the relationship between the dynamics of export quality and income inequality. Specifically, this study challenges previous literature that an increase in product quality generates greater income inequality (J. Anderson & Sutherland, 2015; Castilho et al., 2012; Roine et al., 2009). Recent decades have witnessed the development of transportation and new technologies, such as the Internet, with reductions in trade costs, travel costs, and communication costs (Canh et al., 2020), potentially altering the effects of export quality on income inequality. With a reduction in travel and communication costs, the shift of high-quality production towards developing countries (mostly low- and middle-income economies) shifts relative labour demand towards unskilled workers rather than medium-skilled workers. As a result, the upgrading of export quality in developing countries can reduce overall income inequality. Meanwhile, economic development, technological development, and production quality are already at an advanced stage in most high-income economies, so upgrading export quality leads to greater income inequality due to the shift in labour demand towards high-skilled workers as an expectation.
### Table 2 Export quality and Income inequality (Gini index pre-tax and pre-transfer)

| Dep. Var: Gini1 | Sample | Estimator: | | | | | | | | | |
|-----------------|--------|------------|---|---|---|---|---|---|---|---|---|
|                 | Full sample | PCSE | FGLS | Twostep system GMM | Robust two-step system GMM | SELPDM | SELPDM with year effects | LMEs | FGLS | PCSE | FGLS |
| Income          | 11.75*** 11.75*** 13.80*** 13.80*** 8.877*** 8.952*** 28.44*** 28.44*** 33.53*** 33.53 | | | | | | | | | | |
|                 | [0.841] [1.315] [0.583] [4.924] [1.436] [1.670] [3.768] [7.739] [10.10] [22.16] | | | | | | | | | | |
| Income^2        | −0.636*** −0.636*** −0.693*** −0.693*** −0.478*** −0.478*** −1.873*** −1.873*** −1.961*** −1.961 | | | | | | | | | | |
|                 | [0.049] [0.076] [0.029] [0.261] [0.080] [0.094] [0.270] [0.544] [0.566] [1.265] | | | | | | | | | | |
| EQ              | −14.32*** −14.32*** −16.80*** −16.80*** −13.95*** −13.95*** −16.28*** −16.28*** −17.89*** −17.89*** | | | | | | | | | | |
|                 | [0.763] [1.572] [0.391] [6.512] [1.109] [1.798] [1.088] [2.027] [3.318] [5.175] | | | | | | | | | | |
| Inst            | 2.333*** 2.333*** 2.223*** 2.223* 2.139*** 2.052*** 5.649*** 5.649*** 5.049*** 5.049*** | | | | | | | | | | |
|                 | [0.217] [0.361] [0.088] [1.310] [0.270] [0.342] [0.863] [0.853] [0.977] [1.145] | | | | | | | | | | |
| Industry        | −0.186*** −0.186*** −0.148*** −0.148*** −0.169*** −0.169*** −0.192*** −0.192*** −0.025 −0.025 | | | | | | | | | | |
|                 | [0.008] [0.020] [0.006] [0.056] [0.015] [0.021] [0.027] [0.038] [0.023] [0.041] | | | | | | | | | | |
| HC              | −3.927*** −3.927*** −12.33*** −12.33*** −3.35*** −3.35*** −2.40* 0.315 0.315 | | | | | | | | | | |
|                 | [0.159] [0.800] [0.559] [4.815] [1.102] [1.333] [1.404] [1.204] [1.879] [2.021] | | | | | | | | | | |
| FDI             | −0.008** −0.008 −0.007*** −0.007* −0.008*** −0.008*** −0.180*** −0.180*** −0.429*** −0.429*** | | | | | | | | | | |
|                 | [0.003] [0.006] [0.000] [0.004] [0.002] [0.003] [0.074] [0.052] [0.156] [0.076] | | | | | | | | | | |
| Trade           | −0.008*** −0.008*** −0.003*** −0.003 −0.007*** −0.007*** −0.059*** −0.059*** −0.059*** −0.059*** | | | | | | | | | | |
|                 | [0.001] [0.002] [0.000] [0.005] [0.002] [0.003] [0.005] [0.009] [0.007] [0.009] | | | | | | | | | | |
| ED              | 0.604*** 0.604*** 1.485*** 1.485*** 0.682*** 0.682*** 0.538*** −0.672*** −0.672*** 0.578*** 0.578 0.388** 0.388 | | | | | | | | | | |
|                 | [0.095] [0.170] [0.048] [0.579] [0.132] [0.181] [0.154] [0.304] [0.178] [0.383] [0.152] [0.036] | | | | | | | | | | |
| Constant        | 16.09*** 16.09*** 13.95*** 13.95 27.20*** 26.41*** −42.67*** −42.67 −72.75 −72.75 224.7*** 224.7*** | | | | | | | | | | |
|                 | [3.249] [5.238] [2.089] [19.48] [5.774] [6.878] [12.78] [27.31] [45.14] [96.44] [12.55] [36.97] | | | | | | | | | | |

| Observations   | 1,196 1196 1196 1196 1196 1196 390 390 273 273 533 533 | | | | | | | | | | |
| R-squared      | 0.206 0.325 0.421 0.243 | | | | | | | | | | |
| No. of countries | 92 92 92 92 92 92 30 30 21 21 41 41 | | | | | | | | | | |
### Table 2 (continued)

| Dep. Var: Gini1 | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Sample          | Full sample | LMEs | UMEs | HIEs | LMEs | UMEs | HIEs | LMEs | UMEs | HIEs | LMEs | UMEs | HIEs |
| Estimator:      | PCSE | FGLS | Two step system GMM | Robust two step system GMM | SELPDM | SELPDM with year effects | PCSE | FGLS | PCSE | FGLS | PCSE | FGLS |
| IVs             | 91  | 67  | 67  | 67  | 91  | 91  | 67  | 67  | 0.238 | 0.238 | 0.061 | 0.133 |
| Hansen test     | 0.238 | 0.061 | 0.133 |

Standard errors are in [ ]; *, **, *** are significance levels at 10%, 5%, and 1%, respectively.
Empirically, this paper investigated the impact of export quality on income inequality over the period 2002–2014 in a global sample of 92 economies, including 30 low- and lower-middle-income economies, 21 upper-middle-income economies, and 41 high-income economies. Using different econometric techniques for balanced panel data to deal with cross-sectional dependence, heteroscedasticity and endogeneity, we obtained comprehensive results. First, export quality is found to have a significant negative effect on the Gini index pre-tax and pre-transfer for a global sample, implying that an increase in export quality gives rise to a reduction in income inequality. Second, we found that while export quality has a significant negative effect on income inequality for LMEs and UMEs, export quality has a significant positive effect for HIEs.

The study makes a significant contribution to the literature. This research is the first substantive attempt to study the influence of export quality on income inequality. Most previous research on trade liberalisation and income inequality focuses on the influence of trade openness (Furusawa et al., 2020; McCalman, 2018; Turnovsky & Rojas-Vallejos, 2018), and some recent studies have considered the effects of export dynamics, such as export diversification (Le et al., 2020). However, export quality is also an important feature of exporting, reflecting the quality of products for export, or the production systems. Alongside the dynamics of export quality is the evolution in production technologies, which is linked to labour demand and the cost of investment (Fan et al., 2015). In addition to the demand for funds for technological investment (e.g., R&D) (Fan et al., 2015), upgrading export product quality would bias a shift of labour demand towards skilled workers, which could then cause income inequality. Therefore, this study has added to the literature on the effects of export dynamics (export diversification and export quality) on income inequality. More interestingly, the study highlights that the effects of export quality in specific (or trade) activities on income inequality should be investigated for different income levels in order to form a comprehensive view.

In regard to policy implications, there is a negative impact of export quality on income inequality for LMEs and UMEs, and thus governments should implement supporting policies for domestic firms to upgrade product quality. The policies to support the upgrading of product quality in LMEs or UMEs would not only stimulate economic growth and create jobs, but would also improve social welfare. Conversely, the positive impact of export quality on income inequality for HIEs suggests that instead of policies to boost support for upgrading product quality, HIE governments should implement economic policies to reduce income inequality; which is in line with tax incentives for investment, and fiscal transfer. These policies would not only stimulate firms’ investment to boost product quality, but would also help to solve social inequality.

Since our study is carried out for the period 2002–2014, which is a relatively short time, we cannot conclude on the long-run effects of export quality on income inequality in the global sample or the three subsamples. Future studies should pay attention to the effects of export quality on income inequality in the long-run, or in sectoral studies. Interestingly, previous studies also show interest in sectoral diversification or specialisation and their influence on income inequality (e.g., Blancheton and Chhorn (2019)). For instance, there are nine product categories in the Standard International Trade Classification (SITC), including food and live animals, beverages and tobacco, crude materials—inedible, mineral fuels-lubricants and related materials, animal and vegetable oils and fats, chemicals, manufactured goods classified chiefly by material, machinery and transport equipment, miscellaneous manufactured articles, and others.11 As such, export quality by sector may have a heteroscedastic influence on income inequality, which should be further examined in future studies.

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11 See https://data.imf.org/?sk=3567E911-4282-4427-98F9-2B8A6F83C3B6.
Finally, from the perspective of free trade and globalisation, our findings imply that governments should design a full set of policies to boost inclusive growth and income inequality reduction: (i) creating an enabling environment for competition and export; (ii) adopting modern technology and spurring innovation to produce high-quality export goods; (iii) facilitating structural transformation from agriculture to manufacturing, and from rural to urban; and (iv) investing in human capital and creating income-earning opportunities for the poor.

Appendix (e-component)

See Tables 3, 4, 5, 6, 7, 8, 9, 10, 11.
Table 4  Data descriptions for the three subsamples

| Variables          | Definitions                                      | Obs | Mean   | S.D   | Min   | Max   |
|--------------------|--------------------------------------------------|-----|--------|-------|-------|-------|
| **30 low- and lower-middle-income economies (LMEs)** |
| Gini1              | Income inequality (before government influences) | 390 | 44.98  | 5.14  | 35.60 | 59.20 |
| Gini2              | Income inequality (after government influences)  | 390 | 42.62  | 5.25  | 33.50 | 55.70 |
| Income             | Income level                                     | 390 | 7.07   | 0.66  | 5.78  | 8.36  |
| Inst               | Overall institutional quality                    | 390 | −0.52  | 0.30  | −1.22 | 0.25  |
| Industry           | Industrialisation                                | 390 | 25.41  | 7.49  | 11.26 | 48.06 |
| HC                 | Human capital                                    | 390 | 0.70   | 0.27  | 0.08  | 1.20  |
| FDI                | FDI inflows                                      | 390 | 4.19   | 4.82  | −2.50 | 43.91 |
| Trade              | Trade openness                                   | 390 | 74.50  | 32.51 | 26.86 | 169.53|
| ED                 | Export diversification                           | 390 | −3.55  | 0.82  | −5.84 | −2.05 |
| EQ                 | Export quality                                   | 390 | 0.74   | 0.13  | 0.37  | 0.98  |
| **21 upper-middle-income economies (UMEs)** |
| Gini1              | Income inequality (before government influences) | 273 | 45.37  | 5.16  | 33.80 | 59.90 |
| Gini2              | Income inequality (after government influences)  | 273 | 41.69  | 5.97  | 26.40 | 51.90 |
| Income             | Income level                                     | 273 | 8.73   | 0.44  | 7.63  | 9.59  |
| Inst               | Overall institutional quality                    | 273 | −0.30  | 0.45  | −1.38 | 0.72  |
| Industry           | Industrialisation                                | 273 | 32.83  | 8.12  | 17.99 | 53.09 |
| HC                 | Human capital                                    | 273 | 0.93   | 0.16  | 0.48  | 1.21  |
| FDI                | FDI inflows                                      | 273 | 3.86   | 3.79  | −4.89 | 31.24 |
| Trade              | Trade openness                                   | 273 | 73.89  | 36.30 | 22.11 | 210.37|
| ED                 | Export diversification                           | 273 | −3.11  | 1.05  | −5.95 | −1.76 |
| EQ                 | Export quality                                   | 273 | 0.83   | 0.10  | 0.50  | 0.96  |
| **41 high-income economies (HIEs)** |
| Gini1              | Income inequality (before government influences) | 533 | 46.93  | 4.08  | 32.70 | 54.60 |
| Gini2              | Income inequality (after government influences)  | 533 | 31.45  | 5.93  | 22.80 | 50.80 |
| Income             | Income level                                     | 533 | 10.25  | 0.66  | 8.60  | 11.63 |
| Inst               | Overall institutional quality                    | 533 | 1.14   | 0.51  | −0.49 | 1.97  |
| Industry           | Industrialisation                                | 533 | 24.11  | 6.05  | 6.72  | 41.11 |
| HC                 | Human capital                                    | 533 | 1.15   | 0.11  | 0.80  | 1.32  |
| FDI                | FDI inflows                                      | 533 | 10.25  | 34.99 | −58.32| 451.72|
| Trade              | Trade openness                                   | 533 | 113.41 | 84.47 | 20.69 | 442.62|
| ED                 | Export diversification                           | 533 | −2.28  | 0.67  | −4.21 | −1.38 |
| EQ                 | Export quality                                   | 533 | 0.97   | 0.06  | 0.74  | 1.10  |
Table 5  Multicollinearity checks by Variance Inflation Factor (VIF)

| Variable | Sample | Full sample | LMEs | UMEs | HIEs |
|----------|--------|-------------|------|------|------|
|          | VIF    | 1/VIF       | VIF  | 1/VIF| VIF  | 1/VIF| VIF  | 1/VIF|
| Income   | 7.19   | 0.139       | 3.46 | 0.289| 1.67 | 0.600| 4.54 | 0.220|
| EQ       | 3.17   | 0.315       | 1.46 | 0.684| 4.87 | 0.205| 3.11 | 0.322|
| Inst     | 5.43   | 0.184       | 1.36 | 0.737| 4.42 | 0.226| 3.03 | 0.331|
| Industry | 1.42   | 0.705       | 1.79 | 0.560| 1.9  | 0.527| 1.38 | 0.725|
| HC       | 2.91   | 0.344       | 2.2  | 0.454| 1.64 | 0.609| 1.4  | 0.716|
| FDI      | 1.16   | 0.866       | 1.38 | 0.724| 1.45 | 0.688| 1.19 | 0.840|
| Trade    | 1.39   | 0.722       | 1.84 | 0.544| 2.01 | 0.498| 1.94 | 0.516|
| ED       | 1.81   | 0.552       | 1.36 | 0.733| 2.77 | 0.361| 1.76 | 0.567|
| Mean     | 3.06   | 1.86        | 2.59 | 2.29 |      |      |      |      |

VIF is variance inflation factor for the independent variables specified in a linear regression model.

Table 6  Endogeneity tests

| Dep. var | Gini1 | Sample | (1) | (2) | (3) | (4) |
|----------|-------|--------|-----|-----|-----|-----|
|          |       | Full sample | LMEs | UMEs | HIEs |
| Income   | 11.757*** | [1.320]  | 28.445*** | [7.840]  | 33.539 | [22.586]  | [7.518]  | −31.718*** | |
| Income²  | −0.636*** | [0.077]  | −1.873*** | [0.552]  | −1.961 | [1.288]  | [0.362]  | 1.392***  | |
| EQ       | −14.323*** | [1.579]  | −17.899*** | [2.054]  | −8.693 | [5.272]  | [4.745]  | 12.431*** | |
| Inst     | 2.333***  | [0.363]  | 5.649***  | [0.864]  | 5.049*** | [1.166]  | [0.539]  | 3.358***  | |
| Industry | −0.186*** | [0.020]  | −0.192*** | [0.039]  | −0.025 | [0.041]  | [0.030]  | −0.236*** | |
| HC       | 3.927***  | [0.803]  | 0.315     | [1.220]  | −8.022*** | [2.059]  | [1.716]  | −6.185*** | |
| FDI      | −0.008    | [0.006]  | −0.180*** | [0.053]  | −0.429*** | [0.077]  | [0.005]  | −0.006    | |
| Trade    | −0.008*** | [0.002]  | 0.002     | [0.009]  | −0.059*** | [0.010]  | [0.003]  | −0.015*** | |
| ED       | 0.604***  | [0.171]  | −0.672**  | [0.308]  | 0.578  | [0.390]  | [0.309]  | 0.388     | |
| Constant | 16.097*** | [5.260]  | −42.677   | [27.673] | −72.750 | [98.264] | [37.325] | 224.721*** | |
| Observations | 1.196   | 390       | 273       | 533      | 0.206 | 0.325 | 0.421 | 0.243 |
| R-squared | 0.0000  | 0.0000    | 0.0000    | 0.0000   | 0.206 | 0.325 | 0.421 | 0.243 |
| Durbin-Wu-Hausman chi-sq test p-value | 0.0000  | 0.0000    | 0.0000    | 0.0000   | 0.206 | 0.325 | 0.421 | 0.243 |

The instrumental variables (2SLS) regression is firstly estimated for each sample, the ivedog test (stata code) is implemented following each estimate; the H0 of Durbin-Wu-Hausman chi-sq test is Regressors are exogenous; the significance of Durbin-Wu-Hausman chi-sq test (p-value < 0.01) means that there may exist potential endogeneity.
| Dep. Var | Gini2 | Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Robust Pooled OLS | Pooled OLS | Robust twostep system GMM | SELPDM |
|----------|-------|-----------|------|------|------|------|------|------|------|-------------------|-----------|---------------------------|--------|
| Income   |       |           | 12.740*** | 15.050*** | 20.066*** | 20.277*** | 20.380*** | 20.751*** | 20.751*** | 20.751*** | 20.856*** | 19.061*** | 19.061*** | 17.959*** |
|          |       |           | [0.494] | [0.556] | [0.746] | [0.803] | [0.826] | [0.972] | [1.552] | [1.559] | [1.947] | [1.568] | [0.650] | [5.742] | [2.494] |
| Income²  |       |           | -0.857*** | -0.971*** | -1.188*** | -1.202*** | -1.224*** | -1.224*** | -1.224*** | -1.224*** | -1.231*** | -1.120*** | -1.120*** | -1.073*** |
|          |       |           | [0.028] | [0.029] | [0.040] | [0.044] | [0.045] | [0.054] | [0.090] | [0.090] | [0.087] | [0.091] | [0.035] | [0.312] | [0.140] |
| EQ       |       |           | -15.763*** | -16.658*** | -7.519*** | -18.096*** | -17.384*** | -17.384*** | -17.384*** | -17.384*** | -17.384*** | -19.116*** | -19.116*** | -14.848*** |
|          |       |           | [1.290] | [1.282] | [1.240] | [1.260] | [1.191] | [1.010] | [1.856] | [1.864] | [1.945] | [1.877] | [0.196] | [6.897] | [1.426] |
| Inst     |       |           | -0.269 | -0.827*** | -0.441* | -0.378 | -0.378 | -0.378 | -0.378 | -0.378 | -0.378 | -0.858*** | -0.858 | -0.727** |
|          |       |           | [0.227] | [0.257] | [0.267] | [0.255] | [0.276] | [0.275] | [0.426] | [0.423] | [0.452] | [0.436] | [0.113] | [1.489] | [0.343] |
| Industry |       |           | -0.104*** | -0.088*** | -0.094*** | -0.092*** | -0.097*** | -0.097*** | -0.097*** | -0.097*** | -0.099*** | -0.099*** | -0.070*** | -0.070 | -0.068*** |
|          |       |           | [0.010] | [0.009] | [0.010] | [0.012] | [0.023] | [0.023] | [0.022] | [0.022] | [0.024] | [0.006] | [0.090] | [0.006] | [0.020] |
| HC       |       |           | -9.789*** | -9.813*** | -10.102*** | -9.892*** | -9.892*** | -9.892*** | -9.892*** | -9.892*** | -8.486*** | -11.385*** | -11.385* | -8.762*** |
|          |       |           | [0.241] | [0.230] | [0.225] | [0.148] | [0.944] | [0.948] | [0.875] | [0.875] | [0.574] | [6.689] | [1.547] | [6.689] | [1.640] |
| FDI      |       |           | -0.017*** | -0.022* | -0.023*** | -0.023*** | -0.023*** | -0.023*** | -0.024*** | -0.024*** | -0.019*** | -0.019*** | -0.023*** |
|          |       |           | [0.008] | [0.010] | [0.010] | [0.007] | [0.007] | [0.005] | [0.007] | [0.005] | [0.000] | [0.006] | [0.000] | [0.002] |
| Trade    |       |           | 0.006*** | 0.005* | 0.005* | 0.005* | 0.005* | 0.005* | 0.008*** | 0.008*** | 0.008* | 0.004* |
|          |       |           | [0.002] | [0.002] | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] | [0.012] | [0.012] |
| ED       |       |           | -0.263** | -0.263 | -0.263 | -0.263 | -0.263 | -0.263 | -0.200 | -0.040*** | -0.804 | -0.804 | -0.078 |
|          |       |           | [0.125] | [0.201] | [0.201] | [0.194] | [0.204] | [0.204] | [0.047] | [1.036] | [1.036] | [1.036] |
| Constant |       |           | 7.516*** | -0.119 | -17.461*** | -18.079*** | -18.541*** | -21.417*** | -21.417*** | -21.417*** | -22.110*** | -9.762*** | -9.762 | -12.511 |
|          |       |           | [1.191] | [1.535] | [2.168] | [2.406] | [2.484] | [3.714] | [6.184] | [6.210] | [5.792] | [6.275] | [2.366] | [22.782] | [9.923] |
### Table 7 (continued)

| Dep. Var | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| Gini2    |     |     |     |     |     |     |     |     |     |      |      |      |      |
| Estimator| PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Twostep system GMM | Robust twostep system GMM | SELPDM |
| Observations | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 |
| R-squared  | 0.538 | 0.546 | 0.584 | 0.587 | 0.589 | 0.589 | 0.589 | 0.589 | 0.590 |      |      |      |      |
| No. of countries | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| IVs       |     |     |     |     |     |     |     |     |     |      |      |      |      |
| Hansen test – p-value |     |     |     |     |     |     |     |     |     | 0.309 | 0.309 | 0.058 |      |

Standard errors are in [ ]; *, **, *** are significance levels at 10%, 5%, and 1%, respectively.
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Robust Pooled OLS | Twostep system GMM | Robust twostep system GMM | SELPDM |
|-----------|------|------|------|------|------|------|------|------------|------------------|------------------|------------------|------------------|------------------|-------|
| Dep. Var: Log of Gini1 | | | | | | | | | | | | | | |
| Income | 0.131*** | 0.224*** | 0.274*** | 0.278*** | 0.274*** | 0.254*** | 0.254*** | 0.254*** | 0.254*** | 0.254*** | 0.296*** | 0.296*** | 0.193*** |
| [0.014] | [0.014] | [0.015] | [0.016] | [0.015] | [0.018] | [0.029] | [0.029] | [0.026] | [0.030] | [0.013] | [0.109] | [0.030] | |
| Income2 | −0.008*** | −0.013*** | −0.015*** | −0.015*** | −0.014*** | −0.014*** | −0.014*** | −0.014*** | −0.015*** | −0.015** | −0.015*** | −0.015*** | |
| [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.002] | [0.002] | [0.001] | [0.002] | [0.001] | [0.006] | [0.002] | |
| EQ | −0.252*** | −0.288*** | −0.296*** | −0.295*** | −0.272*** | −0.312*** | −0.312*** | −0.312*** | −0.312*** | −0.312*** | −0.369*** | −0.369*** | −0.298*** |
| [0.020] | [0.020] | [0.020] | [0.017] | [0.017] | [0.017] | [0.035] | [0.035] | [0.042] | [0.035] | [0.009] | [0.140] | [0.025] | |
| Inst | 0.070*** | 0.048*** | 0.051*** | 0.053*** | 0.056*** | 0.051*** | 0.051*** | 0.051*** | 0.051*** | 0.051*** | 0.048*** | 0.048* | 0.047*** |
| [0.005] | [0.005] | [0.005] | [0.005] | [0.005] | [0.005] | [0.008] | [0.008] | [0.008] | [0.008] | [0.002] | [0.028] | [0.006] | |
| Industry | −0.004*** | −0.004*** | −0.004*** | −0.004*** | −0.004*** | −0.004*** | −0.004*** | −0.004*** | −0.004*** | −0.003** | −0.003*** | −0.003*** | |
| [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] | [0.001] | [0.000] | |
| HC | −0.096*** | −0.096*** | −0.096*** | −0.096*** | −0.097*** | −0.097*** | −0.097*** | −0.097*** | −0.094*** | −0.276*** | −0.276* | −0.079*** |
| [0.003] | [0.003] | [0.004] | [0.004] | [0.018] | [0.018] | [0.017] | [0.018] | [0.013] | [0.109] | [0.024] | |
| FDI | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000** | −0.000*** | −0.000*** | |
| [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | |
| Trade | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | |
| [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | |
| ED | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | |
| [0.002] | [0.002] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | |
| Constant | 3.502*** | 3.194*** | 3.024*** | 3.010*** | 3.028*** | 3.186*** | 3.186*** | 3.186*** | 3.186*** | 3.186*** | 3.186*** | 3.186*** | 3.186*** |
| [0.042] | [0.041] | [0.045] | [0.051] | [0.046] | [0.069] | [0.117] | [0.118] | [0.103] | [0.119] | [0.047] | [0.436] | [0.123] | |
| Year effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 | 1,196 |
| R-squared | 0.091 | 0.155 | 0.175 | 0.182 | 0.194 | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 |
| No. of countries | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| IVs | | | | | | | | | | | | | | |
Table 8 (continued)

Part A: Log of Gini index pre-tax and pre-transfer

| Dep. Var: Log of Gini1 | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Estimator              | PCSE| PCSE| PCSE| PCSE| PCSE| PCSE| FGLS| Pooled OLS| Robust Pooled OLS| Pooled OLS| Twostep system GMM| Robust two-step system GMM| SELPDM |
|                        |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Hansen test – p-value  | 0.249| 0.249| 0.057|

Part B: Log of Gini index post-tax and post-transfer

| Dep. Var: Gini2       | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) | (26) |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Estimator              | PCSE| PCSE| PCSE| PCSE| PCSE| PCSE| FGLS| Pooled OLS| Robust Pooled OLS| Pooled OLS| Twostep system GMM| Robust two-step system GMM| SELPDM |
| Income                 | 0.346***| 0.417***| 0.555***| 0.561***| 0.564***| 0.575***| 0.575***| 0.575***| 0.575***| 0.577***| 0.513***| 0.513***| 0.479***|
| (0.011)                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Income²                | −0.023***| −0.027***| −0.033***| −0.033³***| −0.034***| −0.034***| −0.034***| −0.034***| −0.034***| −0.034***| −0.030***| −0.030***| −0.029***|
| (0.001)                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| EQ                     | −0.358***| −0.386***| −0.409***| −0.409***| −0.426***| −0.406***| −0.406***| −0.406***| −0.406***| −0.406***| −0.457***| −0.457***| −0.356***|
| (0.03)                 |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Inst                   | −0.020***| −0.026***| −0.022***| −0.027***| −0.025***| −0.025***| −0.025***| −0.025***| −0.023***| −0.037***| −0.037 | −0.029***|
| (0.005)                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Industry               | −0.003***| −0.003***| −0.003³***| −0.003***| −0.003***| −0.003***| −0.003***| −0.003***| −0.003***| −0.003***| −0.002***| −0.002 | −0.002***|
| (0.000)                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| HC                     | −0.270***| −0.270***| −0.279***| −0.273***| −0.273***| −0.273***| −0.273***| −0.273***| −0.273***| −0.317***| −0.317*| −0.248***|
| (0.005)                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| FDI                    | −0.001***| −0.001***| −0.001***| −0.001***| −0.001***| −0.001***| −0.001***| −0.001***| −0.001***| −0.001***| −0.001***| −0.001***|
| (0.000)                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Trade                  | 0.000***| 0.000***| 0.000***| 0.000***| 0.000***| 0.000***| 0.000***| 0.000***| 0.000***| 0.000***| 0.000***| 0.000***| 0.000***|
Table 8 (continued)

Part B: Log of Gini index post-tax and post-transfer

| Dep. Var | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) | (26) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two-step system GMM | Robust two-step system GMM | SELPDM |
| ED | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Constant | 2.738*** | 2.504*** | 2.026*** | 2.008*** | 1.995*** | 1.914*** | 1.914*** | 1.914*** | 1.914*** | 1.895*** | 2.303*** | 2.303*** | 2.263*** |
| Year effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 | 1.196 |
| R-squared | 0.549 | 0.558 | 0.596 | 0.599 | 0.601 | 0.602 | 0.602 | 0.602 | 0.602 | 0.602 | 0.602 | 0.602 | 0.602 |
| No. of countries | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| IVs | 91 | 91 | 91 | 67 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 |
| Hansen test – p-value | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 | 0.364 |

Standard errors are in [ ]; * , ** , *** are significant levels at 10%, 5%, and 1%, respectively
### Table 9  Export quality and Income inequality in low- and lower-middle-income economies (LMEs): Sensitivity check

| Dep. Var | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|------|
| Income   | 23.367*** | 28.056*** | 28.460*** | 28.155*** | 27.978*** | 28.445*** | 28.445*** | 28.445*** | 28.445*** | 28.197*** | 29.146* | 28.677** |
|          | [4.147] | [4.067] | [3.858] | [3.904] | [3.786] | [3.768] | [7.739] | [7.840] | [7.377] | [7.952] | [16.333] | [11.832] |
| Income²  | −1.647*** | −1.872*** | −1.897*** | −1.884*** | −1.873*** | −1.873*** | −1.873*** | −1.873*** | −1.873*** | −1.849*** | −1.923*** | −1.927** |
|          | [0.298] | [0.290] | [0.275] | [0.280] | [0.278] | [0.270] | [0.544] | [0.552] | [0.522] | [0.560] | [1.181] | [0.829] |
| EQ       | −16.776*** | −16.831*** | −16.874*** | −17.158*** | −17.223*** | −17.899*** | −17.899*** | −17.899*** | −17.899*** | −17.961*** | −15.214*** | −16.439*** |
|          | [0.879] | [0.819] | [0.804] | [0.835] | [0.961] | [1.088] | [2.027] | [2.054] | [2.361] | [2.084] | [2.145] | [1.592] |
| Inst     | 6.480*** | 5.438*** | 5.403*** | 5.757*** | 5.743*** | 5.649*** | 5.649*** | 5.649*** | 5.649*** | 5.657*** | 3.220*** | 3.389*** |
|          | [0.782] | [0.794] | [0.842] | [0.873] | [0.859] | [0.863] | [0.853] | [0.864] | [1.056] | [0.884] | [0.791] | [1.103] |
| Industry | −0.194*** | −0.194*** | −0.184*** | −0.184*** | −0.192*** | −0.192*** | −0.192*** | −0.192*** | −0.192*** | −0.197*** | −0.145*** | −0.142*** |
|          | [0.026] | [0.026] | [0.028] | [0.028] | [0.027] | [0.038] | [0.039] | [0.035] | [0.040] | [0.022] | [0.026] |
| HC       | −0.196 | 0.176 | 0.085 | 0.315 | 0.315 | 0.315 | 0.315 | 0.489 | −6.241*** | −2.133 |
|          | [0.398] | [0.475] | [0.387] | [0.404] | [1.204] | [1.220] | [1.135] | [1.243] | [1.353] | [1.518] |
| FDI      | −0.149*** | −0.152** | −0.180** | −0.180*** | −0.180*** | −0.180*** | −0.180*** | −0.180*** | −0.125*** | −0.134*** |
|          | [0.055] | [0.061] | [0.074] | [0.052] | [0.053] | [0.054] | [0.055] | [0.012] | [0.038] |
| Trade    | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.001 | 0.019*** | −0.004 |
|          | [0.004] | [0.005] | [0.009] | [0.009] | [0.009] | [0.009] | [0.009] | [0.005] | [0.007] |
| ED       | −0.672*** | −0.672** | −0.672** | −0.672** | −0.672** | −0.705*** | 0.952*** | 0.341 |
|          | [0.154] | [0.304] | [0.308] | [0.348] | [0.314] | [0.326] | [0.399] |
| Constant | −21.430 | −38.803*** | −40.258*** | −38.275*** | −37.670*** | −42.677*** | −42.677 | −42.677*** | −42.677*** | −42.084 | −41.064 | −41.243 |
|          | [13.891] | [13.679] | [13.119] | [13.119] | [13.129] | [12.788] | [27.315] | [27.673] | [25.667] | [28.064] | [56.512] | [40.923] |
| Year effects | Yes |
| Observations | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 |
| R-squared | 0.252 | 0.297 | 0.297 | 0.316 | 0.316 | 0.325 | 0.325 | 0.325 | 0.325 | 0.325 | 0.325 | 0.325 |
Table 9  (continued)

| Dep. Var | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Gini1    |     |     |     |     |     |     |     |     |     |      |      |      |
| No. of countries | 30  | 30  | 30  | 30  | 30  | 30  | 30  | 30  | 30  | 30   | 30   | 30   |
| IVs      |     |     |     |     |     |     |     |     |     | 79   | 43   |      |
| Hansen test – p-value | 1.000 | 0.962 | 1.000 | 0.962 | 1.000 | 0.962 | 1.000 | 0.962 | 1.000 | 0.962 |

Part B: Log of Gini index pre-tax and pre-transfer

| Dep. Var | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Log of Gini1 |     |     |     |     |     |     |     |     |     |      |      |      |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS |
|           |      |      |      |      |      |      |      |      |      |      |      |      |
| Income   | 0.474*** | 0.578*** | 0.599*** | 0.591*** | 0.582*** | 0.591*** | 0.591*** | 0.591*** | 0.591*** | 0.591*** | 0.585*** | 0.589 |
|          | [0.091] | [0.089] | [0.084] | [0.086] | [0.084] | [0.082] | [0.171] | [0.173] | [0.166] | [0.176] | [0.367] | [0.278] |
| Income²  | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     |
|          | 0.033*** | 0.038*** | 0.040*** | 0.039*** | 0.039*** | 0.039*** | 0.039*** | 0.039*** | 0.039*** | 0.039*** | 0.039*** | 0.039*** |
|          | [0.007] | [0.006] | [0.006] | [0.006] | [0.006] | [0.012] | [0.012] | [0.012] | [0.012] | [0.012] | [0.027] | [0.019] |
| EQ       | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     |
|          | 0.363*** | 0.365*** | 0.367*** | 0.374*** | 0.377*** | 0.389*** | 0.389*** | 0.389*** | 0.389*** | 0.389*** | 0.390*** | 0.336*** |
|          | [0.019] | [0.017] | [0.017] | [0.018] | [0.021] | [0.024] | [0.045] | [0.045] | [0.050] | [0.046] | [0.050] | [0.040] |
| Inst     | 0.146*** | 0.123*** | 0.121*** | 0.129*** | 0.129*** | 0.127*** | 0.127*** | 0.127*** | 0.127*** | 0.127*** | 0.075*** | 0.078*** |
|          | [0.017] | [0.017] | [0.018] | [0.019] | [0.019] | [0.019] | [0.019] | [0.019] | [0.024] | [0.020] | [0.018] | [0.024] |
| Industry | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     | −     |
|          | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** |
Table 9 (continued)

Part B: Log of Gini index pre-tax and pre-transfer

| Dep. Var Log of Gini1 | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Estimator             | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust OLS | Pooled OLS | Two step system GMM | SELPDM |
| HC                    | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.002 | 0.001 | 0.001 |
| FDI                   | 0.001 | 0.002 | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 |
| Trade                 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| ED                    | 0.012*** | 0.012* | 0.012* | 0.012*** | 0.012*** | 0.012*** | 0.012*** | 0.012*** | 0.012*** | 0.012*** | 0.012*** | 0.012*** |
| Constant              | 2.478*** | 2.094*** | 2.019*** | 2.067*** | 2.097*** | 2.007*** | 2.007*** | 2.007*** | 2.007*** | 2.020*** | 2.112 | 1.761* |
| Year effects          | yes | | | | | | | | | | | |
| Observations          | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 |
| R-squared             | 0.247 | 0.299 | 0.287 | 0.287 | 0.285 | 0.279 | 0.604 | 0.612 | 0.579 | 0.620 | 1.265 | 0.959 |
| No. of countries      | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
Table 9 (continued)

### Part B: Log of Gini index pre-tax and pre-transfer

| Dep. Var | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Log of Gini1 |      |      |      |      |      |      |      |      |      |      |      |      |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Twostep system GMM | SELPDM |
|          |      |      |      |      |      |      |      |      |      |      |      |      |
| IVs      |      |      |      |      |      |      |      |      |      |      |      |      |
| Hansen test |      |      | 79   | 43   |      |      |      |      |      |      |      |      |
| p-value  |      |      | 1.000 | 0.968 |      |      |      |      |      |      |      |      |

### Part C: Gini index post-tax and post-transfer

| Dep. Var | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) | (33) | (34) | (35) | (36) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Gini2    |      |      |      |      |      |      |      |      |      |      |      |      |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Twostep system GMM | SELPDM |
|          |      |      |      |      |      |      |      |      |      |      |      |      |
| Income   | –10.575*** | –9.922*** | –2.606 | –3.064 | 1.059 | 2.084 | 2.084 | 2.084 | 2.084 | 1.734 | 5.022 | –12.850 |
|          | [2.704] | [2.699] | [2.802] | [2.999] | [2.502] | [2.576] | [7.181] | [7.275] | [6.678] | [7.359] | [11.482] | [11.521] |
| Income²  | 0.844*** | 0.813*** | 0.363* | 0.383* | 0.077 | 0.071 | 0.071 | 0.071 | 0.071 | 0.103 | –0.170 | 1.178 |
|          | [0.196] | [0.194] | [0.208] | [0.179] | [0.188] | [0.505] | [0.512] | [0.469] | [0.518] | [0.820] | [0.821] |      |
| EQ       | –25.099*** | –25.107*** | –25.879*** | –26.306*** | –24.796*** | –26.277*** | –26.277*** | –26.306*** | –26.277*** | –26.277*** | –26.277*** | –26.277*** |
|          | [1.110] | [1.104] | [1.108] | [1.114] | [1.369] | [1.881] | [1.905] | [1.846] | [1.929] | [2.126] | [2.124] |      |
| Inst     | 4.618*** | 4.473*** | 3.839*** | 4.370*** | 4.697*** | 4.492*** | 4.492*** | 4.492*** | 4.492*** | 4.492*** | 4.492*** | 3.405*** |
|          | [0.601] | [0.584] | [0.602] | [0.598] | [0.566] | [0.577] | [0.792] | [0.802] | [0.868] | [0.818] | [0.749] | [0.684] |
| Industry | –0.027 | –0.027 | –0.012 | –0.006 | –0.022 | –0.022 | –0.022 | –0.022 | –0.022 | –0.028 | –0.026 | –0.032 |
|          | [0.023] | [0.022] | [0.026] | [0.025] | [0.025] | [0.036] | [0.036] | [0.031] | [0.037] | [0.042] | [0.029] |      |
| HC       | –3.547*** | –2.989*** | –0.886*** | –0.384 | –0.384 | –0.384 | –0.384 | –0.384 | –0.384 | –0.166 | –1.278 | –4.657*** |
Table 9 (continued)

| Dep. Var | Gini2 | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) | (33) | (34) | (35) | (36) |
|----------|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Estimator | PCSE  | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled | OLS  | Robust | Pooled | OLS  | Two-step |
|          |       |      |      |      |      |      |      | OLS       |      | OLS system |        |      | GMMSELPD |
|          | PCSE  |      |      |      |      |      |      |           |      |            |        |      |        |
|          | OLS   |      |      |      |      |      |      |           |      |            |        |      |        |
|          | Robust |      |      |      |      |      |      |           |      |            |        |      |        |
|          | Pooled |      |      |      |      |      |      |           |      |            |        |      |        |
|          | OLS    |      |      |      |      |      |      |           |      |            |        |      |        |
|          | Two-step |      |      |      |      |      |      |           |      |            |        |      |        |
|          | GMM    |      |      |      |      |      |      |           |      |            |        |      |        |
|          | SELPD  |      |      |      |      |      |      |           |      |            |        |      |        |
| FDI      |       | -0.223*** | -0.132** | -0.194*** | -0.194*** | -0.194*** | -0.194*** | -0.194*** | -0.195*** | -0.195*** | -0.195*** | -0.195*** | -0.253*** |
|          |       | [0.058] | [0.054] | [0.071] | [0.049] | [0.049] | [0.037] | [0.050] | [0.028] | [0.026] | [0.028] | [0.026] |
| Trade    |       | -0.035*** | -0.033*** | -0.033*** | -0.033*** | -0.033*** | -0.033*** | -0.033*** | -0.035*** | -0.026*** | -0.026*** | -0.026*** | -0.012 |
|          |       | [0.004] | [0.008] | [0.008] | [0.008] | [0.011] | [0.009] | [0.008] | [0.009] | [0.009] | [0.009] | [0.009] |
| ED       |       | -1.473*** | -1.473*** | -1.473*** | -1.473*** | -1.473*** | -1.513*** | -1.045** | -1.260*** | -1.260*** | -1.260*** | -1.260*** |
|          |       | [0.208] | [0.282] | [0.286] | [0.255] | [0.290] | [0.381] | [0.326] | [0.326] | [0.326] | [0.326] | [0.326] |
| Constant |       | 95.737*** | 93.318*** | 67.005*** | 69.978*** | 55.913*** | 44.942*** | 44.942* | 44.942* | 44.942* | 45.769* | 33.401 | 95.662*** |
|          |       | [9.189] | [9.222] | [9.517] | [10.439] | [8.610] | [8.619] | [25.345] | [25.676] | [23.599] | [25.969] | [40.324] | [40.938] |
| Year effects | Yes |       |       |       |       |       |       |       |       |       |       |       |       |
| Observations | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 | 390 |
| R-squared | 0.318 | 0.319 | 0.337 | 0.378 | 0.403 | 0.442 | 0.442 | 0.442 | 0.448 |       |       |       |       |
| No. of countries | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| IVs |       |       |       |       |       |       |       |       |       |       |       |       | 79 |
| Hansen test – |       |       |       |       |       |       |       |       |       |       |       | 1.000 | 0.998 |
| p-value |       |       |       |       |       |       |       |       |       |       |       |       |       |
Part D: Log of Gini index post-tax and post-transfer

| Dep. Var | (37) | (38) | (39) | (40) | (41) | (42) | (43) | (44) | (45) | (46) | (47) | (48) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Log of Gini2 | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two step system GMM | SELPDM |
| Income | − | − | 1.510*** | 1.482*** | 1.235*** | 1.069*** | 1.069* | 1.069* | 1.069* | 0.943 | 8.630** | 4.598 |
| Income2 | 0.038*** | 0.033** | − | − | − | − | 0.065* | − 0.065* | − 0.065** | − 0.058* | − 0.490** | − 0.264 |
| EQ | 0.134 | 0.144 | 0.220*** | 0.126* | 0.098 | 0.256*** | 0.256* | 0.256* | 0.256* | 0.193 | 0.171 | 0.197 |
| Inst | − 0.009 | − 0.028 | − 0.009 | 0.034*** | 0.094*** | 0.094*** | 0.094*** | 0.094*** | 0.113*** | − 0.007 | 0.004 |
| Industry | − | − | − | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | − 0.004 | − 0.002 |
| HC | 0.002*** | 0.001*** | 0.002*** | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 | [0.003] | [0.002] |
| FDI | − | − | − | − | − | − | − | − | − | − | − | − |

Table 9 (continued)
Table 9 (continued)

Part D: Log of Gini index post-tax and post-transfer

| Dep. Var | (37) | (38) | (39) | (40) | (41) | (42) | (43) | (44) | (45) | (46) | (47) | (48) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Log of Gini2 |      |      |      |      |      |      |      |      |      |      |      |      |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two-step system GMM | SELPDM |
| Trade | − | − | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.000 | − 0.000 |
| ED | − | − | − | 0.018*** | 0.018* | 0.018* | 0.018** | 0.017 | 0.017 | 0.017 | 0.026 | 0.005 |
| Constant | 7.304*** | 6.899*** | − 2.369* | − 2.080* | − 0.895 | − 0.330 | − 0.330 | − 0.330 | − 0.330 | − 0.280 | − 32.997** | − 15.709 |
| Year effects |      |      |      |      |      |      |      |      |      |      |      |      |
| Observations | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 |
| R-squared | 0.083 | 0.083 | 0.423 | 0.481 | 0.512 | 0.518 | 0.518 | 0.518 | 0.518 | 0.518 | 0.538 | 0.538 |
| No. of countries | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| IVs |      |      |      |      |      |      |      |      |      |      | 79 | 43 |
| Hansen test |      |      |      |      |      |      |      |      |      |      | − | 1.000 |
| − p-value |      |      |      |      |      |      |      |      |      |      | 0.997 |      |

Standard errors are in [ ]; *, **, *** are significance levels at 10%, 5%, and 1%, respectively.
## Table 10  
Export quality and Income inequality in upper-middle-income economies (UMEs): Sensitivity check

| Dep. Var | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Gin1     |     |     |     |     |     |     |     |     |     |      |      |      |
| Estimator| PCSE| PCSE| PCSE| PCSE| PCSE| PCSE| FGLS| Pooled| OLS  | Robust| Pooled| Pooled|
|          |     |     |     |     |     |     |     |      |      |      |      |      |
| Income   | – 20.489*** | – 11.866** | 43.622*** | 42.483*** | 28.163*** | 33.539*** | 33.539 | 33.539 | 33.539 | 27.055 | 262.301* | 126.502** |
|          | [5.674] | [4.653] | [11.203] | [9.691] | [9.337] | [10.103] | [22.168] | [22.586] | [19.588] | [21.966] | [137.859] | [63.771] |
| Income2  | 1.150*** | 0.673** | – 2.377*** | – 2.379*** | – 1.961*** | – 1.961 | – 1.961 | – 1.961 | – 1.961 | – 1.961 | – 1.961 | – 1.961* |
|          | [0.318] | [0.262] | [0.628] | [0.547] | [0.520] | [0.566] | [1.265] | [1.288] | [1.110] | [1.252] | [7.902] | [3.671] |
| EQ       | – 0.977 | – 0.113 | 1.828 | – 2.024 | – 3.594 | – 8.693*** | – 8.693 | – 8.693 | – 8.693 | – 10.313* | – 0.695 | – 7.043 |
|          | [3.049] | [2.787] | [2.333] | [2.161] | [2.884] | [3.318] | [5.175] | [5.272] | [5.345] | [5.288] | [11.996] | [7.778] |
| Inst     | 0.975 | – 0.668 | – 0.192 | 1.562*** | 5.046*** | 5.049*** | 5.049*** | 5.049*** | 5.049*** | 5.049*** | 5.049*** | 5.049*** |
|          | [0.709] | [0.748] | [0.713] | [0.561] | [0.953] | [0.977] | [1.145] | [1.166] | [1.206] | [1.172] | [1.623] | [1.122] |
| Industry | – 0.147*** | – 0.141*** | – 0.156*** | – 0.200 | – 0.025 | – 0.025 | – 0.025 | – 0.025 | – 0.025 | – 0.025 | – 0.025 | – 0.025 |
|          | [0.017] | [0.019] | [0.013] | [0.022] | [0.023] | [0.041] | [0.041] | [0.041] | [0.041] | [0.041] | [0.041] | [0.041] |
| HC       | – 16.958*** | – 12.294*** | – 8.192*** | – 8.022*** | – 8.022*** | – 8.022*** | – 8.022*** | – 8.022*** | – 8.022*** | – 8.022*** | – 8.022*** | – 8.022*** |
|          | [0.412] | [1.959] | [1.879] | [2.021] | [2.059] | [2.448] | [2.066] | [2.066] | [2.066] | [2.066] | [2.066] | [2.066] |
| FDI      | – 0.476*** | – 0.420*** | – 0.429*** | – 0.429*** | – 0.429*** | – 0.429*** | – 0.429*** | – 0.429*** | – 0.429*** | – 0.429*** | – 0.429*** | – 0.429*** |
|          | [0.162] | [0.152] | [0.156] | [0.076] | [0.077] | [0.072] | [0.082] | [0.082] | [0.082] | [0.082] | [0.082] | [0.082] |
| Trade    | – 0.061*** | – 0.059*** | – 0.059*** | – 0.059*** | – 0.059*** | – 0.059*** | – 0.059*** | – 0.059*** | – 0.059*** | – 0.059*** | – 0.059*** | – 0.059*** |
|          | [0.007] | [0.007] | [0.009] | [0.010] | [0.010] | [0.009] | [0.009] | [0.009] | [0.009] | [0.009] | [0.009] | [0.009] |
| ED       | 0.578*** | 0.578 | 0.578 | 0.578* | 0.578* | 0.555 | 0.494 | 0.424 |
|          | [0.178] | [0.383] | [0.390] | [0.342] | [0.380] | [1.288] | [0.745] |
| Constant | 137.511*** | 102.214*** | – 135.005*** | – 123.166*** | – 54.461 | – 72.750 | – 72.750 | – 72.750 | – 72.750 | – 43.765 | – 1,073.360* | – 479.436* |
|          | [27.003] | [21.393] | [50.263] | [43.171] | [42.866] | [45.140] | [96.447] | [98.264] | [85.740] | [95.666] | [584.913] | [272.802] |
| Year effects | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Observations | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 |
| R-squared | 0.006 | 0.043 | 0.237 | 0.322 | 0.416 | 0.421 | 0.421 | 0.421 | 0.421 | 0.421 | 0.483 | 0.483 |
| No. of countries | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
### Table 10 (continued)

#### Part A: Gini index pre-tax and pre-transfer

| Dep. Var | (1)    | (2)    | (3)    | (4)    | (5)    | (6)    | (7)    | (8)    | (9)    | (10)   | (11)   | (12)   |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| **IVs**  | Hansen test – p-value | 79 | 43 | 1.000 | 0.999 |

#### Part B: Log of Gini index pre-tax and pre-transfer

| Dep. Var | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| **Estimator** | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Twostep system GMM | SELPDM |
| Income   | −0.401*** | −0.229*** | 1.053*** | 1.026*** | 0.724*** | 0.796*** | 0.796* | 0.796* | 0.796* | 0.796* | 0.796* | 0.796* |
| Income²  | 0.022*** | 0.013*** | −0.058*** | −0.058*** | −0.043*** | −0.047*** | −0.047* | −0.047* | −0.047* | −0.047* | −0.047* | −0.047* |
| EQ       | 0.029 | 0.046 | 0.091* | 0.000 | −0.033 | −0.101 | −0.101 | −0.101 | −0.101 | −0.138 | 0.002 | −0.195** |
| Inst     | 0.010 | −0.023 | −0.012 | 0.029*** | 0.103*** | 0.103*** | 0.103*** | 0.103*** | 0.103*** | 0.103*** | 0.103*** | 0.103*** |
| Industry | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 |
| HC       | −0.392*** | −0.282*** | −0.195*** | −0.193*** | −0.193*** | −0.193*** | −0.193*** | −0.193*** | −0.193*** | −0.193*** | −0.193*** | −0.193*** | −0.193*** |

* p ≤ 0.10, ** p ≤ 0.05, *** p ≤ 0.01
Table 10 (continued)

Part B: Log of Gini index pre-tax and pre-transfer

| Dep. Var | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Log of Gini |      |      |      |      |      |      |      |      |      |      |      |      |
| Estimator  | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust OLS | Pooled OLS | Twostep system GMM | SELPDM |
| FDI        | [0.011] | [0.045] | [0.043] | [0.043] | [0.045] | [0.046] | [0.054] | [0.046] | [0.208] | [0.092] |      |      |
|            | − 0.011*** | − 0.010*** | − 0.010*** | −      | −      | −      | − 0.004*** | − 0.010*** |      |      |      |      |
|            | [0.004] | [0.004] | [0.004] | [0.002] | [0.002] | [0.002] | [0.002] | [0.002] | [0.001] | [0.002] |      |      |
| Trade      | − 0.001*** | − 0.001*** | −      | −      | −      | − 0.000 | −      |      |      |      |      |      |
|            | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |      |      |
| ED         | 0.008** | 0.008 | 0.008 | 0.008 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.010 | 0.017 |
| Constant   | 5.575*** | 4.873*** | − 0.608 | − 0.329 | 1.122 | 0.875 | 0.875 | 0.875 | 0.875 | 1.514 | − 23.012* | − 20.687** |
|            | [0.603] | [0.471] | [1.186] | [1.008] | [1.003] | [1.049] | [2.145] | [2.186] | [1.905] | [2.132] | [13.069] | [10.304] |
| Year effects| yes |      |      |      |      |      |      |      |      |      |      |      |
| Observations | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 |
| R-squared   | 0.006 | 0.035 | 0.243 | 0.338 | 0.423 | 0.424 | 0.424 | 0.424 | 0.484 |      |      |      |
| No. of countries | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| IVs         |      |      |      |      |      |      |      |      |      |      | 79 | 43 |
| Hansen test | − p-value |      |      |      |      |      |      |      |      |      | 1.000 | 0.999 |
### Table 10 (continued)

| Dep. Var | Gini2 | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) | (33) | (34) | (35) | (36) |
|----------|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS |Robust Pooled OLS |Pooled OLS |Twostep system GMM |SELPDM |
| Income | $-24.398^{***}$ | $-19.747^{**}$ | $62.510^{***}$ | $50.283^{***}$ | $45.468^{***}$ | $45.468^{*}$ | $45.468^{*}$ | $45.468^{*}$ | $40.263^{*}$ | $301.170^{**}$ | $111.761^{*}$ |
| Income$^2$ | $0.925^*$ | $-3.597^{***}$ | $-3.599^{***}$ | $-3.041^{***}$ | $-2.774^{***}$ | $-2.774^{***}$ | $-2.774^{***}$ | $-2.774^{***}$ | $-2.498^{*}$ | $-17.074^{**}$ | $6.428$ |
| EQ | $2.402$ | $2.888$ | $5.745^*$ | $2.170$ | $0.945$ | $5.512$ | $5.512$ | $5.512$ | $3.105$ | $4.371$ | $6.324$ |
| Inst | $0.053$ | $-0.833$ | $-0.128$ | $1.501^{**}$ | $4.215^{***}$ | $4.215^{***}$ | $4.215^{***}$ | $4.215^{***}$ | $4.965^{***}$ | $-1.018$ | $1.551$ |
| Industry | $-0.079^{***}$ | $-0.071^{***}$ | $-0.085^{***}$ | $0.021$ | $0.025$ | $0.025$ | $0.025$ | $0.025$ | $0.012$ | $-0.108$ | $-0.052$ |
| HC | $25.139^{***}$ | $20.811^{***}$ | $17.611^{***}$ | $17.764^{***}$ | $17.764^{***}$ | $17.764^{***}$ | $17.764^{***}$ | $17.764^{***}$ | $17.764^{***}$ | $17.764^{***}$ | $17.764^{***}$ |
| FDI | $-0.442$ | $-0.398$ | $-0.389$ | $-0.389^{***}$ | $-0.389^{***}$ | $-0.389^{***}$ | $-0.516^{***}$ | $-0.133^{**}$ | $-0.382^{***}$ | $-0.382^{***}$ |
| Trade | $-0.457^{***}$ | $-0.398^{***}$ | $-0.389^{***}$ | $-0.389^{***}$ | $-0.389^{***}$ | $-0.389^{***}$ | $-0.516^{***}$ | $-0.133^{**}$ | $-0.382^{***}$ | $-0.382^{***}$ |
| ED | $0.050^{***}$ | $0.025$ | $0.025$ | $0.025$ | $0.025$ | $0.025$ | $0.025$ | $0.025$ | $0.025$ | $0.025$ |
| Constant | $162.390^{***}$ | $143.535^{***}$ | $-208.305^{***}$ | $-197.317^{***}$ | $-143.730^{***}$ | $-127.350^{***}$ | $-127.350^{***}$ | $-127.350^{***}$ | $-102.506$ | $-1,234.444^{**}$ | $-421.498$ |
| Year effects | Yes |
| Observations | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 |
| R-squared | 0.082 | 0.090 | 0.408 | 0.463 | 0.505 | 0.508 | 0.508 | 0.508 | 0.531 |
| No. of countries | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| IVs | 79 | 43 |
| Dep. Var | (37) | (38) | (39) | (40) | (41) | (42) | (43) | (44) | (45) | (46) | (47) | (48) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Income   | −0.757*** | −0.658*** | 1.510*** | 1.482*** | 1.235*** | 1.069*** | 1.069* | 1.069* | 0.943 | 8.630** | 4.598 |
| Income²  | 0.038*** | 0.033** | −0.087*** | −0.087*** | −0.074*** | −0.065*** | −0.065* | −0.065* | −0.058* | −0.490** | −0.264 |
| EQ       | 0.134 | 0.144 | 0.220*** | 0.126* | 0.098 | 0.256*** | 0.256* | 0.256* | 0.193 | 0.171 | 0.197 |
| Inst     | −0.009 | −0.028 | −0.009 | 0.034*** | 0.094*** | 0.094*** | 0.094*** | 0.113*** | −0.007 | 0.004 |
| Industry | − | − | − | −0.001*** | −0.002*** | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.003 | 0.002 |
### Table 10 (continued)

| Dep. Var | (37) | (38) | (39) | (40) | (41) | (42) | (43) | (44) | (45) | (46) | (47) | (48) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Log of Gini2 |      |      |      |      |      |      |      |      |      |      |      |      |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust OLS | Pooled OLS | Twostep system | SELPDM |
| HC       | – 0.663*** | – 0.549*** | – 0.478*** | – 0.483*** | – 0.483*** | 0.483*** | 0.483*** | 0.483*** | 0.437*** | – 1.376*** | – 0.625*** |      |
|          | [0.018] | [0.047] | [0.043] | [0.043] | [0.055] | [0.056] | [0.070] | [0.058] | [0.272] | [0.116] |      |      |
| FDI      | – 0.012*** | – 0.011*** | – 0.010*** | – 0.010*** | 0.010*** | 0.010*** | 0.010*** | 0.013*** | – 0.004*** | – 0.012*** |      |      |
|          | [0.004] | [0.003] | [0.003] | [0.002] | [0.002] | [0.002] | [0.002] | [0.001] | [0.002] | [0.002] |      |      |
| Trade    | – 0.001*** | – 0.001*** | – 0.001*** | – 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.000 | 0.000 |      |      |
|          | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |      |      |      |      |
| ED       | – 0.018*** | – 0.018* | – 0.018* | – 0.018* | – 0.018* | – 0.017 | – 0.026 | 0.005 | – 0.035 | – 0.015 |      |      |
|          | [0.003] | [0.010] | [0.011] | [0.011] | [0.007] | [0.011] | [0.011] | [0.007] |      |      |      |      |
| Constant | 7.304*** | 6.899*** | – 2.369* | – 2.080* | – 0.895 | – 0.330 | – 0.330 | – 0.330 | 0.280 | 32.997** | 15.709 |      |
|          | [0.884] | [0.950] | [1.274] | [1.181] | [0.729] | [0.665] | [2.616] | [2.665] | [2.427] | [2.686] | [14.157] | [12.369] |
| Year effects | yes |      |      |      |      |      |      |      |      |      |      |      |
| Observations | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 | 273 |
| R-squared | 0.083 | 0.089 | 0.423 | 0.481 | 0.512 | 0.518 | 0.518 | 0.518 | 0.538 |      |      |      |
| No. of countries | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| IVs | 79 | 43 |      |      |      |      |      |      |      |      |      |      |

Part D: Log of Gini index post-tax and post-transfer
**Table 10 (continued)**

Part D: Log of Gini index post-tax and post-transfer

| Dep. Var | (37) | (38) | (39) | (40) | (41) | (42) | (43) | (44) | (45) | (46) | (47) | (48) |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Log of Gini2 |      |      |      |      |      |      |      |      |      |      |      |      |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Twostep system GMM | SELPDM |
| Hansen test |      |      |      |      |      |      |      |      |      |      |      |      |
| − p-value |      |      |      |      |      |      |      |      |      |      | 1.000 | 0.998 |

Standard errors are in []; *, **, *** are significant levels at 10%, 5%, and 1%, respectively.
| Dep. Var | Gini1 | Part A: Gini index pre-tax and pre-transfer |
|----------|-------|------------------------------------------|
| Estimator | PCSE  | PCSE  | PCSE  | PCSE  | PCSE  | PCSE  | FGLS  | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two-step system | GMM | SELPDM |
| Income   | −15.928*** | −16.715*** | −16.219*** | −32.767*** | −31.718*** | −31.718*** | −31.718*** | −31.718*** | −31.718*** | −36.884*** | −21.663*** | −26.694*** |
| Income²  | 0.677*** | 0.703*** | 0.688*** | 0.740*** | 1.392*** | 1.392*** | 1.392*** | 1.392*** | 1.392*** | 1.626*** | 0.949*** | 1.194*** |
| EQ       | 5.252*** | 0.035 | 1.613 | 2.992 | 15.640*** | 12.431*** | 12.431*** | 12.431*** | 12.431*** | 14.914*** | 5.669*** | 9.939*** |
| Inst     | 1.673*** | 2.067*** | 2.114*** | 2.365*** | 3.376*** | 3.358*** | 3.358*** | 3.358*** | 3.358*** | 3.881*** | 2.732*** | 2.380*** |
| Industry | 0.216*** | 0.188*** | 0.203*** | 0.244*** | 0.236*** | 0.236*** | 0.236*** | 0.236*** | 0.236*** | 0.221*** | 0.210*** | 0.210*** |
| HC       | 4.519*** | 4.906*** | 6.084*** | 6.185*** | 6.185*** | 6.185*** | 6.185*** | 6.185*** | 6.185*** | 7.980*** | 3.415*** | 6.602*** |
| FDI      | 0.016*** | 0.008*** | 0.006*** | 0.006 | 0.006*** | 0.006*** | 0.006*** | 0.006*** | 0.006*** | 0.007*** | 0.007*** | 0.007*** |
| Trade    | 0.017*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.017*** | 0.012*** | 0.014*** |
| ED       | 0.388*** | 0.388 | 0.388 | 0.388 | 0.388 | 0.388 | 0.388 | 0.388 | 0.388 | 0.456 | 0.800*** | 0.310*** |
| Constant | 131.796*** | 146.974*** | 146.318*** | 153.276*** | 227.286*** | 224.721*** | 224.721*** | 224.721*** | 224.721*** | 250.535*** | 172.658*** | 197.115*** |
| Year effects | yes | Observations | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 |
| R-squared | 0.038 | 0.133 | 0.143 | 0.162 | 0.241 | 0.243 | 0.243 | 0.243 | 0.243 | 0.265 | 0.265 | 0.265
Table 11 (continued)

Part A: Gini index pre-tax and pre-transfer

| Dep. Var | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| **Gini** |     |     |     |     |     |     |     |     |     |      |      |      |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Twostep system GMM | SELPDM |
| No. of countries | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 |
| IVs | 91 | 55 |     |     |     |     |     |     |     |     |     |     |
| Hansen test – p-value | 1.000 | 0.901 |     |     |     |     |     |     |     |     |     |     |

Part B: Log of Gini index pre-tax and pre-transfer

| Dep. Var | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| **Log of Gini** |     |     |     |     |     |     |     |     |     |      |      |      |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Twostep system GMM | SELPDM |

| Income | 0.362*** | 0.380*** | 0.369*** | 0.396*** | 0.723*** | 0.691*** |       | 0.691*** |       | 0.691*** | 0.802*** | 0.480*** | 0.605*** |
|        | [0.042]  | [0.037]  | [0.036]  | [0.042]  | [0.063]  | [0.057]  |       | [0.168] |       | [0.170] | [0.131]  | [0.120]  | [0.106]  |
| Income²| 0.016*** | 0.016*** | 0.016*** | 0.017*** | 0.032*** | 0.030*** | 0.030*** | 0.030*** | 0.030*** | 0.035*** | 0.021*** | 0.027*** |
|        | [0.002]  | [0.002]  | [0.002]  | [0.002]  | [0.003]  | [0.003]  | [0.008] | [0.008] | [0.006] | [0.008] | [0.006] | [0.005] |
| EQ     | 0.108** | -0.015 | 0.022 | 0.052 | 0.322*** | 0.223** | 0.223** | 0.223** | 0.223 | 0.276** | 0.102*** | 0.173*** |
|        | [0.044] | [0.052] | [0.054] | [0.056] | [0.071] | [0.064] | [0.106] | [0.107] | [0.138] | [0.109] | [0.020] | [0.025] |
| Inst   | 0.039*** | 0.048*** | 0.049*** | 0.054*** | 0.076*** | 0.076*** | 0.076*** | 0.076*** | 0.076*** | 0.087*** | 0.062*** | 0.054*** |
|        | [0.003] | [0.003] | [0.004] | [0.004] | [0.007] | [0.007] | [0.012] | [0.012] | [0.012] | [0.013] | [0.006] | [0.017] |
Table 11 (continued)

Part B: Log of Gini index pre-tax and pre-transfer

| Dep. Var | Log of Gini |
|----------|-------------|
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two-step system GMM | SELPDM |
| Industry | | | | | | | | | | | | |
| Industry | 0.005*** | 0.004*** | 0.005*** | 0.006*** | 0.005*** | 0.005*** | 0.005*** | 0.005*** | 0.005*** | -0.005*** | -0.005*** |
| [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] | [0.001] | [0.001] | [0.000] | [0.001] | |
| HC | 0.101*** | 0.110*** | 0.135*** | 0.138*** | 0.138*** | 0.138*** | 0.138*** | 0.177*** | -0.074** | -0.138*** |
| [0.013] | [0.014] | [0.016] | [0.016] | [0.038] | [0.039] | [0.030] | [0.041] | [0.030] | [0.033] | |
| FDI | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | -0.000*** | -0.000*** |
| [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | |
| Trade | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | -0.000*** | -0.000*** |
| [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | |
| ED | 0.012*** | 0.012* | 0.012* | 0.012 | 0.014* | 0.019*** | 0.019*** | 0.010*** |
| [0.003] | [0.007] | [0.007] | [0.008] | [0.007] | [0.002] | [0.003] | |
| Constant | 5.766*** | 6.118*** | 6.103*** | 6.251*** | 7.837*** | 7.757*** | 7.757*** | 7.757*** | 8.312*** | 6.643*** | 7.261*** |
| [0.229] | [0.181] | [0.178] | [0.195] | [0.309] | [0.835] | [0.843] | [0.666] | [0.855] | [0.638] | [0.555] | |
| Year effects | yes | | | | | | | | | | | |
| Observations | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 |
| R-squared | 0.034 | 0.134 | 0.145 | 0.161 | 0.233 | 0.237 | 0.237 | 0.237 | 0.258 | | |
Table 11 (continued)

**Part B: Log of Gini index pre-tax and pre-transfer**

| Dep. Var | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Log of Gini | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two step system GMM | SELPDM |
| No. of countries | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 |
| IVs | 91 | 55 |
| Hansen test | 1.000 | 0.9136 |

**Part C: Gini index post-tax and post-transfer**

| Dep. Var | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) | (33) | (34) | (35) | (36) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gini2 | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two step system GMM | SELPDM |
| Income | −31.784*** | −32.765*** | −31.901*** | −32.855*** | −20.815*** | −24.012** | −20.815*** | −24.012** | −24.012** | −24.840** | −21.054*** | −11.938 |
| [3.574] | [4.420] | [4.193] | [4.743] | [5.363] | [5.314] | [9.379] | [9.468] | [10.283] | [9.711] | [5.125] | [11.916] |
| Income² | 1.491*** | 1.524*** | 1.498*** | 1.537*** | 0.989*** | 1.118*** | 1.118** | 1.118** | 1.118** | 1.151** | 1.013*** | 0.547 |
| [0.160] | [0.202] | [0.191] | [0.217] | [0.249] | [0.250] | [0.452] | [0.456] | [0.492] | [0.467] | [0.244] | [0.562] |
| EQ | −24.093*** | −30.677*** | −27.811*** | −26.782*** | −36.754*** | −26.976*** | −26.976*** | −26.976*** | −26.976*** | −26.976*** | −26.018*** | −22.843*** |
| [3.817] | [4.026] | [3.906] | [4.043] | [4.719] | [4.384] | [5.919] | [5.975] | [6.346] | [6.158] | [0.729] | [2.288] |
| Inst | −2.329*** | −1.838*** | −1.756*** | −1.569*** | −2.366*** | −2.311*** | −2.311*** | −2.311*** | −2.220*** | −2.220*** | −2.220*** | −2.220*** |
| [0.196] | [0.175] | [0.157] | [0.211] | [0.218] | [0.226] | [0.672] | [0.678] | [0.601] | [0.706] | [0.218] | [0.536] |
| Industry | −0.269*** | −0.219*** | −0.231*** | −0.198*** | −0.222*** | −0.222*** | −0.222*** | −0.222*** | −0.230*** | −0.139*** | −0.215*** |
| [0.196] | [0.175] | [0.157] | [0.211] | [0.218] | [0.226] | [0.672] | [0.678] | [0.601] | [0.706] | [0.218] | [0.536] |
| Part C: Gini index post-tax and post-transfer |
|---------------------------------------------|
| **Dep. Var** | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) | (33) | (34) | (35) | (36) |
| **Gini2** |  |
| **Estimator** | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Robust OLS | Pooled OLS | Two-step system GMM | SELPDM |
| **PCSE** | [0.016] | [0.013] | [0.015] | [0.016] | [0.019] | [0.038] | [0.038] | [0.048] | [0.040] | [0.020] | [0.026] |
| **HC** | − 7.860*** | − 8.149*** | − 7.220*** | − 6.912*** | − 6.912*** | − 6.912*** | − 6.912*** | − 6.764*** | − 19.005*** | − 8.388*** |
| **FDI** | [0.725] | [0.743] | [0.614] | [0.621] | [2.141] | [2.161] | [2.042] | [2.290] | [1.289] | [1.122] |
| **Trade** | − 0.012** | − 0.019** | − 0.023** | − 0.023*** | − 0.023*** | − 0.023*** | − 0.025*** | − 0.021*** | − 0.022*** |
| **ED** | 0.013*** | 0.008*** | 0.008** | 0.008* | 0.008* | 0.008* | 0.008** | 0.010*** | 0.008*** |
| **Constant** | 226.047*** | 244.951*** | 243.809*** | 248.999*** | 190.653*** | 198.466*** | 198.466*** | 198.466*** | 198.466*** | 201.874*** | 192.533*** |
| **Year effects** | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| **Observations** | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 |
| **R-squared** | 0.310 | 0.380 | 0.395 | 0.399 | 0.423 | 0.433 | 0.433 | 0.433 | 0.433 | 0.433 | 0.433 | 0.433 |
| **No. of countries** | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 |
| **IVs** | 91 | 55 |
| **Hansen test – p-value** | 1.000 | 0.903 |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two step system GMM | SELPDM |
|-----------|------|------|------|------|------|------|------|------------|------------------|------------|----------------------|--------|
| Income    | –    | –    | –    | –    | –    | –    | –    | –          | –                | –          | –0.638***            | –0.668*** |
|           | 0.638*** | 0.668*** | 0.642*** | 0.673*** | 0.456 | 0.456 | 0.456 | 0.456      | 0.485                | 0.264      | [0.107]              | [0.137] |
| Income$^2$| 0.030*** | 0.031*** | 0.030*** | 0.031*** | 0.017** | 0.021*** | 0.021 | 0.021      | 0.022                | 0.013      | [0.005]              | [0.006] |
| EQ        | –    | –    | –    | –    | –1.017*** | –    | –    | –          | –                | –          | –0.697***            | –0.735*** |
|           | 0.669*** | 0.876*** | 0.789*** | 0.756*** | 0.718*** | 0.718*** | 0.718*** | 0.718***    | 0.686***              | 0.026      | [0.110]              | [0.116] |
| Inst      | –    | –    | –    | –    | –    | –    | –    | –          | –                | –0.069***   | 0.082***            | –0.094*** |
|           | 0.082*** | 0.066*** | 0.064*** | 0.058*** | 0.079*** | 0.077*** | 0.077*** | 0.077***    | 0.074***              | 0.009      | [0.006]              | [0.005] |
| Industry  | –    | –    | –    | –    | –    | –    | –    | –          | –                | –          | –0.005***            | –0.006*** |
|           | 0.008*** | 0.007*** | 0.007*** | 0.006*** | 0.007*** | 0.007*** | 0.007*** | 0.007***    | 0.007***              | 0.009      | [0.000]              | [0.000] |
| HC        | –    | 0.237*** | 0.246*** | 0.222*** | 0.213*** | 0.213*** | 0.213*** | 0.213***    | 0.209***              | 0.047      | [0.021]              | [0.022] |
| FDI       | –    | –    | –    | –    | –    | –    | –    | –          | –                | –0.001***   | 0.001***            | 0.001*** |
|           | 0.000** | 0.001** | 0.000** | 0.000** | 0.000** | 0.000** | 0.000** | 0.000**    | 0.001***              | 0.000      | [0.000]              | [0.000] |
Table 11 (continued)

| Part D: Log of Gini index post-tax and post-transfer |
|---------------------------------|
| Dep. Var | (37) | (38) | (39) | (40) | (41) | (42) | (43) | (44) | (45) | (46) | (47) | (48) |
| Log of Gini2 | | | | | | | | | | | | |
| Estimator | PCSE | PCSE | PCSE | PCSE | PCSE | PCSE | FGLS | Pooled OLS | Robust Pooled OLS | Pooled OLS | Two step system GMM | SELPDM |
| Trade | 0.000*** | 0.000*** | 0.000* | 0.000* | 0.000 | 0.000 | 0.000*** | 0.000*** | | | | |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | | | | |
| ED | −0.036*** | −0.036*** | −0.036*** | −0.036*** | −0.039*** | −0.012*** | −0.033*** | | | | | |
| | [0.008] | [0.012] | [0.012] | [0.012] | [0.003] | [0.005] | | | | | |
| Constant | 7.590*** | 8.182*** | 8.148*** | 8.314*** | 6.789*** | 7.028*** | 7.028*** | 7.028*** | 7.028*** | 7.153*** | 6.324*** | 5.367*** |
| | [0.487] | [0.628] | [0.588] | [0.678] | [0.750] | [1.428] | [1.442] | [1.388] | [1.478] | [1.618] | [1.706] | |
| Year effects | Yes | | | | | | | | | | | |
| Observations | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 |
| R-squared | 0.282 | 0.358 | 0.373 | 0.379 | 0.396 | 0.407 | 0.407 | 0.407 | 0.409 | | | |
| No. of countries | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 |
| IVs | | | | | | | | | | 91 | 55 | |
| Hansen test | | | | | | | | | | | 1.000 | 0.914 |

Standard errors are in [ ]; *, **, *** are significance levels at 10%, 5%, and 1%, respectively.
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Declarations

Conflict of interest  There is no conflict of interest.

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