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Export Product Quality and Inclusivity in Developing Countries

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Abstract

The present study has examined the effect of export product quality improvement on inclusivity in developing countries. Inclusivity is measured by three factors considered simultaneously, namely an increase in the real per capita income, a reduction in within-country income inequality, and poverty reduction. The analysis covers 101 developing countries over the period from 1980 to 2014, and uses primarily the two-step system Generalized Method of Moments estimator. It shows that export product quality improvement results in greater inclusivity, especially in countries that face high levels of economic growth volatility, including large magnitudes of external shocks. Likewise, export product quality improvement leads to a greater inclusivity in countries that experience high levels of export product concentration. The analysis sheds light on the positive contribution of export product quality improvement to inclusivity in developing countries.

Keywords: Export product quality; Inclusivity.

JEL Classification: D63; F14; O11.

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1. Introduction

In September 2015, the member states of the United Nations adopted 17 sustainable development goals (SDGs) contained in the 2030 Agenda for Sustainable Development, with a view to promoting sustainable development in its three dimensions, namely economic, social and environmental (UNGA, 2015). The first of these goals aims to "*end poverty in all its forms everywhere*", and the eight goals aim to "*promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*" (UNGA, 2015: p14). Moreover, the United Nations' members agreed that in light of the importance of sustained, inclusive and sustainable economic growth for prosperity, they would seek to build strong economic foundations for all our countries (see UNGA, 2015: paragraph 27 - p8).

Upgrading the quality of export products improves the chances of export success in an increasingly competitive environment, promotes economic development (e.g., Khandelwal, 2010; Kremer, 1993; Henn et al., 2020), and can, therefore, be instrumental in achieving these two SDGs. Export product upgrading can take place through export product quality improvement .

Does improving the quality of export products contribute to the achievement of these two SDGs? The present paper aims to address this question by investigating whether export product quality has been conducive to inclusivity. Specifically, given the close link between poverty, income inequality and the real per capita income (as well as economic growth) (e.g., Bagchi and Svejnar, 2015; Cerra et al., 2021; Fosu, 2017), we investigate the effect of export product quality improvement on inclusivity, where the latter encapsulates jointly an improvement in the real per capita income, a reduction in within-country income inequality and in poverty. The concept of inclusivity in the present analysis is closed in spirit to the one underpinning the construction of the human development index, which is a summary measure of the average achievement in key dimensions of human development², namely a long and healthy life (measured by the life of expectancy at birth), knowledge (measured by the education level) and decent standard of living (measured by the per capita gross national income).

Investigating the effect of export product quality on inclusivity amounts to examining whether participation in international trade, including from the export side, is inclusive, that is, whether it helps simultaneously improve the real per capita income, reduce income inequality, and reduce poverty. Therefore, the present analysis pertains to the strand of the literature on trade inclusiveness (e.g., Bacchetta et al., 2021; Goff, 2021; Hui, 2019; Kang et al., 2017; UNESCAP, 2013; UNECLAC, 2014; WTO, 2016). The analysis also speaks to the recent work by Santos-Paulino et al. (2019) who have examined the effect of countries' participation in regional trade agreements on what the authors have termed "the development trinity" that encompasses the improvement in economic growth performance, within-country inequality reduction, and fall in poverty rates.

The quality of export products indicates the quality of the products exported by a country, and reflects the unit values of exports (unit price of export products) (e.g., Amighini and Sanfilippo, 2014; Feenstra and Romalis, 2014; Hallak 2006; Hummels and Klenow, 2005;

² The human development index is obtained by first transforming into an index each of the indicators capturing the three dimensions of human development. The three indices are then normalized, and the human development index has been computed as the geometric mean of normalized indices for each of the three dimensions. Detailed information on the human development index is available online at: <https://hdr.undp.org/data-center/human-development-index#/indicies/HDI>

Minondo, 2020; Schott, 2004; Xu, 2010). A product is considered to be of a higher quality if buyers prefer it over other products of the same general type and equal price (Chiang and Masson, 1988).

Why is it then important to study the inclusiveness of trade through the lens of the effect of the export product quality upgrading on inclusivity, as defined above. The importance of this topic lies on the strong relevance of export quality improvement for countries' development path (e.g., Hallak and Schott, 2011; Hummels and Klenow, 2005). In fact, the literature has well established that what matters for economic growth and development prospects is not the volume of exports, but rather the capacity of countries to latch on to a set of goods that are placed higher on this quality spectrum, that is, sophisticated (higher-income) products over time (e.g., Hausman et al., 2007; Rodrik, 2006). Countries that export higher quality (including sophisticated) products grow faster (e.g., Hausmann et al. 2007; Huchet-Bourdon et al., 2018; Rodrik, 2006; Hidalgo et al., 2007). They are less subject to the price competition from low-wage producers (e.g., Amiti and Khandelwal, 2013; Khandelwal 2010; Medina, 2022) and enjoy higher export revenues (e.g., Henn et al., 2020). For example, Huchet-Bourdon et al. (2018) have provided empirical evidence that countries that are more open to international trade and concurrently export higher quality products enjoy higher economic growth rates, and the higher the quality of the export product basket, the larger is the positive impact of trade on economic growth.

The rest of the paper is structured as follows. Section 2 relates the concept of inclusivity as defined in the present study to existing works on inclusive trade. Section 3 provides a theoretical discussion on the effect of export product quality on inclusivity. Section 4 describes the indicators of inclusivity and export product quality used in the analysis. Section 5 presents the empirical analysis, while section 6 goes deeper into the analysis. Section 7 concludes.

2. The concept of inclusive trade in the literature

An increasing attention has been being paid to the issue of "inclusive trade" both in the international and domestic arenas (e.g., Bacchetta et al., 2019; Bacchetta et al., 2021; Engel et al., 2021; Garcia-Algarra et al., 2020; Goff, 2021; Luke and Macleod, 2019; UNCTAD, 2007; UNESCAP, 2013; WTO, 2016). The question as to what makes trade inclusive has been approached in the literature from various perspectives. Some studies have considered trade inclusiveness from the perspective of reducing trade inequality among countries in the world, including by enhancing the participation of weakest economies (low-income countries) in international trade (Garcia-Algarra et al., 2020), and of making global trade inclusive for smaller sellers and firms, including small and medium size enterprises (e.g., Goff, 2021; Hui, 2019).

Another strand of the literature has considered trade inclusivity from the perspective of the effect of international trade, including trade policies and trade openness on inclusive growth³ and development (e.g., APEC, 2015; Bacchetta et al., 2019; Dollar and Kraay, 2002; Engel et al., 2021; Gngangnon, 2019; Kang et al., 2017; Luke and Macleod, 2019; Son and Kakwani, 2008; UNECLAC, 2014; UNCTAD, 2007; UNESCAP, 2009, 2013; Winters, 2014; WTO, 2016; WTO and World Bank, 2015). For example, according to UNESCAP (2009), inclusive trade policy is a "pro-poor trade policy", which aligns the objectives of such a policy with both poverty reduction,

³ The concept of 'inclusive growth' has been defined in various ways in the literature (see Klasen, 2010 for a literature survey). A literature survey on the concept of 'inclusive development' is provided for example, by Gupta (2020) and Pouw and Gupta (2017).

and the provision of fairer and more equitable access to benefits of economic openness. For UNESCAP (2013), trade and investment are inclusive if all people can participate in, and benefit from those activities, and in particular if they are fully consistent with the principles of inclusive growth, which implies that all people can contribute to and benefit from international transactions. UNECLAC (2014: p29) has defined inclusive trade as "a type of trade that helps generate a virtuous circle between the reduction of structural heterogeneities and growth in employment, productivity and income, improving the well-being of the majority and reducing inequality". UNCTAD (2007) has considered 'trade for inclusive development' as a process of globalization that benefits countries and population segments that were previously excluded. For World Bank (2011), trade is associated with inclusive development if it entails the facilitation of workers and enterprises' movement to growing sectors, and the adoption of new technologies with a view to enhancing productivity growth and employment in a broad group of workers and enterprises.

Regarding the empirical analyses⁴ on the link between international trade and inclusive growth, Dollar and Kraay (2002) have obtained empirical evidence that trade openness improves countries' overall incomes and average incomes of the poorest fifth. Son and Kakwani (2008) have defined 'inclusive growth' as a pro-poor growth, and found no significant effect of trade openness on inclusive growth in developing countries. Winters (2014) has shown that the growth effect of free trade benefit mostly higher-income groups, which makes the income distribution worse, especially in developing countries. APEC (2015) has measured inclusive growth as an improvement in income and its distribution, and reported for Asia-Pacific Economic Cooperation (APEC) member economies that, while trade openness has been associated with an improvement in economic growth, it has benefited essentially to richer segments of society rather than the poor ones. Using two measures of inclusive growth, namely the income inequality and the income growth adjusted by changes in income inequality, Kang et al. (2017) have reported for South Korea that the growth in international trade has exerted a positive effect on inclusive growth, and this positive effect is driven mainly by strong output growth effect, and not by the income distribution effect of the trade growth. Gnangnon (2019) has explored the interaction effect of export product diversification and trade policy on inclusive growth (measured as the difference between the real GDP growth adjusted by changes in income inequality) in developing countries. He has found that countries that have low levels of export product diversification (i.e., high levels of export product concentration) tend to implement restrictive trade policy measures so as to achieve greater inclusive growth, while export product diversification is complementary with trade policy liberalization in promoting inclusive growth for high degrees of trade policy liberalization. The study by Santos-Paulino et al. (2019) has revealed, among others, that on aggregate, developing countries' participation in regional trade agreements has led to a higher economic growth rate, a decline in within-country inequality and lower poverty levels.

The present analysis pertains to the strand of the literature on the effect of international trade on inclusive growth and development, and looks at the effect of export product quality on inclusivity, the latter being measured through the lens of the joint real per capita income improvement, fall in within-country income inequality and poverty reduction. In particular, it is closely related to the recent work by Santos-Paulino et al. (2019) who have examined the effect of

⁴ Bacchetta et al. (2021) have provided a literature survey on the relationship between international trade and inclusive growth.

participation in regional trade agreements on the "development trinity" measured by the improvement in the economic growth performance, the reduction in within-country inequality, and the fall in poverty.

3. Theoretical discussion on the effect of export product quality on inclusivity

The discussion on the effect of export product quality on inclusivity, as defined in the present study, entails considering how export product quality affects the real per capita income (sub-section 3.1), within-country income inequality (sub-section 3.2) and poverty (sub-section 3.3). The present section lays down this discussion (see sub-sections 3.1 to 3.3). The net effect of export product quality on inclusivity depends on how it affects the real per capita income, income inequality and poverty reduction. This effect is expected to be positive in countries that experience simultaneously an improvement in the real per capita income, a lower income inequality and a fall in poverty rates. However, if export product quality reduces the real per capita income, and /or enhances income inequality and/or increases poverty, then it will exert a negative effect on inclusivity. The analysis additionally examines the extent to which the effect of export product quality on inclusivity depends on countries' size of economic growth volatility, and external shocks they face (sub-section 3.4).

3.1. Effect of export product quality on the real per capita income

Export product quality upgrading is expected to affect positively the real per capita can be straightforward (e.g., Feenstra and Romalis, 2014; ; Hummels and Klenow, 2005). In fact, the literature has shown that promoting economic development⁵ does not hinge only on the type of products exported by a country, but also on the quality of goods produced by that country (e.g., Hallak and Schott, 2011; Hausmann et al., 2007; Hidalgo et al., 2007; IMF, 2014; Rodrik, 2006; Verhoogen, 2008). The production of higher-quality varieties of existing products offers a pathway for building on comparative advantage to accelerate income convergence (e.g., Henn et al., 2019; Hidalgo et al., 2007).

3.2. Effect of export product quality on income inequality

The literature on the effect of the export product quality on income inequality is scant, although some studies have considered the wage effect of export product quality upgrading. These studies can be important here because wages represent a substantial part of income in developing countries, meaning that wages variations contribute substantially to income inequality in developing countries. For example, Verhoogen (2008) has shown that the exchange-rate devaluation has incentivized more productive Mexican manufacturing firms to increase exports, upgrade quality, and raise wages relative to less-productive plants within the same industry, thereby increasing within-industry wage inequality. Rankin and Schöer (2013) have found that the export destination of products is related to the quality of products exported, which in turn, is linked with worker quality and hence, workers' wages. The authors have relied on data on South African firms that have two main export destinations, namely the regional (i.e., African) market where per capita incomes are lower than at home, and the international market (i.e., outside Africa) where per capita

⁵ The implications of quality production for economic development have been discussed in Kremer (1993) and Verhoogen (2008).

incomes are higher than in South Africa. Rankin and Schöer (2013) have observed empirically that workers in firms that export to the domestic market enjoy higher wages than those in firms that export to the rest of Africa. At the same time, workers in firms that export outside the African region are paid higher wages than those in firms that serve either the domestic market or other countries in the region.

The study by Nguyen and Su (2022a) is one of the rare works on the effect of export product quality on income inequality⁶ at the macroeconomic level. The authors have hypothesized that upgrading export product quality could result in a higher demand for high-skilled workers at the detriment of unskilled workers, higher premium for skilled workers, and consequently a greater wages gap among skilled and unskilled workers (e.g., Acharyya and Jones, 2001). This would exacerbate income inequality, notably in high-income countries. However, in lower and middle-income countries, a different scenario may prevail. Given that unskilled workers represent the lion share of workers in developing countries, export product quality upgrading is likely to result in a higher income of unskilled workers, thereby shrinking the income inequality in lower-income countries relative to higher-income countries (Robbins et al., 2000). In particular, the fall in trade costs, as well as lower travel and communication costs brought about by recent technological developments may lead high-quality sectors to shift from developed to developing countries (Wood, 2002) and benefit both skilled workers and unskilled works. An improvement in export product quality can lead to a lower demand for skilled workers than for unskilled labour in developing countries, and allows the unskilled labour to also reap the benefits of likely more equal assets distribution. Overall, upgrading export product quality can lead to lower income inequality in lower and middle-income countries. Nguyen and Su (2022a) have provided empirical support for these hypotheses, namely that export product quality exacerbates income inequality in high income countries, but reduces it in lower-and middle income countries.

3.3. Effect of export product quality on poverty

In a recent analysis, Minondo (2020) has used firm-level export data from eight low-income and middle-income countries to provide empirical evidence that firms that export high quality products (including high-price products) enjoy higher export revenue. In particular, this effect has appeared to be non-existent for extractables, weak for primary commodities and strong for manufactured goods. The question is then whether higher export revenue is associated with poverty reduction. The extant literature has confirmed that this is the case. It is now well admitted in the literature that exporting firms are in general better-off than non-exporting firms, including in low-income countries. This is because exporting⁷ generates jobs creation, higher wages, and draws women out of informality into the formal sector (e.g., Artuç et al., 2019; De Loecker, 2007; Fabling and Sanderson, 2013; Kasahara and Lapham, 2013; Porto, 2005; Robertson et al. 2020; Van Biesebeek, 2005). The export orientation strategy of China and Vietnam has been instrumental in reducing poverty and shifting the labour away from the agricultural sector (e.g., Erten and Leight 2019; McCaig and Pavcnik 2018). According to a recent report by the World

⁶ Acharyya and Ganguly (2023) have discussed the channels through which export product quality affects within-country income or wage inequality.

⁷ In a recent report, the World Bank and the World Trade Organization have discussed at length how trade can contribute to poverty reduction in developing countries (World Bank and WTO, 2018). Likewise, Engel et al. (2021) have provided a survey on the distributional impacts of trade, including on the poverty effect of exports.

Bank (World Bank, 2020), the participation in global value chains of some regions in Mexico and Vietnam has contributed to significantly to poverty reduction in those regions. Van Biesebroeck (2005) has obtained that exporting manufacturing firms in African countries are more productive, and increases their productivity advantage after entry into the export market. Milner and Tandrayen (2007) have used data for African manufacturing firms to provide evidence that manufactured exports are associated with higher individual earnings, and a higher skill wage premium in export firms of the exporting country, notably if these firms export to other African markets. Santos-Paulino (2017) has reported empirical evidence that while the export of manufactured products by developing countries has been associated with poverty reduction, in low-income countries, it is rather the export of agricultural products that helps reduce poverty. Gnanangnon (2023) has found that non-reciprocal trade preferences have contributed to poverty reduction in beneficiary (developing) countries, with a larger poverty reduction effect taking place in the least developed countries (LDCs).

Against this backdrop, we expect that the improvement in export product quality will result in greater poverty reduction in developing countries.

Summing-up, the discussion in sub-sections 3.1 to 3.3 shows that export product quality improvement can lead to an improvement in the real per capita income, and greater poverty reduction. However, its effect on income inequality is likely to vary across countries, and be negative in poor countries, but positive in other countries. As a result, we can expect that an improvement in export product quality would result in greater inclusivity in poor countries, and may, at best, exert no significant effect on inclusivity in other developing countries (in the worst case, it could exert a negative effect on inclusivity due to its positive effect on income inequality) (**hypothesis 1**).

3.4. The role of economic growth volatility/external shocks in the relationship between export product quality and inclusivity

The present section discusses the extent to which economic growth volatility, and particularly the extent of external shocks affects inclusivity.

Above the aforementioned possible channels, export product quality upgrading can affect inclusivity through the channel of economic growth volatility. The relevance of this channel rests on the fact that due to their greater frequency of shocks (than developed countries), developing countries tend to experience stronger fluctuations of output growth than developed countries (e.g., Barrot et al. 2018; Dabla-Norris and Gündüz, 2014; Guillaumont, 2009).

The improvement in export product quality can affect the volatility of economic growth, and in turn, the volatility of economic growth can affect inclusivity, including the real per capita income, income inequality and poverty. The literature on the effect of export product quality upgrading on economic growth volatility is relatively nascent. As export product quality improvement is often associated with structural transformation (e.g., Trinh et al., 2022), and as structural transformation can dampen economic growth volatility (e.g., Da-Rocha and Restuccia, 2006; Joya, 2015; Moro, 2012), one can expect that export product quality improvement would lead to lower economic growth volatility. Da-Rocha and Restuccia (2006) have reported that structural transformation featured by the decline in the share of employment in agriculture (i.e., economies' dependence on agriculture) tend to experience lower fluctuations in aggregate output.

According to Joya (2015), the diversification of production structure, particularly in resource-rich countries, has been instrumental in mitigating the economic growth volatility generated by countries' dependence on natural resources. Moro (2012) has found, *inter alia*, that structural transformation leads to a fall in the volatility of aggregate GDP, and the volatility of each broad component of GDP (manufacturing consumption, services consumption and investment).

On the other side, economic growth volatility is likely to result in lower inclusivity due to its potential negative effect on the real per capita income, its positive income inequality effect, and its potential for raising poverty rates. Large macroeconomic economic fluctuations, including greater volatility of economic growth volatility reduce welfare (e.g., Aurland-Bredesen, 2021; Gavin and Hausmann, 1998; Loayza et al., 2007; Mobarak, 2005; Naoussi and Tripier, 2013; Wang and Wen, 2011; Wolf, 2005), and hence potentially the real per capita income. Economic growth volatility also raises poverty rates (e.g., Álvarez et al. 2021; Moncarz et al. 2018) and exacerbates income inequality (e.g., Huang et al., 2015; Stiglitz, 2012).

In light of the foregoing, we postulate the following hypothesis 2.

Hypothesis 2: By helping reduce economic growth volatility (or economic fluctuations induced by external shocks), export product quality improvement will contribute to enhancing inclusivity, and the greater the economic growth volatility (or the larger the external shocks), the larger will be the positive effect of export product quality improvement on inclusivity.

4. Measuring the inclusivity and export product quality

As mentioned above, the indicator of inclusivity captures three economic and social dimensions, which are the real per capita income, poverty and income inequality. It is calculated as the geometric mean of the normalized indices for each of these three dimensions of the indicator of inclusivity. Practically, we first transform the variables capturing the real per capita income, poverty, and income inequality into normalized indices, and then compute the geometric mean of these three indices. The real per capita income is the real per capita GDP in constant prices (2015 US dollars). The indicator of income inequality (denoted "GINI1") is the measure of the market Gini, that is, the Gini of incomes before taxes and transfers. Its values range from 0 to 100, with higher values indicating a greater income inequality that is, a more unequal income distribution. For the sake of the calculation of the inclusivity index, the index "GINI1" has been transformed into the index denoted "GINI2" such that its values range from 0 to 1. $GINI2 = 1 - GINI1$. Higher values of GINI2 reflect lower income inequality, that is, a more equal income distribution. As for the poverty indicator, we use the poverty headcount ratio at \$1.90 a day, which is the percentage of the population living on less than \$1.90 a day at 2011 international prices. This indicator is the main poverty indicator on the basis of which our main variable of inclusivity is computed. It is denoted "PHC1". For robustness check analysis, we also use the poverty gap at \$1.90 a day (2011 PPP), which is the mean shortfall in income or consumption from the poverty line \$1.90 a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line. This alternative measure of poverty is denoted "PGAP1". The values of the indicators "PHC1" and "PGAP1" initially range from 0 to 100, with greater values indicating a higher level of poverty. For the purpose of computing the indicator of inclusivity, we have first divided "PHC1" and "PGAP1" by 100 so that their values range from 0 to 1, and then transformed them respectively into "PHC2" and "PGAP2" such that higher values of the latter reflect lower poverty

rates: $PHC2 = 1 - PHC1$ and $PGAP2 = 1 - PGAP1$. The normalized index of the real per capita income is computed for a given country i , in a given sub-period t as follows: $IGDPC_{it} = \frac{GDPC_{it} - \min(GDPC_i)}{\max(GDPC_i) - \min(GDPC_i)}$. The normalized index of income inequality for a given country i , in a given year t is computed as follows: $IGINI_{it} = \frac{GINI2_{it} - \min(GINI2_i)}{\max(GINI2_i) - \min(GINI2_i)}$. The normalized index of poverty headcount (at \$1.90 a day) for a given country i , in a given sub-period t is computed as follows: $IPHC_{it} = \frac{PHC2_{it} - \min(PHC2_i)}{\max(PHC2_i) - \min(PHC2_i)}$. The normalized index of poverty gap (at \$1.90 a day) for a given country i , in a given sub-period t is computed as follows: $IPGAP_{it} = \frac{PGAP2_{it} - \min(PGAP2_i)}{\max(PGAP2_i) - \min(PGAP2_i)}$. Our main index of inclusivity for a given country i , in a given year t is calculated using "PHC1" as the indicator of poverty rate, and is as follows: $INCLHC_{it} = [(IGDPC_{it}) * (IGINI_{it}) * (IPHC_{it})]^{\frac{1}{3}}$. The second indicator of inclusivity (used for robustness check) is calculated using "PGAP1" as the indicator of poverty rate, for a given country i , in a given year t , as follows: $INCLGAP_{it} = [(IGDPC_{it}) * (IGINI_{it}) * (IPGAP_{it})]^{\frac{1}{3}}$.

Values of the indicators of inclusivity "INCLHC" and "INCLGAP" range between 0 and 1, with higher values indicating a greater inclusivity.

Data used to compute the index of inclusivity has been collected from various sources. Data on the real per capita income (constant 2015 US\$) is extracted from the World Development Indicators (WDI) of the World Bank. Data on income inequality is collected from the Standardized World Income Inequality Database (SWIID) (see Solt, 2019) (<https://fsolt.org/swiid/>). Data on the indicators of poverty headcount and poverty gap are collected from the WDI and POVCALNET of the World Bank in 2021.

The indicator of export product quality "QUAL" comes from the International Monetary Fund (IMF). It reflects the quality of existing export products. It has been calculated using bilateral trade values and quantities at the SITC 4-digit level (see Henn et al., 2013, 2015), using an estimation methodology that derives quality from unit values. Export product quality is measured by the average quality (unit value) demanded in an exporter's present destination markets for any product. Higher values of this indicator show greater export product quality. Details on the methodology used to calculate this indicator can be found in Henn et al. (2013, 2015). Data on the indicator of export product quality are available from the IMF's diversification toolkit⁸.

To get a first insight into the development of the indicators of inclusivity and export product quality, we present in Figures 1 and 2 the development of these three indicators over the period of analysis, respectively over the full sample, and the sub-samples of least-developed countries (LDCs) and other countries, referred to as NonLDCs. In particular, Figure 1 shows the development of the three indicators over the full sample. Figure 2 displays the development of the indicator of inclusivity based on the headcount poverty ratio and the indicator of export product quality over the samples of LDCs and NonLDCs. The choice to rely on the sub-samples of LDCs and NonLDCs is explained by the fact that LDCs are known to export products of low quality (e.g., WTO, 2022). LDCs are, indeed, a group of countries identified by the United Nations as the poorest countries and most vulnerable countries to environmental and exogenous economic and

⁸ See the website <https://www.imf.org/external/np/res/dfidimf/diversification.htm>

financial shocks in the world⁹. This is why we find it useful to examine the correlation patterns between the inclusivity indicators and export product quality in LDCs versus NonLDCs. We also display in Figures 3 and 4 the correlation patterns (in the form of scatter plot) between export product quality and each of the indices of inclusivity, respectively over the full sample, and the sub-samples of LDCs and NonLDCs.

The panel dataset used in the empirical analysis, is also utilized here to construct Figures 1 to 4. As described below, it contains 101 developing countries over the period 1980-2014. Data on the two indicators of inclusivity and the indicator of export product quality were initially available annually over the period 1980-2014. We have, then, averaged them using non-overlapping sub-periods of 5-year average, and are 1980-1984; 1985-1989; 1990-1994; 1995-1999; 2000-2004; 2005-2009 and 2010-2014 (see below).

Figure 1 shows a tendency of improvement of export product quality over time and at the same time, a tendency for greater inclusivity over time in the full sample. Interestingly, the two indicators of inclusivity evolved closely over time. Figure 2 shows as expected, that LDCs' export product quality level is lower than that of NonLDCs. LDCs experienced a fall in the quality of their export products between 1980-1984 and 1995-1999, and then an improvement in export product quality between 1995-1999 and 2000-2004. For the rest of the period, the level of export product quality in LDCs remained stable. For NonLDCs, the development of export product quality was slightly different, as it tended to improve steadily over time. At the same time, the inclusivity index, which was higher in LDCs than in NonLDCs between 1980-1984 and 1985-1989, tend to be higher in NonLDCs than LDCs over the rest of the period. Figure 3 shows a strong positive correlation pattern between export product quality and each of the two indices of inclusivity. The patterns observed in Figure 3 are also observed in Figure 4 for LDCs. However, for NonLDCs, export product quality and each of the two indices of inclusivity are positively correlated, but to a lesser extent than for LDCs.

5. Empirical analysis

We commence this section by presenting the baseline model used to investigate empirically the effect of export product quality on inclusivity (sub-section 5.1). Secondly, we discuss the appropriate estimator(s) for carrying out the empirical analysis (sub-section 5.2). Thirdly, we interpret estimations' outcomes (sub-section 5.3).

5.1. Model specification

To investigate empirically the effect of export product quality on inclusivity, we consider a baseline model specification where the dependent variable is each of the two indicators of inclusivity described above, and where the regressors include mainly the indicator of export product quality and a set of control variables. Note that our main indicator of inclusivity is the one computed using the poverty headcount ratio and denoted "INCLHC". For robustness check, we use the inclusivity index computed based on the poverty gap indicator and denoted "INCLGAP".

⁹ Additional details on the LDCs, including the list of countries included in this group and the criteria used to identify countries to be included in the group are made available by the United Nations Committee for Development Policy are available online at: <https://www.un.org/ldcportal/content/committee-development-policy-cdp-0>

The choice of control variables in the present analysis is guided by the relatively limited literature on the determinants of welfare (e.g., Bussmann, 2009; Carmignani and Avom, 2010; Gnanangnon, 2022; Kosack and Tobin, 2015; Sakyi et al., 2018), as well as the literature on the macroeconomic determinants of 'development', the latter being measured from the perspective of economic growth and income inequality (e.g., Carmignani and Chowdhury, 2011) or from the perspective of economic growth, income inequality and poverty (e.g., Santos-Paulino et al. 2019). The set of control includes the human capital accumulated, the economic growth rate, terms of trade, the inflation rate, the degree of trade openness, the population size, the terms of trade, and the political institutions proxied by the quality of the political system. The effect of these variables on inclusivity would depend on how each of them affect the real per capita income, income inequality and poverty.

The baseline model specification used in the analysis is as follows.

$$INCL_{it} = \alpha_1 INCL_{it-1} + \alpha_2 QUAL_{it} + \alpha_3 HUM_{it} + \alpha_4 GROWTH_{it} + \alpha_5 INFL_{it} + \alpha_6 OPEN_{it} + \alpha_7 GCONS_{it} + \alpha_8 POLIY_{it} + \alpha_9 TERMS_{it} + \alpha_{10} Log(POP)_{it} + \mu_i + \delta_t + \epsilon_{it} \quad (1)$$

i and t are the subscripts representing respectively a country and a sub-period in the panel dataset. On the basis of available data, we have constructed an unbalanced panel dataset of 101 developing countries over the period 1980-2014, using non-overlapping sub-periods of 5-year average. The use of non-overlapping sub-periods helps overcome the missing data problem for some countries over certain years, but also avoid modelling business cycles, while also obtaining medium term and long term effects. These sub-periods are 1980-1984; 1985-1989; 1990-1994; 1995-1999; 2000-2004; 2005-2009, and 2010-2014. The parameters α_1 to α_{10} will be estimated. μ_i are country (time invariant) heterogeneity, and δ_t are time dummies that account for global shocks affecting inclusivity in all countries simultaneously. ϵ_{it} is a well-behaving error-term.

The indicator "INCL" is the index of inclusivity. It could be the index of inclusivity computed based on the poverty headcount ratio (denoted "INCLHC") or the index of inclusivity computed based on the poverty gap (denoted "INCLGAP"). We, henceforth, use the expression of "headcount poverty based inclusivity" in reference to the indicator "INCLHC", and poverty gap based inclusivity" in reference to the indicator "INCLGAP". To recall, values of the indicators of inclusivity "INCLHC" and "INCLGAP" range from 0 to 1, with higher values indicating greater inclusivity. The lagged dependent variable has been introduced in model (1) to capture the persistence of inclusivity over time, in light of the well-known strong persistence of indicators of the real per capita income, income inequality and poverty. This also allows dampening the problem of omitted variables in model (1).

The indicator "QUAL" is the export product quality indicator described above. The control variables "HUM", "GROWTH", "OPEN", "GCONS", "POLITY", "TERMS" and "POP" are respectively the human capital, economic growth rate, trade openness, government consumption, political institutions, terms of trade and the population size. The variable "INFL" is the transformed indicator of the annual inflation rate (not expressed in percentage), in view of the latter's skewness and the fact that it contains both negative and positive values. It has been calculated using the following formula: $INFL = sign(INFLATION) * \log(1 + |INFLATION|)$, where $|INFLATION|$ refers to the absolute value of the annual inflation rate (not expressed in

percentage), denoted "INFLATION". The annual inflation rate (not expressed in percentage) is based on consumer price index -CPI- (not expressed in percentage) where missing values have been replaced with values of the GDP deflator (not expressed in percentage).

We present in Appendix 1 the description and source of variables used in the analysis, notably of the control variables. Appendix 2 shows the standard descriptive statistics on these variables, and Appendix 3 presents the list of the 101 countries used in the full sample as well as countries contained in the sub-sample of LDCs.

Effect of government consumption on inclusivity

Government spending can exert a positive or negative effect on the real per capita income depending on whether it is used for the effective provision of public goods or services or not (Barro, 1990; Grossman, 1990) as well as whether it has stimulated or crowded-out private investment (e.g., Agell et al., 1997; Arestis et al., 2021; Auerbach and Gorodnichenko, 2012; Guseh, 1997; Nelson and Singh 1994). Its effect can be positive or negative depending on the way it is financed, including when financed through increased taxes (e.g., Afonso and Sousa 2011) or unsustainable debt (e.g., Sawyer, 2012). In the meantime, the effects of government spending on income inequality and poverty depend on its size, composition, progressivity and how it is financed (e.g. Jellema et al., 2021). Some types of government spending tend to reduce income inequality (e.g. Goni et al 2011; Lustig et al., 2013; Martinez Vazquez et al., 2012) and poverty (e.g., Hidalgo-Hidalgo and Iturbe-Ormaetxe, 2018). In general, pro-poor public spending (even financed through regressive taxes, provided that the latter are not excessive) often results in lower income inequality and poverty (e.g., Lustig, 2018, chapter 10). For example, Hidalgo-Hidalgo and Iturbe-Ormaetxe (2018) have found that public expenditure on education exerts a strong long-run negative effect on the incidence of poverty in adulthood, especially among individuals who have parents with a low level of education. Likewise, government spending on health and education can reduce income inequality, although much of its benefits tend to accrue to middle-income groups in urban areas (e.g., Alesina 1998, Davoodi et al. 2003). Concurrently, spending on indirect subsidies (which represents a lion's share of total government spending in developing countries) tend to benefit to higher income groups (e.g., Rhee et al 2014), thereby raising income inequality. Overall, the net effect of government spending on inclusivity is theoretically undetermined, and will be determined empirically.

Effect of trade openness on income inequality

Trade openness is associated with a higher per capita income (e.g., Camarero et al., 2016; Felbermayr and Gröschl, 2013; Frankel and Romer, 1999), especially in economies that facilitate firm entry (e.g., Freund and Bolaky, 2008). The effect of trade openness on income inequality and poverty is context specific e.g., Goldberg and Pavcnik, 2007; Pavcnik, 2017). While some studies have found a positive effect of trade openness on income inequality, including in developing countries (e.g., Bergh and Nilsson, 2010), others have reported a dampening income inequality effect of trade openness (e.g., Calderon and Chong, 2001; Furceri and Ostry, 2019; Jaumotte et al., 2013; Siddique, 2021). In a more recent study, Dorn et al. (2022) have obtained that trade openness does not necessarily benefit all poor, but tends to disproportionately benefit the relative income shares of the very poor in emerging and developing economies. Trade openness (or alternatively trade policy liberalization) can reduce poverty (e.g., Fajgelbaum and Khandelwal, 2016; Kis-Katos

and Sparrow, 2015) under certain conditions (e.g., Winters et al., 2004), including for example when adjustment costs for the poor are appropriately addressed (e.g., World Bank and WTO, 2015, 2018), when financial sectors are deep, and when education levels are high and institutions strong (e.g., Le Goff and Singh, 2014). In light of the uncertainty surrounding the direction of the effect of trade openness on per capita income, income inequality and poverty, we cannot conclude on the precise direction of the effect of trade openness on inclusivity.

Effect of the population size

The population size, a proxy for the market size, can increase the scope for within-country trade (e.g., Frankel and Romer, 1999; Levine and Zervos, 1993), and affect positively income per capita because of scale economies (e.g., Freund and Bolaky, 2008). However, an increase in the population size can negatively affect human capital, and in turn reduce per capita income (e.g., Mankiw et al., 1992). Boucekkine et al. (2013) have shown that the effect of changes in the population size on the level of per capita income can be negative, nil, or positive, depending on the interaction of three transmission mechanisms of demographic shocks, namely a standard one (i.e. dilution) and two non-standard (altruism and human capital accumulation). In particular, the joint negative effect of dilution and altruism appears to be always stronger than the induced positive human capital effect. On the other hand, demographics and changes in the population size can influence the income distribution (e.g., Furceri and Ostry, 2019; Dorn, 2022; OECD, 2008). Ahlburg (1996) has suggested that the population growth can affect poverty through a variety of channels. An increase in the population size can raise poverty through its negative effect on per capita income growth and well-being. It can also generate higher poverty rates by increasing landlessness in poor nations that experience pressure on land. Finally, an increase in the population size can negatively affect child health, and education and hence raise poverty. However, an increase in the population size can reduce poverty if it is associated with an increase in economic growth and the per capita income (e.g., Cruz and Ahmed, 2018; Sinding, 2009). In light of the foregoing, the effect of the population size on inclusivity is undermined theoretically.

Effect of inflation

A high inflation rate reflects an economic malaise. Its adverse effects on economic growth (for example, through lower investment and efficiency) have been documented in the literature (e.g., Christiansen et al., 2013; Hu et al., 2021; Levine and Renelt, 1992; Levine and Zervos, 1993; Slemrod, 1995). We expect that a stable macroeconomic environment (proxied by a lower inflation rate) is associated with a higher per capita income. As for the income inequality effect of inflation, Albanesi (2007) has shown that as low-income households hold more liquid assets than high-income ones, an increase in the inflation rate can raise income inequality. The positive effect of inflation on income inequality has also been reported by many studies (e.g., Doepke and Schneider, 2006; Easterly and Fischer 1998). However, recently, Zheng et al. (2023) have shown that the effect of inflation on income inequality depends on the relative dominance of wealth heterogeneity to skill heterogeneity and how the ratio of interest income to labour income responds to inflation. Menna and Tirelli (2017) have shown that income inequality falls when an increase in the inflation rate is combined with lower income taxes. Nordvik (2022) has found that an increase in unanticipated inflation is particularly harmful in more homogenous populations, as it reduces the income share of the poor in ethnically fractionalized countries, and increases it in ethnically

homogenous populations. Likewise, inflation raises poverty rates (e.g., Easterly and Fischer, 2001; Nordvik, 2022). Overall, we expect a higher inflation rate to be harmful to inclusivity.

Effect of human capital

While human capital development can raise the real per capita income, and reduce poverty, its effect on income inequality is mixed. The literature has pointed to the positive effect of human capital on economic growth (e.g., Aghion et al., 2015; Mankiw et al., 1992; Lucas, 1988; Nelson and Phelps, 1966) and income per capita (e.g., Barros et al., 2023; Égert et al., 2020). Likewise, the accumulation of human capital can contribute to poverty reduction. Ceroni (2001) has shown theoretically that when education is privately financed, the resulting human capital accumulation can lead to poverty traps that may affect many generations, and imply long-lasting effects of the initial distribution of human capital on aggregate dynamics. Attanasio et al. (2017) have noted that poor health at early ages is pervasive in developing countries. They have found that ill-health for children can result in a higher cognitive deficits at very young ages, which becomes persistent and can perpetuate poverty. In the same vein, Attanasio et al. (2020) have demonstrated that parental investments influence child cognitive development at all ages, in particular at very young ages. Low parental investments at early ages result in poor health and affect in a persistent manner children's cognitive development. Likewise, an improved education level can help reduce poverty by improving the labour force participation and generating full-time employment, as well as by enhancing the population health (e.g., Hofmarcher, 2021; Teffo, 2008). Santos (2011) has developed a model that shows that an unequal initial income and human capital distribution, and differences in the quality of education between children from more and less advantaged social sectors cause poverty trap, and reduce the economy's current and steady-state aggregate output level as well as its growth rate. The author has recommended the implementation of policies aiming at equalizing the education quality with a view to reducing initial inequalities in the long run.

On the other hand, the effect of human capital on income inequality is not clear-cut. For example, according to Aghion (2002), pro-growth policies designed to improve education with a view to increasing labour mobility, can lead to inequality within groups of workers between jobs and sectors during transition. Nonetheless, such policies lead to an improvement in the distribution of permanent income. Dabla-Norris et al. (2015) have found that the education level is positively associated with share of income accruing to the top income decile, but negatively affect the share of income accruing to the middle income decile. Coady and Dizioli (2017) have uncovered that the average years of schooling is positively (but not always significantly) associated with income inequality, finding that is some extent, consistent with constant or increasing returns to additional years of schooling. Overall, the accumulation of human capital may increase or affect negatively inclusivity, and is, therefore an empirical matter.

Effect of the institutional quality

The literature has demonstrated that a better institutional and governance quality generates a higher per capita income (e.g., Nisticò, 2022; Rodrik et al., 2004). Weak institutions can result in higher poverty rates as they are associated with market exclusion, market inefficiency, and misallocation of resources, and can reduce the effectiveness of government expenditure (e.g., Bastiaensen et al., 2005; Grindle, 2004; Jetter and Parmeter, 2018; Tebaldi and Mohan, 2010). However, the effect of institutions on income distribution is more nuanced (e.g., Furceri and

Ostry, 2019), as institutional quality is correlated with income inequality, even among democracies (e.g., Chong and Gradstein, 2019). In line with this, Acemoglu et al. (2015) have observed many contradictory results in studies on the relationship between democracy and income inequality, and Krauss (2016) has shown that these different findings arise from the country and time coverage in the datasets, estimation techniques or measures of democracy. Nevertheless, studies such as Chong and Gradstein (2007) have shown that an improvement in institutional quality can be conducive to a more equal income distribution. According to Panaro and Vaccaro (2023), a political system featured by the presence of elections and multiparty competition, provides a fertile ground for the adoption of redistributive policies (see also Pelke, 2020; Teo, 2020). On the other hand, state capacity increases the likelihood of successfully implemented redistributive policies (e.g., Panaro and Vaccaro, 2023). Zuazu (2022) has shown that more proportional systems and lower income inequality, especially at low and medium levels of political equality. In contrast, changes in electoral systems in political equal societies are associated with a higher income inequality. The net effect of political institutions on inclusivity is a priori unknown.

Effect of the terms of trade and economic growth

Finally, we expect that an improvement in terms of trade would raise the real per capita income, reduce poverty and eventually lead to a lower income inequality, especially if it benefits poor exporters in countries that export primarily low-value added products. Incidentally, in light of the possible positive effect of economic growth on welfare (e.g., Aurland-Bredesen, 2021; Kosack and Tobin, 2015; Sánchez and Cicowiez, 2014), we expect that a higher economic growth will foster inclusivity.

5.2. Econometric approach

At the outset, we would like to note that the estimations of all specifications of model (1) described below are done using each of the two indicators of inclusivity as dependent variable, bearing in mind that the main inclusivity indicator is the headcount poverty based inclusivity. The poverty gap based inclusivity is used for robustness check.

Concerning estimators, we start by using the within fixed effects estimator (denoted "FEDK¹⁰") to estimate the static version of model (1) (i.e., model (1) without the lagged dependent variable as a regressor) (see results in columns [1] and [2] of Table 1). We also use the same estimator to estimate model (1) as it stands, i.e., with the lagged dependent variable as a regressor (see results in columns [3] and [4] of Table 1). All these estimates help test hypothesis 1 using the FEDK estimator.

While the estimates obtained using the FEDK estimator provide a first insight into the effect of export product quality on inclusivity, these estimates may be biased for several reasons. First, all regressors with the exception of the population size and the terms of trade, are suspected to be endogenous, i.e., suffering from the bi-directional causality between the dependent variable and each of these variables. For example, taking the case of our variable of interest, we can argue that while export product quality can affect inclusivity, countries with low levels of inclusivity featured by a low real per capita income, high income inequality and/or low poverty rates, may be willing to

¹⁰ This estimator has been used along with the Driscoll and Kraay (1998) approach to account for the heteroscedasticity, serial correlation and contemporaneous cross-sectional dependence in the residuals (see Hoechle, 2007).

implement several policies and measures aiming at improving the quality of these export products, in particular if they believe that export product quality improvement will foster inclusivity. This reasoning clearly explains the endogeneity of the indicator of export product quality. Similar reasons can be made for other suspected endogenous variables. The second rationale for the likely biased estimates arising from the FEDK estimator is the existence of a correlation between the lagged dependent variable and countries' time invariant fixed effects in the error term. This correlation generates the so-called Nickell bias (Nickell, 1981) in the analysis.

We use the two-step system Generalized Method of Moments (GMM) estimator proposed by Blundell and Bond (1998) to handle these endogeneity concerns. This estimator is more efficient than the Arellano and Bond (1991)'s difference GMM estimator that generates weak instruments when the dependent variable is highly persistent over time (e.g., Bond, 2002). This estimator is widely used in the macroeconomic empirical literature, and is appropriate for dynamic panel datasets with large cross section and small-time dimensions. (similar to ours in the present analysis). It permits to address the endogeneity problems raised above, while also helping overcome the unobserved country heterogeneity, omitted variable bias, and measurement error problems.

Estimating model (1) (or its different other variants described below) using the two-step system GMM estimator involves estimating a system of equations where an equation with variables in first differences is combined with an equation with variables in levels. Lagged first differences are utilized as instruments for the levels equation, and lagged levels are used as instruments for the first-difference equation. The correctness of the different specifications of model (1) estimated by the two-step system GMM estimator is assessed using the following three standard tests: the Arellano-Bond test of first-order serial correlation in the residuals of the equations in level (denoted AR(1)), the Arellano-Bond test of no second-order autocorrelation in the residual in the differenced equation (denoted AR(2)), and the Hansen test of over-identifying restrictions (OID), whose null hypothesis is the validity of the instruments used in the regression. We also report the Arellano-Bond test of absence of third-order autocorrelation in the residual in the differenced equation (denoted AR(3)), which helps make sure that the relevant model specification does not suffer from the omitted variables. Furthermore, we avoid the instrument proliferation problem by ensuring that the number of instruments is lower than the number of countries (e.g., Roodman, 2009).

Columns [1] and [2] of Table 2 report the outcomes arising from the estimation of model (1) (as presented) using the two-step system GMM estimator. Columns [1] and [2] of the same Table present the outcomes of the estimation of a specification of model (1), i.e., model (1) with the dummy "LDC" and its interaction with the indicator of export product quality. The "LDC" dummy takes the value of 1 for LDCs, and 0, for other countries in the full sample. Outcomes in Table 2 help test hypothesis 1, over the full sample, as well as in LDCs versus NonLDCs.

Outcomes in Table 3 help test hypothesis 2, in particular the extent to which the effect of export product quality on inclusivity depends on level of economic growth volatility/external shocks. To obtain these outcomes, we estimate another specification of model (1), i.e., model (1) that contains both an indicator of economic growth volatility (or of external shocks) and its interaction with the variable measuring export product quality. The economic growth volatility indicator (denoted "GRVOL") was computed as the standard deviation of the annual economic growth rate (constant 2015 US\$) over non-overlapping sub-periods of 5-year. The indicator of

external shocks is measured by the exchange rate pressure, which reflects the total pressure on the exchange rate that has been resisted through foreign exchange intervention or relieved through exchange rate change (e.g., Patnaik et al., 2017: p62). In practical terms, it represents a weighted average of percentage changes of policy variables in response to current account or financial account shocks, and acts for a proxy for export demand and foreign capital flows shocks (e.g., Aizenman and Hutchison, 2012; Morrissey et al., 2016; Patnaik et al., 2017).

5.3. Empirical results' interpretation

Outcomes in columns [1] and [2] (based on the FEDK estimator) show that export product quality improvement affects positively and significantly (at the 1% level) inclusivity, regardless of whether the latter is measured on the basis of poverty headcount or poverty gap. The coefficients of the variable "QUAL" in these two columns are positive and similar, and indicate that a 1-point increase in the indicator of export product quality is associated with an improvement in inclusivity by 0.82 point. Likewise, results in columns [3] and [4] confirm the positive effect of the improvement in export product quality on inclusivity, with the magnitude of the effects being slightly different on poverty headcount-based inclusivity, and poverty gap-based inclusivity. In particular, a 1-point increase in export product quality is associated with an increase in an improvement in poverty headcount-based inclusivity by 0.278 point, and an increase in an improvement in inclusivity based on poverty headcount by 0.359-point. Incidentally, the coefficients of the lagged dependent variables in columns [3] and [4] are positive and significant at the 1% level, thereby confirming the importance of considering the dynamic specification of model (1) in the analysis. Across the four columns of the Table, results of control variables indicate that a higher inflation rate and an increase in government consumption reduce inclusivity, whereas an improvement in terms of trade and a rise in the population size lead to greater inclusivity. The other regressors exert no significant effect on inclusivity at the conventional significance levels.

We observe in Tables 2 and 3 that the coefficients of the lagged dependent variables are positive and significant at the 1% level, thereby providing support for considering the dynamic specification of model (1) in the analysis. In addition, across all columns of Tables 2 and 3, and as expected, the p-values of the AR(1) test are lower than 0.1 at the 10% level, and the p-values of the AR(2) and AR(3) tests are higher than 0.10 at the 10% level. These outcomes lead us to deduce that the two-step system GMM estimator is appropriate for carrying out the empirical analysis.

We observe from columns [1] and [2] of the Table that export product quality improvement leads to greater inclusivity (based on poverty headcount and poverty gap). In addition, the coefficients of the variable "QUAL" are of the same magnitude in the two columns of the Table. We conclude that a 1-point increase in the value of the index of export product quality leads to an increase in inclusivity (or on poverty headcount and poverty gap) by 0.763 point. **These findings confirm hypothesis 1.**

Outcomes in columns [3] and [4] indicate that while export product quality improvement affects positively and significantly (at the 1% level) inclusivity in LDCs, it exerts no significant effect (at the conventional significance levels) on inclusivity in NonLDCs. In LDCs, an improvement in export product quality by 1-point is associated with 1.09 point increase in inclusivity based on poverty headcount, and 1.12 point increase in inclusivity based on poverty gap. The absence of significant effects of export product quality improvement on inclusivity indicators in NonLDCs, may yet reflect differentiated effects across NonLDCs, but also a positive

within-country income inequality effect of export product quality improvement in NonLDCs. In support for this, export product quality improvement can exacerbate income inequality in some countries, including high income countries (e.g., Nguyen and Su, 2022a).

Regarding control variables in all columns of Table 2, we obtain that an improvement in human capital leads to a lower inclusivity. This may be due to the possible positive effect of human capital accumulation on income inequality, as discussed in section 2. As expected, a higher economic growth, a lower inflation rate and an improvement in terms of trade foster inclusivity. However, trade openness, government consumption and the population size are negatively and significantly associated with inclusivity, thereby reflecting conflicting effects of these variables on the components of the inclusivity indicator, namely the real per capita income, income inequality and poverty. A better quality of the political system exerts no significant effect (at the 10% level) on inclusivity indicators. Outcomes concerning control variables in Table 3 are similar to those in Table 2.

Turning to results reported in Table 3, we observe from columns [1] and [2] that the interaction terms of the variable "(QUAL*[Log(GRVOL)])" are positive and significant at the 1% level, and the coefficient of the variable "QUAL" is also positive but significant at best at the 10% level. Incidentally, the coefficients of the variable capturing economic growth volatility are negative and significant at the 1% level in columns [1] and [2]. We conclude that the improvement in export product quality induces greater inclusivity in countries that experience a higher economic growth volatility, and the greater the degree of economic growth volatility, the larger is the positive effect of export product quality improvement on inclusivity. These findings are confirmed by the graphs in Figures 5 and 6, which show at the 95 per cent confidence intervals, the marginal impact of export product quality on inclusivity (respectively based on headcount poverty and on poverty gap) for varying degrees of economic growth volatility. This marginal impact shows similar patterns in Figures 5 and 6. It increases as the level of economic growth volatility rises, and is statistically significant only when it takes positive values. In other words, the marginal impact of export product quality on inclusivity is not significant for low levels of economic growth volatility¹¹, but is positive for higher degrees of economic growth volatility, and its magnitude increases with the level of economic growth volatility. This signifies that the improvement of export product quality dampens the adverse effects of economic growth volatility on inclusivity, especially in countries that face large sizes of economic growth volatility.

These findings are confirmed to some extent when considering outcomes presented in columns [3] and [4]. The coefficients of the interaction variable ("QUAL*ERP") and the coefficients of the variable "QUAL" are positive and significant at the 1% level in columns [3] and [4]. We deduce that on average, over the full sample, the improvement in export product quality always exerts a positive effect (i.e., regardless of the magnitude of external shocks) on inclusivity, and the magnitude of this positive effect increases as the size of external shocks rises. We depict in Figures 7 and 8, at the 95 per cent confidence intervals, the marginal impact of export product quality on inclusivity (respectively headcount poverty-based inclusivity and on poverty gap based inclusivity) for varying degrees of external shocks. This marginal impact shows similar patterns in Figures 7 and 8. It increases as the degree of external shocks (i.e., the values of "ERP") rises.

¹¹ As per our calculation based on Figure 5, the value of the indicator of economic growth volatility above which export product quality affects positively inclusivity is 1.035 (below this level of economic growth volatility, there is no significant effect of export product quality on inclusivity). This value amounts to 1.133 for Figure 6.

However, it is not always significant. Specifically, it is not significant for values of "ERP" ranging from -0.842 to -0.567 in Figure 7. However, for sizes of external shocks (i.e., for values of ERP) higher than -0.567, export product quality induces a greater inclusivity based on headcount ratio. Similar patterns are observed in Figure 8.

In a nutshell, outcomes presented in Table 3 allow concluding that export product quality helps dampen the effect of adverse external shocks (as well as the resulting economic growth volatility) on inclusivity by enhancing the latter in countries that face larger external shocks, as well as greater economic growth volatility.

6. Further analysis

We have found above that export product quality fosters inclusivity in countries that are subject to higher economic growth volatility, and incidentally to greater extent of external shocks. At the same time, it is well established in the literature that export product concentration exposes developing countries to external shocks and is associated with a greater economic growth volatility (e.g., Haddad et al. 2013; Hirsch and Lev, 1971; Kramarz et al. 2020; Vannoorenberghe et al. 2016). This signifies that in light of the previous findings, one should expect that export product quality would foster inclusivity in developing countries that experience a greater export product concentration. It can, therefore, be worth investigating the extent to which the effect of export product quality on inclusivity in developing countries is conditioned on countries' degree of export product concentration. The issue is all the more relevant that existing relevant studies have revealed that export product diversification enhances the improvement of export product quality. In particular, while Henn et al. (2020) and Nguyen and Su (2022b) have reported a positive effect of export product diversification, more nuance findings have been reported by Can and Gozgor (2018). The latter have found that export product diversification at the intensive margins (i.e., an increase in the value of exports among existing products that reflect an increase in the number of existing export products) leads to greater improvement in export product quality in low and lower middle-income countries. In contrast, for upper middle income countries and high-income countries, both export product diversification at the intensive margins, and export product diversification at the extensive margins (i.e., the one that involves an increase in the number of new products exported as well as new trading partners) promote export product quality upgrading. In light of the foregoing, we formulate the following hypothesis.

Hypothesis 3: Export product quality exerts a larger positive effect on inclusivity in countries that experience a higher degree of export product concentration.

To test hypothesis 3, we estimate several variants of model (1), i.e., with yet the two indicators of inclusivity as dependent variable, but also that contain indicators of export product diversification, including the indicator of overall export product diversification, and alternatively its two components, namely export product diversification at the intensive margins, and export product diversification at the extensive margins. The indicators of overall export product concentration ("ECI"), export product concentration at the intensive margins ("ECIINT"), and export product concentration at the extensive margins ("ECIEXT") are used in the analysis. These indicators are collected from the IMF's diversification toolkit database (see Appendix 1), and an increase in the values of these indicators show a greater export product concentration. Table 4

contains the outcomes of the estimation (by the two-step system GMM approach) of these different variants of model (1). Results in column [1] and [2] of the Table indicate that the coefficients of the interaction variable "QUAL*ECI" are positive and significant at the 1% level, while the coefficients of "QUAL" are negative and significant at the 1% level. These outcomes show that over the full sample, export product quality exerts a positive effect on inclusivity in countries whose values of overall export product concentration exceed 2.15 ($= 0.548/0.255$) (for results with "INCLHC" being the dependent variable) and 2.19 ($= 0.589/0.278$) (for results with "INCLHC" being the dependent variable). As values of the indicator "ECI" range from 1.63 to 6.27, we conclude that countries whose level of overall export product concentration exceeds 2.15 experience a positive effect of export product quality improvement on poverty headcount-based inclusivity, and the magnitude of this positive effect increases in countries that have a higher degree of overall export product concentration than in those with a relatively lower degree of export product concentration. Figure 9 shows at the 95 per cent confidence intervals, the marginal impact of export product quality on inclusivity based on headcount poverty conditioned on the degree of overall export product concentration. It indicates that this marginal impact increases as the degree of overall export product concentration rises, but is not statistically significant for low degree of export product concentration, i.e., for high levels of export product diversification. This signifies that export product quality improvement exerts a larger positive effect on poverty headcount-based inclusivity in countries that experience a higher degree of export product concentration. A similar pattern is observed when we constructed Figure 10 that shows at the 95 per cent confidence intervals, the marginal impact of export product quality on poverty gap-based inclusivity conditioned on the degree of overall export product concentration. Estimates reported in Table 4 could also be interpreted in a different way if we consider them from the perspective of the effect of export product concentration on inclusivity conditioned on the degree of export product quality – although this is not the objective of the present paper. In fact, in columns [1] and [2] of Table 4, the coefficients of the variable "ECI" are negative and significant at the 1% level. As the coefficients of the interaction variable "QUAL*ECI" are positive and significant, it ensues that on average over the full sample, export product concentration influences negatively (positively) and significantly inclusivity based on headcount poverty for levels of export product quality lower than (higher than) 0.604 ($= 0.154/0.255$), and affects negatively (positively) and significantly inclusivity based on poverty gap for levels of export product quality lower than (higher than) 0.633 ($= 0.176/0.278$). To recall, values of the index "QUAL" in the full sample range between 0.257 and 1.018. Thus, export product diversification enhances inclusivity in countries with low levels of export product quality, but it is rather export product concentration that fosters inclusivity in countries with relatively higher quality of export products.

Outcomes in columns [3] and [4] show similar patterns as those in columns [1] and [2]: the coefficients of "QUAL" in columns [3] and [4] are not significant at the conventional significance levels, while the coefficients of the interaction variable "QUAL*ECIINT" in these two columns of the Table are positive and significant at the 1% level. We deduce that the effect of export product quality on inclusivity is always positive and significant, and increases as countries' level of export product concentration at the intensive margins rises. This is illustrated in Figures 11 and 12, which shows at the 95 per cent confidence intervals, the marginal impact of export product quality respectively on inclusivity based on headcount poverty (and inclusivity based on poverty gap) conditioned on the level of export product concentration at the intensive margins. It appears

from these two Figures that this marginal effect is positive and significant, and consistently increases as the degree of export product concentration at the intensive margins rises.

Outcomes in columns [5] and [6] reveal that the coefficients of "QUAL" in columns [5] and [6] are positive and significant at the conventional significance levels, while the coefficients of the interaction variable "QUAL*ECIEXT" in these two columns of the Table are yet negative, but not significant at the conventional significance levels. We conclude that regardless of the level of export product concentration at the extensive margins, export product quality always exerts a positive effect on inclusivity. However, in contrast with what we observed in columns [1] to [4] of the Table, here the magnitude of this positive effect is larger, the lower the degree of export product concentration at the extensive margins. In other words, export product quality improvement exerts a larger positive effect on inclusivity in countries with lower levels of export product concentration at the extensive margins.

7. Conclusion

This paper has investigated the effect of export product quality improvement on inclusivity, the latter reflecting concurrently an improvement in the real per capita income, a reduction in within-country income inequality, and a fall in poverty. The analysis covers 101 developing countries over the period from 1980 to 2014. It shows that export product quality improvement leads to greater inclusivity, especially in countries that experience high levels of economic growth volatility, and large magnitudes of external shocks. These findings are corroborated by the outcomes that export product quality improvement fosters inclusivity in countries that experience a higher degree of the overall export product concentration, especially export product concentration at the intensive margins.

The analysis sheds light on the positive contribution of export product quality improvement to inclusivity in developing countries. In this regard, it adds to existing works of export product upgrading on the real per capita income, income inequality and poverty.

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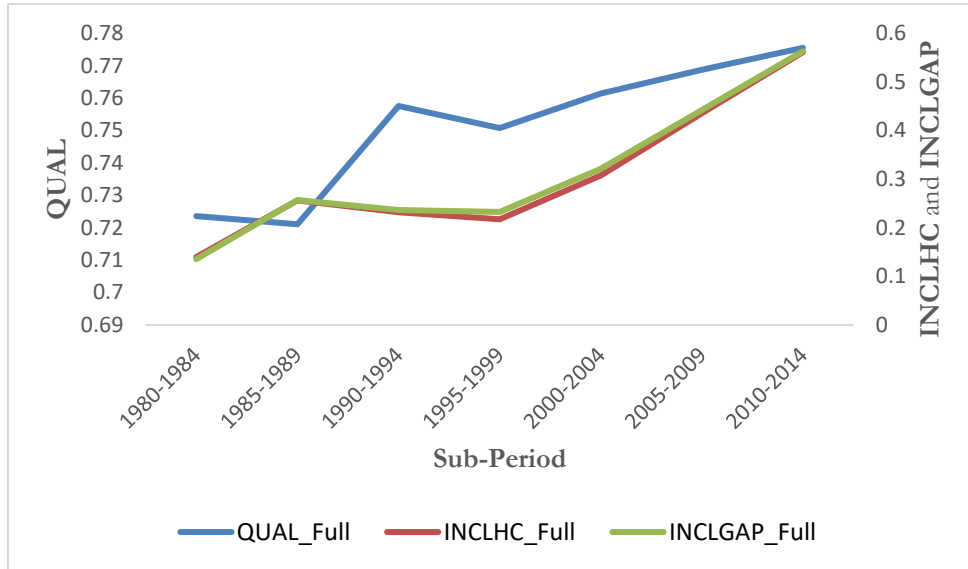
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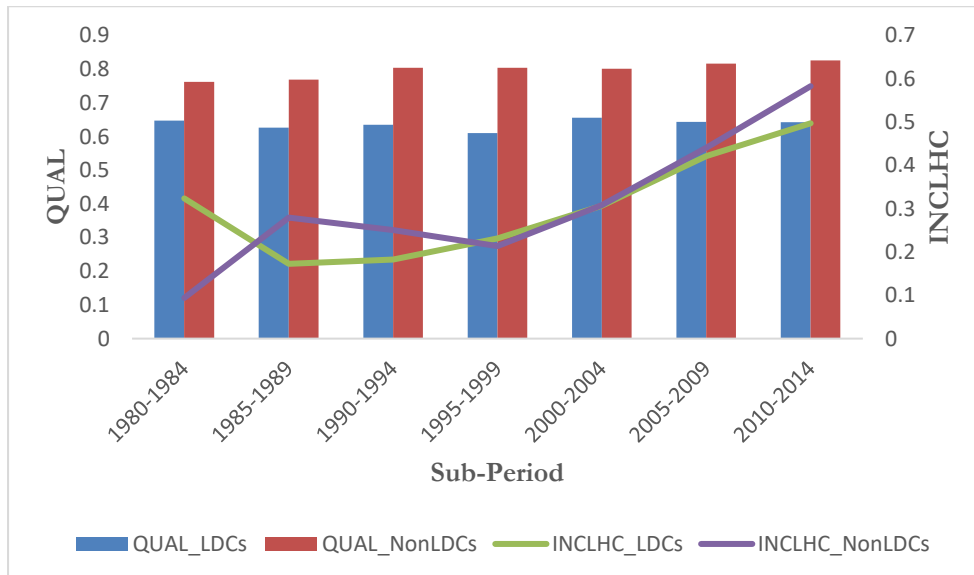
FIGURES

Figure 1: Export product quality and the two indicators of Inclusivity_Over the full sample



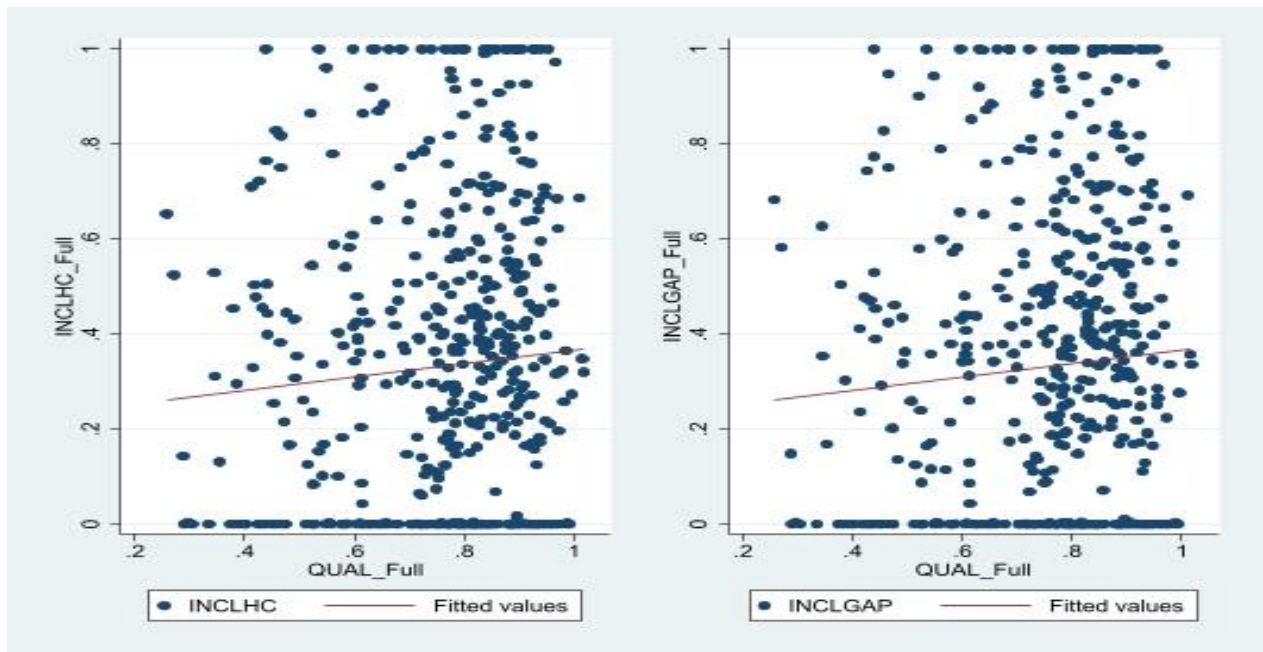
Source: Author

Figure 2: Export product quality and the index of Inclusivity based on poverty headcount ratio_Over the sub-samples of LDCs and NonLDCs



Source: Author

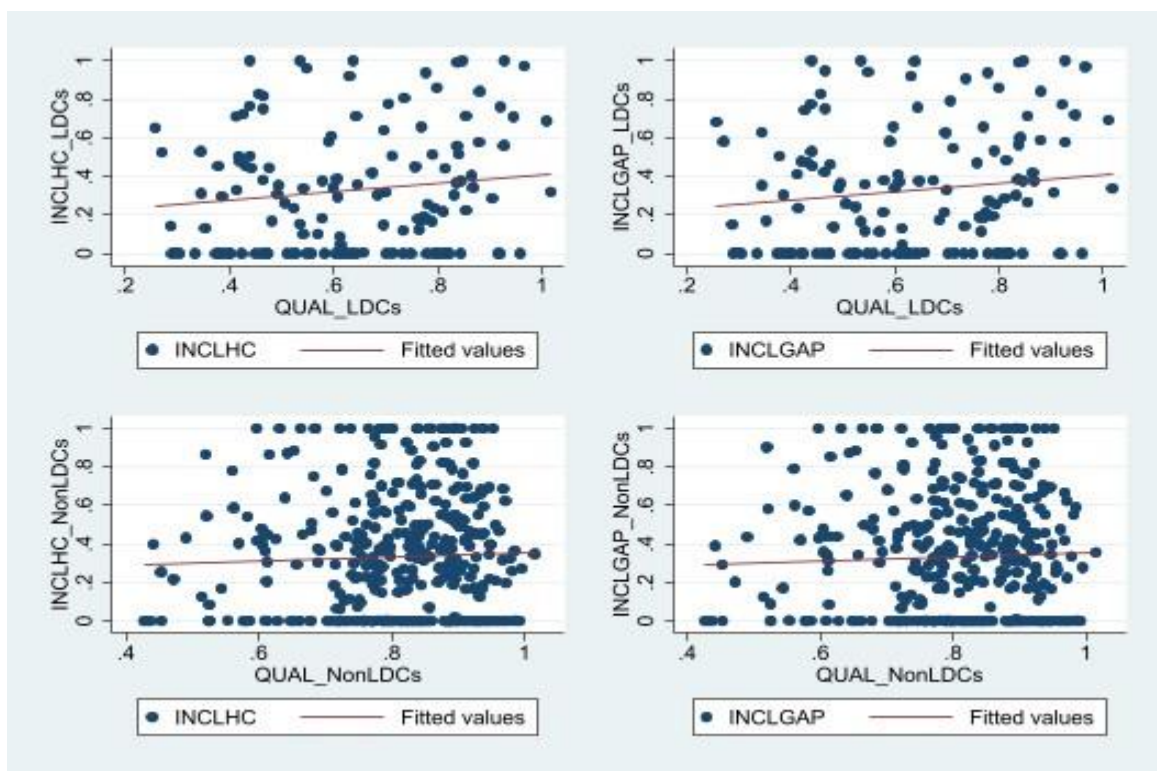
Figure 3: Scatter plot between export product quality and inclusivity indicators_over the full sample



Source: Author

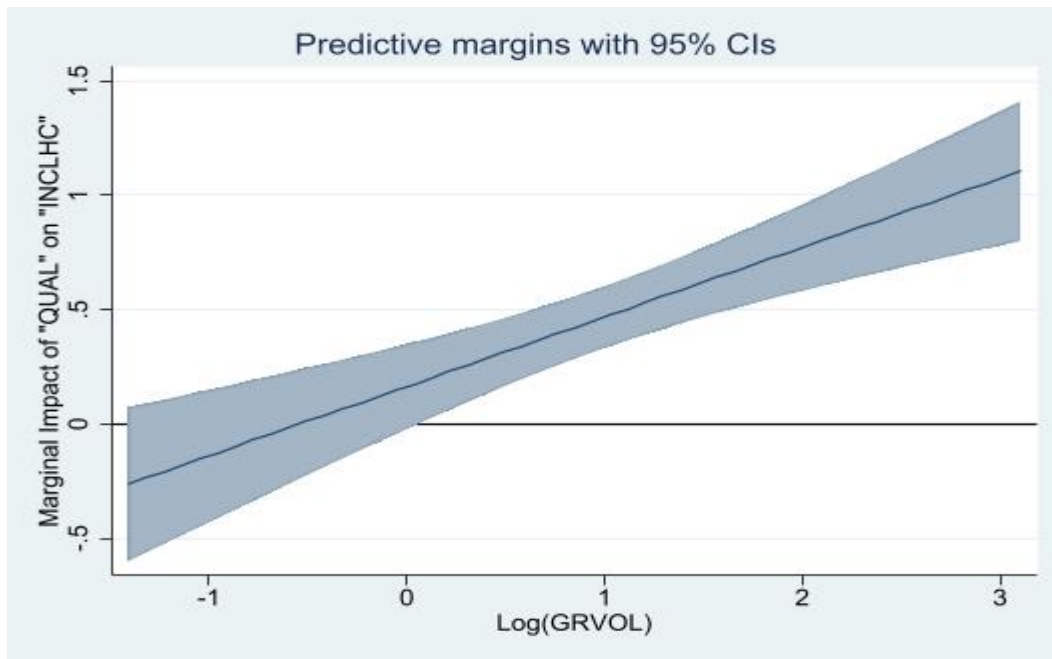
Note: "Full" means "Full sample"

Figure 4: Scatter plot between export product quality and inclusivity indicators_over the subsample of LDCs and NonLDCs



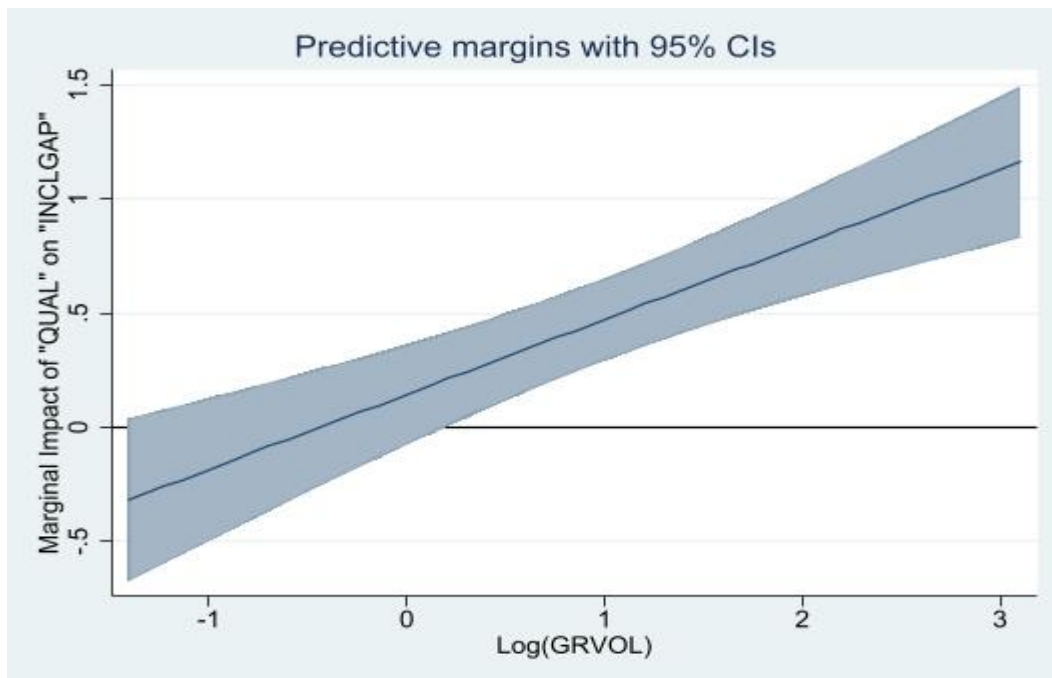
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Figure 5: Marginal Impact of "QUAL" on "INCLHC" for varying degrees of economic growth volatility



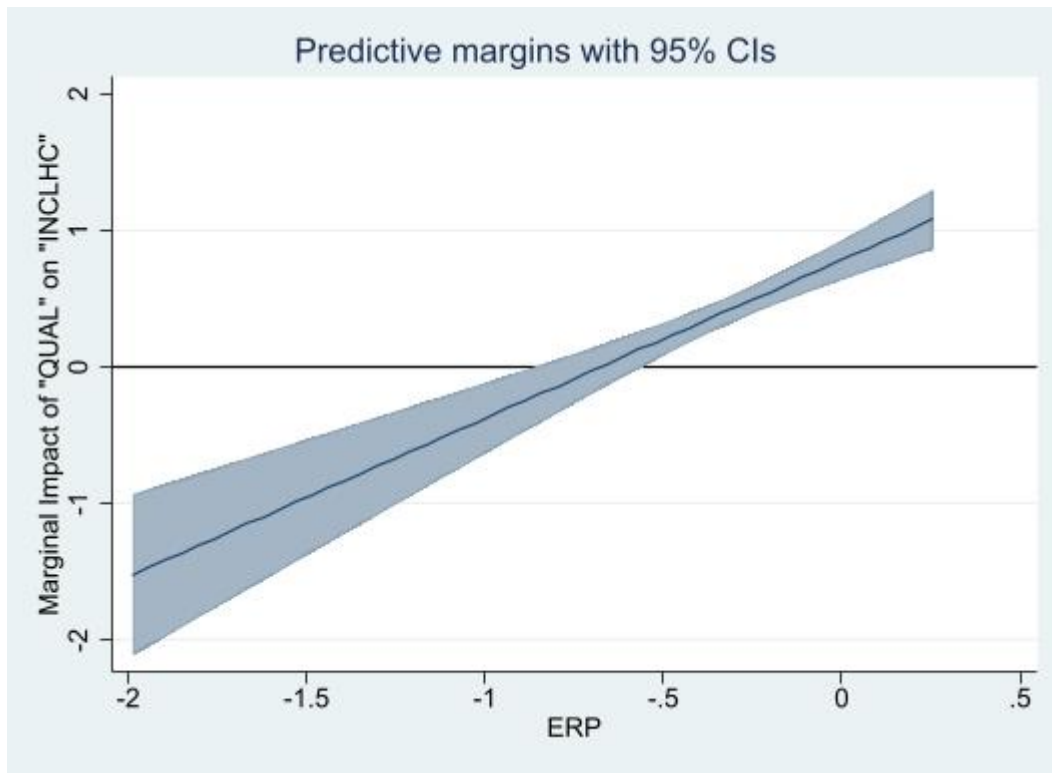
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Figure 6: Marginal Impact of "QUAL" on "INCLGAP" for varying degrees of economic growth volatility



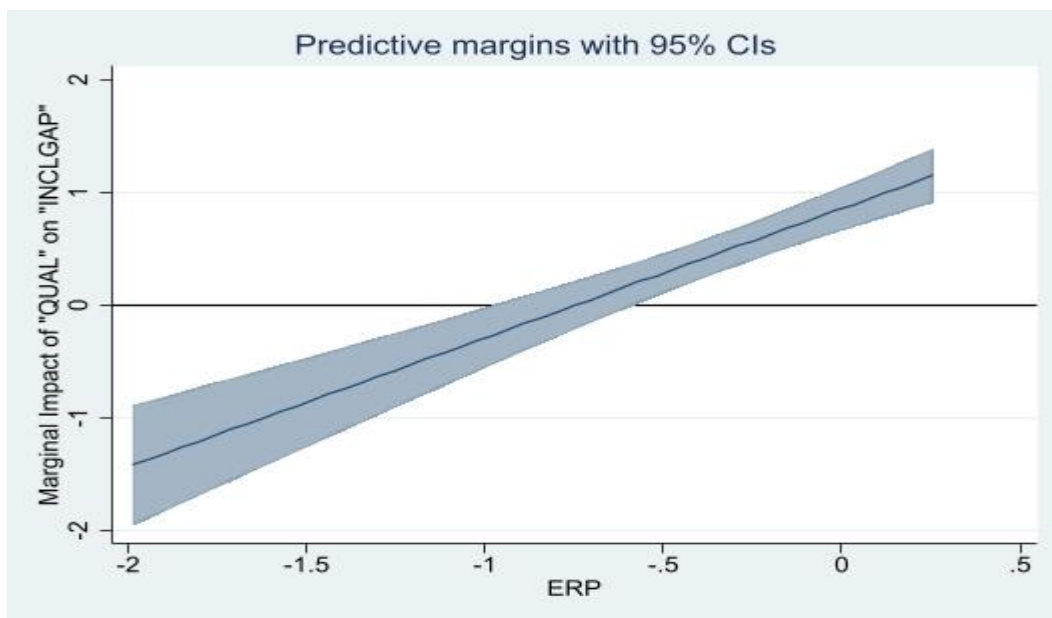
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Figure 7: Marginal Impact of "QUAL" on "INCLHC" for varying degrees of external shocks



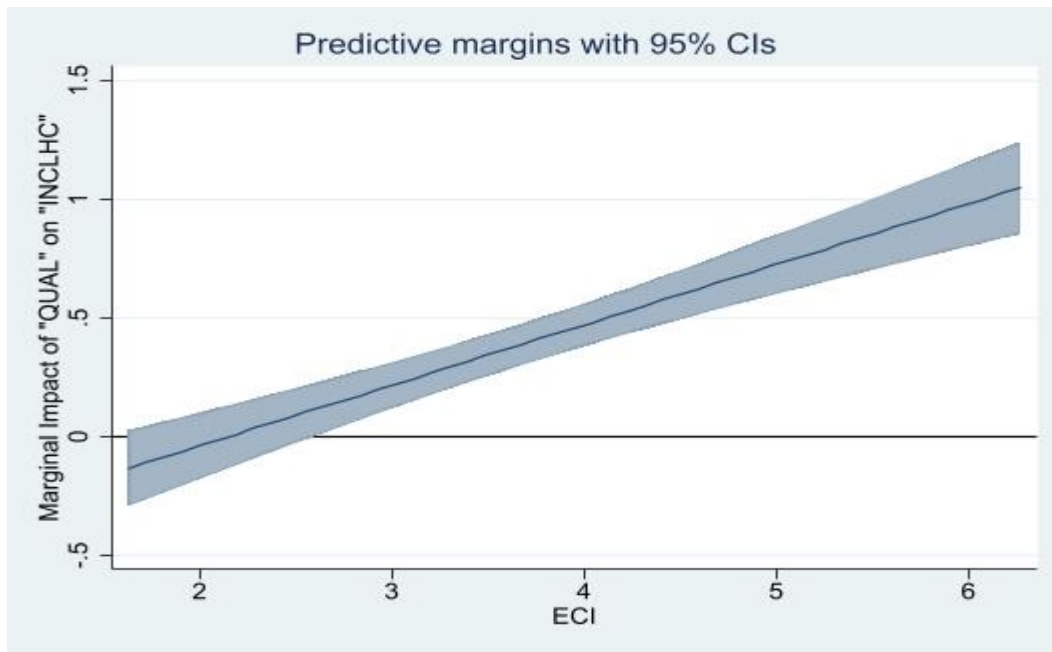
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Figure 8: Marginal Impact of "QUAL" on "INCLGAP" for varying degrees of external shocks



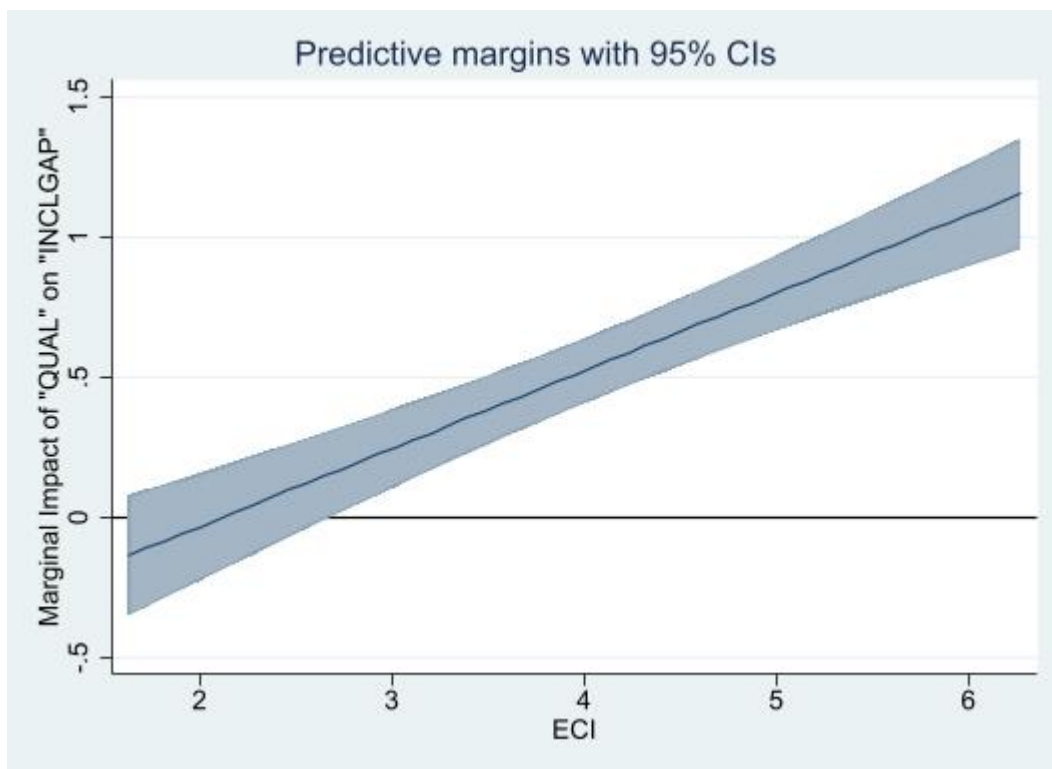
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Figure 9: Marginal Impact of "QUAL" on "INCLHC" conditioned on the overall level of export product concentration



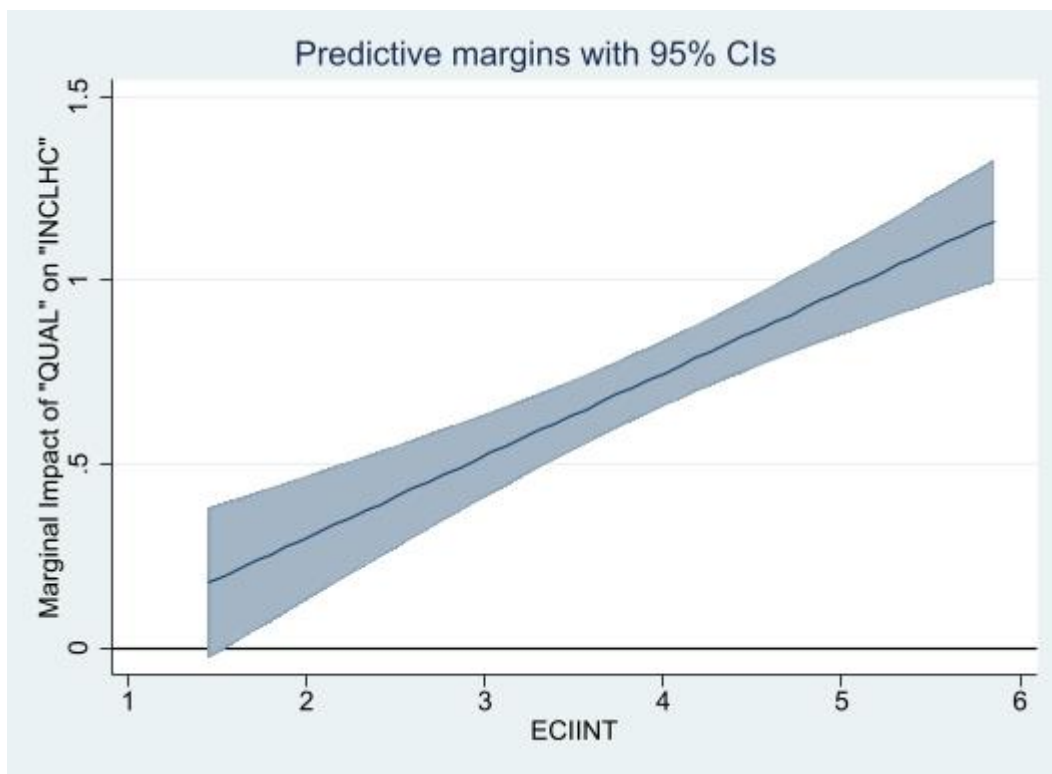
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Figure 10: Marginal Impact of "QUAL" on "INCLGAP" conditioned on the overall level of export product concentration



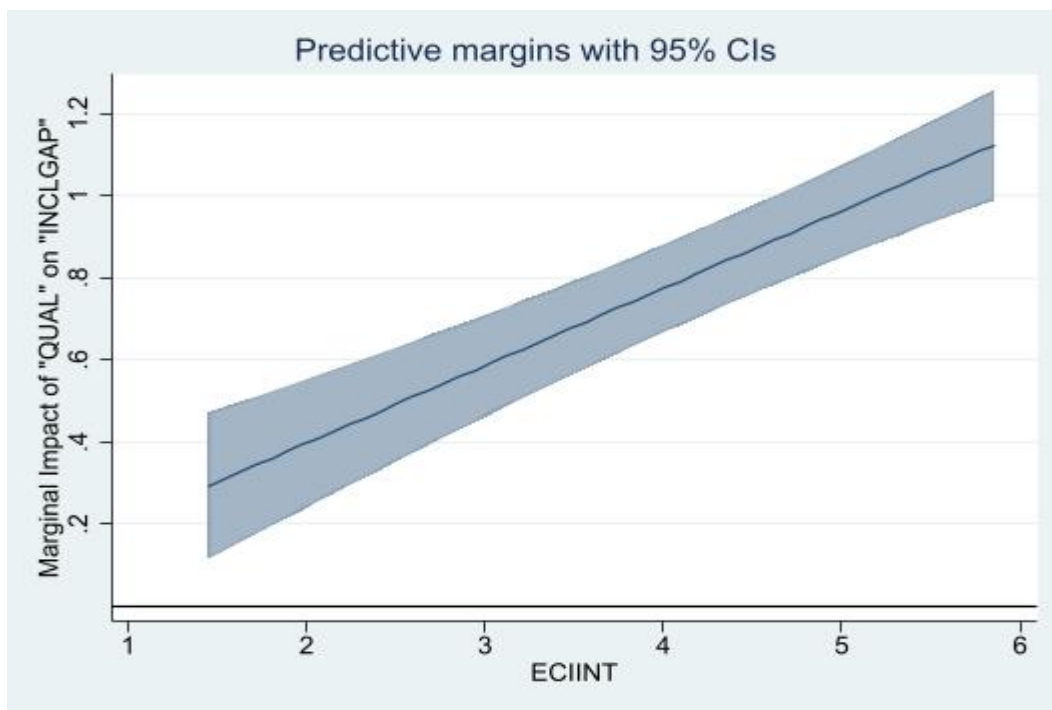
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Figure 11: Marginal Impact of "QUAL" on "INCLHC" conditioned on the level of export product concentration at the intensive margins



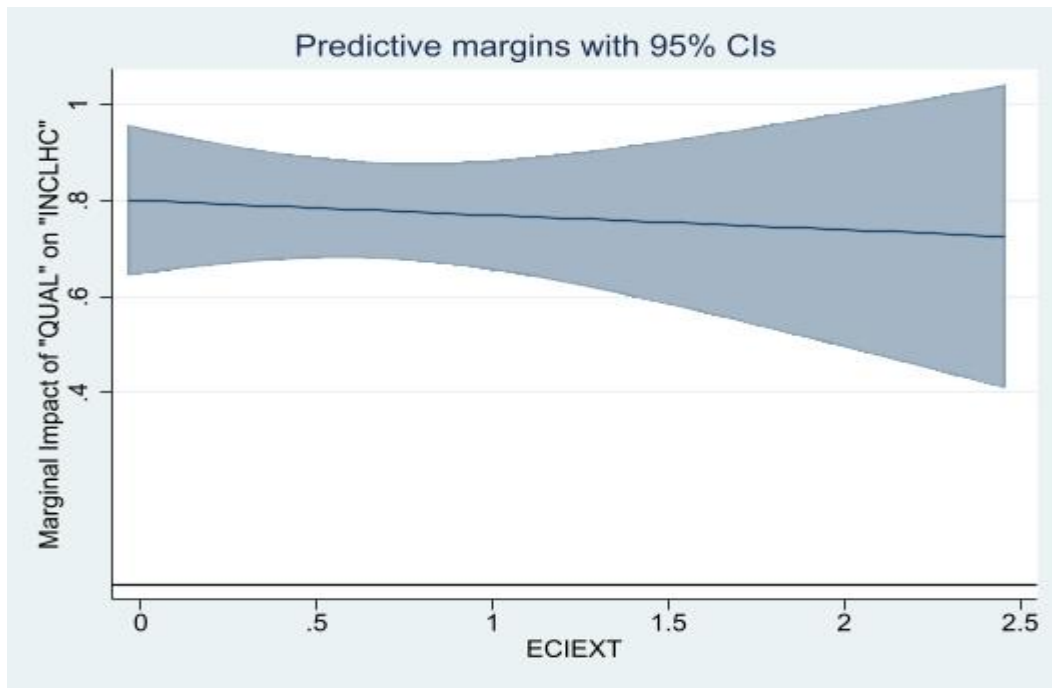
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Figure 12: Marginal Impact of "QUAL" on "INCLGAP" conditioned on the level of export product concentration at the intensive margins



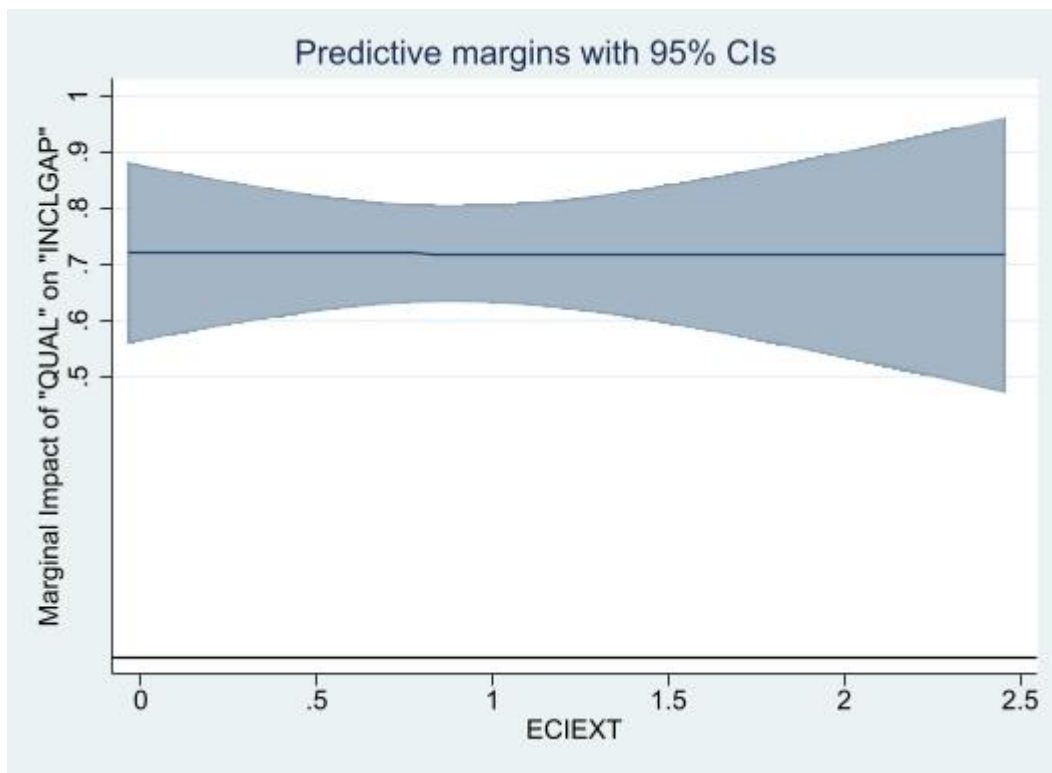
Source: Author

Figure 13: Marginal Impact of "QUAL" on "INCLHC" conditioned on the level of export product concentration at the extensive margins



Source: Author

Figure 14: Marginal Impact of "QUAL" on "INCLGAP" conditioned on the level of export product concentration at the extensive margins



Source: Author

TABLES and APPENDICES

Table 1: Effect of export product quality upgrading on inclusivity
Estimator: FEDK

Variables	INCLHC (1)	INCLGAP (2)	INCLHC (3)	INCLGAP (4)
One-period lag of the dependent variable			0.485*** (0.0553)	0.461*** (0.0656)
QUAL	0.824*** (0.0756)	0.818*** (0.0725)	0.278*** (0.0676)	0.359*** (0.0760)
HUM	0.0782 (0.0518)	0.0748 (0.0478)	-0.0162 (0.0580)	-0.0193 (0.0579)
GROWTH	-0.340 (0.598)	-0.199 (0.599)	0.597 (0.489)	0.663 (0.464)
INFL	-0.109*** (0.0411)	-0.111** (0.0437)	-0.125** (0.0500)	-0.127** (0.0542)
OPEN	-0.0298 (0.0955)	-0.0407 (0.107)	-0.0206 (0.0669)	-0.0566 (0.0758)
GCONS	-0.997* (0.523)	-1.012** (0.499)	-1.168*** (0.417)	-1.237*** (0.337)
POLITY	-0.00381 (0.00443)	-0.00381 (0.00442)	0.00292 (0.00307)	0.00272 (0.00312)
TERMS	0.201*** (0.0562)	0.203*** (0.0534)	0.198*** (0.0393)	0.207*** (0.0434)
Log(POP)	0.586*** (0.0749)	0.572*** (0.0720)	0.415*** (0.0998)	0.408*** (0.0829)
Constant	-10.01*** (1.253)	-9.755*** (1.192)	-6.896*** (1.574)	-6.789*** (1.293)
Observations - Countries	446 - 101	445 - 101	382 - 101	381 - 101
Within R-squared	0.2546	0.2422	0.3453	0.3226

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis.*

Table 2: Effect of export product quality upgrading on inclusivity
Estimator. Two-Step System GMM

Variables	INCLHC (1)	INCLGAP (2)	INCLHC (3)	INCLGAP (4)
One-period lag of the dependent variable	0.761*** (0.0345)	0.745*** (0.0325)	0.764*** (0.0252)	0.733*** (0.0226)
QUAL	0.763*** (0.113)	0.763*** (0.118)	-0.0395 (0.0984)	-0.0710 (0.0957)
QUAL*LDC			1.087*** (0.140)	1.117*** (0.126)
LDC			-0.882*** (0.0934)	-0.866*** (0.0857)
HUM	-0.315*** (0.0305)	-0.291*** (0.0320)	-0.188*** (0.0295)	-0.174*** (0.0275)
GROWTH	1.410*** (0.409)	1.181*** (0.385)	1.275*** (0.341)	1.242*** (0.326)
INFL	-0.0394*** (0.0139)	-0.0348*** (0.00998)	-0.0158** (0.00755)	-0.0199*** (0.00654)
OPEN	-0.220*** (0.0501)	-0.247*** (0.0489)	-0.247*** (0.0365)	-0.237*** (0.0376)
GCONS	-0.751*** (0.248)	-0.833*** (0.256)	0.0967 (0.242)	-0.0958 (0.225)
POLITY	8.25e-05 (0.00235)	-0.000831 (0.00237)	-0.000689 (0.00200)	-0.000331 (0.00190)
TERMS	0.155*** (0.0331)	0.170*** (0.0293)	0.0944*** (0.0254)	0.0985*** (0.0264)
Log(POP)	-0.0570*** (0.00994)	-0.0584*** (0.00970)	-0.0617*** (0.00833)	-0.0620*** (0.00779)
Observations - Countries	382 - 101	381 - 101	382 - 101	381 - 101
AR1 (P-Value)	0.0010	0.0009	0.0011	0.0011
AR2 (P-Value)	0.3899	0.3836	0.4598	0.4612
AR3 (P-Value)	0.3681	0.4652	0.3095	0.4047
OID (P-Value)	0.2564	0.2327	0.4629	0.4464

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. The variables "QUAL", "GROWTH", "HUM", "GCONS", "POLITY" and "INFL" have been treated as endogenous. The variable "TERMS" and "POP" have been treated as exogenous. Time dummies have been included in the regressions.*

Table 3: Effect of export product quality upgrading on inclusivity for varying levels of economic growth volatility

Estimator. Two-Step System GMM

Variables	INCLHC (1)	INCLGAP (2)	INCLHC (3)	INCLGAP (4)
One-period lag of the dependent variable	0.746*** (0.0228)	0.734*** (0.0264)	0.699*** (0.0270)	0.682*** (0.0260)
QUAL*[Log(GRVOL)]	0.304*** (0.0659)	0.328*** (0.0665)		
QUAL*ERP			1.159*** (0.177)	1.146*** (0.155)
QUAL	0.164* (0.0945)	0.144 (0.112)	0.783*** (0.0753)	0.855*** (0.0992)
Log(GRVOL)	-0.206*** (0.0489)	-0.233*** (0.0509)		
ERP			-0.860*** (0.104)	-0.911*** (0.0967)
HUM	-0.304*** (0.0262)	-0.295*** (0.0304)	-0.228*** (0.0323)	-0.211*** (0.0395)
GROWTH	1.133*** (0.261)	1.183*** (0.213)	1.534*** (0.425)	0.942* (0.490)
INFL	-0.0649*** (0.00888)	-0.0801*** (0.0111)	-0.0525*** (0.00789)	-0.0679*** (0.00762)
OPEN	-0.199*** (0.0329)	-0.244*** (0.0264)	-0.308*** (0.0365)	-0.309*** (0.0496)
GCONS	-1.695*** (0.169)	-1.771*** (0.167)	-0.311 (0.203)	-0.764*** (0.171)
POLITY	-0.00169 (0.00152)	-0.00195 (0.00175)	0.00136 (0.00157)	-0.000233 (0.00179)
TERMS	0.207*** (0.0241)	0.208*** (0.0265)	0.150*** (0.0372)	0.199*** (0.0320)
Log(POP)	-0.0372*** (0.00611)	-0.0449*** (0.00682)	-0.0693*** (0.0109)	-0.0638*** (0.0126)
Observations - Countries	382 - 101	381 - 101	351 - 93	350 - 93
AR1 (P-Value)	0.0010	0.0009	0.0013	0.0005
AR2 (P-Value)	0.4627	0.4864	0.4728	0.4661
AR3 (P-Value)	0.6225	0.7086	0.3625	0.7032
OID (P-Value)	0.2939	0.3038	0.3697	0.4526

Note: * p -value<0.1; ** p -value<0.05; *** p -value<0.01. Robust standard errors are in parenthesis. The variables "QUAL", "GROWTH", "HUM", "GCONS", "POLITY" and "INFL" have been treated as endogenous. The variable "TERMS" and "POP" have been treated as exogenous. Time dummies have been included in the regressions.

Table 4: Effect of export product quality upgrading on inclusivity for varying degrees of external shocks

Estimator. Two-Step System GMM

Variables	INCLHC (1)	INCLGAP (2)	INCLHC (3)	INCLGAP (4)	INCLHC (5)	INCLGAP (6)
One-period lag of the dependent variable	0.740*** (0.0270)	0.731*** (0.0210)	0.772*** (0.0255)	0.747*** (0.0210)	0.741*** (0.0225)	0.715*** (0.0209)
QUAL	-0.548*** (0.131)	-0.589*** (0.164)	-0.149 (0.156)	0.0197 (0.123)	0.800*** (0.0779)	0.720*** (0.0802)
QUAL*ECI	0.255*** (0.0337)	0.278*** (0.0374)				
QUAL*ECIINT			0.224*** (0.0377)	0.189*** (0.0258)		
QUAL*ECIEXT					-0.0303 (0.0861)	-0.00168 (0.0750)
ECI	-0.154*** (0.0236)	-0.176*** (0.0251)				
ECIINT			-0.136*** (0.0214)	-0.117*** (0.0158)		
ECIEXT					0.0853 (0.0560)	0.0702* (0.0403)
HUM	-0.188*** (0.0231)	-0.207*** (0.0189)	-0.185*** (0.0316)	-0.200*** (0.0268)	-0.321*** (0.0140)	-0.314*** (0.0179)
GROWTH	1.080*** (0.340)	0.959*** (0.307)	1.187*** (0.305)	1.122*** (0.352)	2.002*** (0.283)	1.429*** (0.374)
INFL	-0.0301*** (0.00819)	-0.0190*** (0.00607)	-0.0340*** (0.00703)	-0.0281*** (0.00762)	-0.0120 (0.0189)	-0.0122 (0.0104)
OPEN	-0.152*** (0.0255)	-0.134*** (0.0265)	-0.291*** (0.0276)	-0.310*** (0.0346)	-0.206*** (0.0292)	-0.166*** (0.0386)
GCONS	-0.848*** (0.184)	-0.890*** (0.130)	-0.403*** (0.132)	-0.433*** (0.136)	-0.535*** (0.188)	-0.619*** (0.213)
POLITY	0.000424 (0.00139)	-0.00163 (0.00148)	-0.00259** (0.00126)	-0.00398*** (0.00154)	0.00129 (0.00164)	0.00140 (0.00139)
TERMS	0.120*** (0.0294)	0.119*** (0.0238)	0.124*** (0.0276)	0.139*** (0.0241)	0.145*** (0.0240)	0.174*** (0.0235)
Log(POP)	-0.0271*** (0.00277)	-0.0321*** (0.00591)	-0.0249*** (0.00435)	-0.0370*** (0.00690)	-0.0539*** (0.00973)	-0.0552*** (0.00857)
Observations - Countries	382 - 101	381 - 101	382 - 101	381 - 101	382 - 101	381 - 101
AR1 (P-Value)	0.0012	0.0013	0.0010	0.0010	0.0010	0.0010
AR2 (P-Value)	0.5087	0.4971	0.4386	0.3970	0.3402	0.3559
AR3 (P-Value)	0.4157	0.4904	0.3957	0.4799	0.3119	0.4017
OID (P-Value)	0.4497	0.5526	0.5119	0.5950	0.4268	0.3965

Note: * p -value <0.1 ; ** p -value <0.05 ; *** p -value <0.01 . Robust standard errors are in parenthesis. The variables "QUAL", "GROWTH", "HUM", "GCONS", "POLITY", "INFL" and the export product diversification variables have been treated as endogenous. The variable "TERMS" and "POP" have been treated as exogenous. Time dummies have been included in the regressions.

Appendix 1: Definition and Source of variables

Variables	Definition	Sources
INCLHC, INCLGAP	These are the indicators of inclusivity that encompasses three dimensions, including the real per capita income, poverty and income inequality. It is calculated as the geometric mean of the normalized indices for each of these three dimensions of the indicator of inclusivity (see section 4). "INCLHC" is the index of inclusivity computed using the poverty headcount ratio, and "INCLGAP" is the index of inclusivity computed using the poverty gap. The values of this index range from 0 to 1, with higher values indicating greater inclusivity.	<p>Author's calculation based on data on the real per capita income, income inequality and poverty.</p> <p>Data on the real per capita income (constant 2015 US\$) is extracted from the World Development Indicators (WDI) of the World Bank.</p> <p>Data on income inequality from the Standardized World Income Inequality Database (SWIID) (see Solt, 2019) (https://fsolt.org/swiid/). Data on the indicators of poverty headcount and poverty gap were collected from the WDI and POVCALNET of the World Bank in 2021 (see http://iresearch.worldbank.org/PovcalNet/povOnDemand.aspx).</p>
QUAL	This is the indicator of export product quality.	<p>Details on the methodology used to calculate this index can be found in Henn et al. (2013, 2015). Data are available from the International Monetary Fund's Diversification Toolkit (see: https://www.imf.org/external/np/res/dfidimf/diversification.htm)</p>
ECI	This is the variable capturing the (Theil) index of overall export product concentration. Higher values of this indicator reflect an increase in the level of overall export product concentration, while a decrease in the values of this index indicate a rise in the degree of overall export product diversification (that is, greater export product diversification).	<p>Details on the methodology used to calculate this index can be found in Henn et al. (2013, 2015). Data are available from the International Monetary Fund's Diversification Toolkit (see:</p>

		https://www.imf.org/external/np/res/dfidimf/diversification.htm)
ECIINT	This the Theil index of export product concentration at the intensive margins. Higher values of this index indicate a rise in the level of export product concentration at the intensive margins, while declining values of this index reflect lower levels of concentration at the intensive margins, i.e., greater diversification of export product at the intensive margins.	Details on the methodology used to calculate this index can be found in Henn et al. (2013, 2015). Data are available from the International Monetary Fund's Diversification Toolkit (see: https://www.imf.org/external/np/res/dfidimf/diversification.htm)
ECIEXT	This is the Theil index of export product concentration at the extensive margins. Higher values of this index indicate greater export product concentration at the extensive margins, while declining values of this index reflect a lower concentration at the extensive margins, i.e., greater diversification of export product at the extensive margins.	Details on the methodology used to calculate this index can be found in Henn et al. (2013, 2015). Data are available from the International Monetary Fund's Diversification Toolkit (see: https://www.imf.org/external/np/res/dfidimf/diversification.htm)
GROWTH	Growth rate of the per capita Gross Domestic Product (constant 2015 US\$)	WDI
GRVOL	This is the indicator of the volatility of the economic growth rate. It has been calculated as the standard deviation of annual economic growth rate (constant 2015 US\$) over non-overlapping sub-periods of 5-year data.	Author's calculation based on data from the WDI.
TERMS	This is the indicator of the terms of trade, measured by the net barter terms of trade index (2000 = 100). For the sake of the analysis, this indicator has been divided by 100 so that its values range between 0 and 1.	Author's calculation based on data extracted from the WDI.
INFL	The variable "INFL" has been calculated using the following formula: $INFL = sign(INFLATION) * \log(1 + INFLATION)$, where $ INFLATION $ refers to the absolute value of the annual inflation rate (not expressed in percentage), denoted "INFLATION".	Authors' calculation based on data from the WDI.

	The annual inflation rate (not expressed in percentage) is based on Consumer Price Index -CPI- (not expressed in percentage) where missing values has been replaced with values of the GDP Deflator (not expressed in percentage).	
GCONS	This is the share of the general government final consumption expenditure. It is the ratio of the general government final consumption expenditure to GDP. For the sake of the analysis, this indicator is not expressed in percentage.	Authors' calculation based on data from the WDI.
OPEN	This is the indicator of trade openness. It is measured by the share of sum of exports and imports of goods and services in GDP. For the sake of the analysis, this indicator is not expressed in percentage.	WDI
HUM	<p>Human capital index computed as the geometric mean of life expectancy and educational attainment indicators.</p> $HUM_{it} = \sqrt{LEI_{it} * EDUI_{it}}$ <p>where LEI_{it} and $EDUI_{it}$ represent respectively the index of the life expectancy and the index of educational attainment, for a given country i, in a given year t.</p> $LEI_{it} = \frac{LE_{it} - \min(LE_i)}{\max(LE_i) - \min(LE_i)},$ where and "LE" is the indicator of life expectancy in a given country and in year t. $EDUI_{it} = \frac{EDU_{it} - \min(EDU_i)}{\max(EDU_i) - \min(EDU_i)},$ where and "EDU" is the indicator of 'number of years of schooling and returns to education' in a given country and in a given year t developed by Feenstra et al. (2015). This indicator is also referred to as 'human capital' by the authors by Feenstra et al. (2015). Its values range between 0 and 1, with higher values indicating a higher level of human capital accumulated.	<p>The variable "LE" (i.e., the life expectancy) is extracted from the World Development Indicators (WDI). The variable "EDU" (i.e., the 'number of years of schooling and returns to education') is extracted from the Penn World Tables PWT 9.1 (see Feenstra et al., 2015).</p>
ERP	<p>This is the indicator of the transformed indicator of the exchange rate pressure, which acts as a proxy for the size of exogenous economic ERPs. It is calculated as follows (see also Morrissey et al., 2016): $ERP = \text{sign}(PI) * \log(1 + PI)$ (2), where PI refers to the absolute value of the exchange rate pressure, denoted "PI", and where $PI_{it} = w_{E,i} \frac{\Delta E_{it}}{E_{i,t-1}} - w_{RES,i} \frac{\Delta RES_{it}}{RES_{i,t-1}}$. E is the nominal effective exchange rate; RES is the size of reserves, $w_{E,i}$ and $w_{RES,i}$ are country-specific weights: $w_{E,i} = \frac{\sigma_{RES,i}}{\sigma_{RES,i} + \sigma_{E,i}}$ and $w_{RES,i} = \frac{\sigma_{E,i}}{\sigma_{RES,i} + \sigma_{E,i}}$. $\sigma_{RES,i}$ is the standard deviation of $\frac{\Delta RES_{it}}{RES_{i,t-1}}$ over the full period of the analysis (i.e., 1980-2014). Similarly, $\sigma_{E,i}$ is the standard deviation of $\frac{\Delta E_{it}}{E_{i,t-1}}$ over the full period of the analysis (1980-2014). Higher values of the "ERP" index reflect higher levels of external ERPs, while lower values of the index indicate lower levels of exogenous economic ERPs.</p>	<p>Data on the indicator of the size of reserves are collected from the WDI. The nominal effective exchange rate is based on 65 trading partners. An increase in the index indicates an appreciation of the nominal effective exchange rate. Data on the nominal effective exchange rate are collected from the Bruegel Datasets (see Darvas (2012a, 2012b)). The dataset could be found online at: http://bruegel.org/publications/datasets</p>

		/real-effective-exchange-rates-for-178-countries-a-new-database/
POLITY	This variable is an index extracted from Polity IV Database (Marshall et al., 2018). It represents the degree of democracy based on competitiveness of political participation, the openness and competitiveness of executive recruitment and constraints on the chief executive. Its values range between -10 and +10, with lower values reflecting autocratic regimes, and greater values indicating democratic regimes. Specifically, the value +10 for this index represents a strong democratic regime, while the value -10 stands for strong autocratic regime.	Polity IV Database (Marshall et al., 2018)

Appendix 2: Descriptive statistics on variables over the full sample

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
INCLHC	382	0.381	0.326	0	1
INCLGAP	382	0.389	0.328	0	1
QUAL	382	0.767	0.157	0.257	1.018
ECI	382	3.342	1.027	1.630	6.269
ECINT	382	2.978	0.946	1.451	5.854
ECIEXT	382	0.364	0.431	-0.036	2.510
GRVOL	382	2.896	2.493	0.244	22.239
ERP	351	-0.157	0.196	-1.987	0.304
HUM	382	0.577	0.341	0	1
TERMS	382	1.117	0.303	0.492	2.535
GROWTH	382	0.028	0.028	-0.079	0.198
INFLATION	382	18.954	105.067	-0.179	1607.408
OPEN	382	0.728	0.363	0.133	2.054
GCONS	382	0.136	0.047	0.011	0.396
POLITY	382	3.466	5.734	-9.000	10.000

Appendix 2: List of countries contained in the Full Sample and LDCs

Full sample			LDCs
Albania	Dominican Republic	Madagascar	Slovenia
Angola	Ecuador	Malaysia	South Africa
Argentina	Egypt, Arab Rep.	Mali	Sri Lanka
Armenia	El Salvador	Mauritania	Sudan
Azerbaijan	Estonia	Mauritius	Suriname
Bangladesh	Fiji	Mexico	Syrian Arab Republic
Belarus	Gabon	Moldova	Tajikistan
Benin	Gambia, The	Mongolia	Tanzania
Bolivia	Georgia	Morocco	Thailand
Botswana	Ghana	Mozambique	Tunisia
Brazil	Guatemala	Namibia	Turkey
Bulgaria	Guinea	Nepal	Uganda
Burkina Faso	Guinea-Bissau	Nicaragua	Ukraine
Burundi	Honduras	Niger	Uruguay
Cabo Verde	Hungary	Nigeria	Vietnam
Cambodia	India	North Macedonia	Zambia
Cameroon	Indonesia	Pakistan	Zimbabwe
Central African Republic	Iran, Islamic Rep.	Panama	
Chad	Jamaica	Paraguay	
Chile	Jordan	Peru	
China	Kazakhstan	Philippines	
Colombia	Kenya	Poland	
Congo, Dem. Rep.	Kyrgyz Republic	Romania	
Congo, Rep.	Lao PDR	Russian Federation	
Costa Rica	Latvia	Rwanda	
Cote d'Ivoire	Lesotho	Senegal	
Croatia	Liberia	Sierra Leone	
Czech Republic	Lithuania	Slovak Republic	