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# **IMF Working Paper**

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## **The Distribution of Gains from Globalization**

by Valentin F. Lang and Marina Mendes Tavares

***IMF Working Papers* describe research in progress by the author(s) and are published to elicit comments and to encourage debate.** The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

**I N T E R N A T I O N A L M O N E T A R Y F U N D**

## IMF Working Paper

Strategy, Policy, and Review Department

### The Distribution of Gains from Globalization

Prepared by Valentin F. Lang and Marina Mendes Tavares<sup>1</sup>

Authorized for distribution by Rupa Duttagupta

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### Abstract

We study economic globalization as a multidimensional process and investigate its effect on incomes. In a panel of 147 countries during 1970-2014, we apply a new instrumental variable, exploiting globalization's geographically diffusive character, and find differential gains from globalization both across and within countries: Income gains are substantial for countries at early and medium stages of the globalization process, but the marginal returns diminish as globalization rises, eventually becoming insignificant. Within countries, these gains are concentrated at the top of national income distributions, resulting in rising inequality. We find that domestic policies can mitigate the adverse distributional effects of globalization.

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## I. INTRODUCTION

Over the course of the last decades the world economy has witnessed rapid integration. Most countries have opened up their economies and experienced an unprecedented rise in the flow of goods and capital across borders. This phenomenon – now widely known as economic globalization<sup>2</sup> – was coincident with rising living standards in a large number of countries. Many developing countries have experienced episodes of strong economic growth and substantial poverty reduction as they integrated their economies with the rest of the world. At the same time, however, incomes within many countries have drifted apart. Income inequality has increased significantly in many advanced economies, and, even if declining in some, has increased or remained high in many developing economies.<sup>3</sup> Such coincidence of rising economic integration with widening domestic inequality has to some extent contributed to skepticism about the benefits of globalization (Rodrik 2017). However, while the general trends of economic integration, growth, and income inequality are now well established, the links between them are much less clear: Are these trends in incomes only coincident with globalization or are they a direct result of it?

In this paper, we examine the importance of economic globalization for explaining changes in income levels and income inequality by investigating how the gains from globalization are distributed both across and within countries. Rather than focusing exclusively on an average growth effect, we empirically analyze how globalization affects countries at different stages of the integration process – and different income groups within these countries – differently. Empirically, we develop a novel instrumental variable (IV) to estimate these effects in a large sample of up to 147 countries<sup>4</sup> in the 45-year-period between 1970 and 2014. Our approach contributes to existing research in a number of ways:

First, we study the impact of economic globalization on growth and inequality jointly. The previous literature has typically looked at this as two separate questions. While there is no definitive consensus in either literature, the former set of studies tends to find positive growth effects of various measures of globalization, while the latter often finds that the same measures have

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<sup>2</sup> See section III for a more detailed definition of the concept of “economic globalization.” See also Nye and Donahue (2000) and in particular, the chapters by Keohane and Nye, Frankel, and Rodrik in this volume. Throughout the paper, we use the terms economic globalization and economic integration interchangeably.

<sup>3</sup> See, for instance, the recent reports by the World Bank (2016) and the World Inequality Lab (2017) for detailed descriptions of these trends.

<sup>4</sup> See Appendix 1 for the list of countries included in the analysis.

inequality-increasing effects.<sup>5</sup> We argue that the effects of globalization on income and its distribution are best studied together to comprehensively locate the income gains and losses from globalization. In this study we thus look at a) aggregate growth statistics from different datasets, b) aggregate measures of income inequality from different datasets, and c) a new dataset on income data for different deciles of the national income distributions. The results emerging from these different types of data are consistent with each other and together paint a nuanced picture of globalization's effect on incomes.<sup>6</sup>

Second, for the purpose of the analysis we consider economic globalization as a comprehensive, multidimensional process and examine how it affects incomes at different stages of this process. The concept of economic globalization we apply covers the *de jure* liberalization of various economic cross-border flows as well as the *de facto* increases in the volume of these flows. According to economic theory, these interlinked processes affect incomes via multiple channels. Rather than trying to disentangle and separate individual mechanisms, in this paper we focus on empirically estimating the effect of economic globalization on incomes when understood as a process consisting of multiple interconnected components. While we thus aim to contribute to answering a broad question that underlies a large body of economic literature, our approach specifically speaks to some of the more recent contributions which suggest that the effect of globalization on incomes could be non-linear.

In general, and in line with Ricardian and Heckscher-Ohlin models, globalization is expected to make countries specialize in economic activities in which they have a comparative advantage. In addition to the enhanced productivity resulting from such specialization, standard models of endogenous growth suggest that economic integration improves the flow of knowledge and technological diffusion across countries and extends the potential market for those who innovate.<sup>7</sup> These processes facilitate and intensify incentives for inventing new products and improving

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<sup>5</sup> As a comprehensive review of this multi-faceted literature is beyond the scope of this paper and is provided by existing studies, we refer the reader to the following reviews of the theoretical and empirical literature on the growth and distributional effects of globalization: Goldberg and Pavcnik (2007), Grossman and Helpman (2015), de Haan and Sturm (2016), Harrison, McLaren, and McMillan (2010), Helpman (2016), IMF, World Bank, and WTO (2017), Kanbur (2013), Potrafke (2015), Prasad et al. (2007). For the two pioneering studies applying the measure of globalization we also use, see Dreher (2006) on growth and Dreher and Gaston (2008) on inequality; see also Dorn, Fuest, and Potrafke (2018) for a related paper.

<sup>6</sup> We would like to emphasize that studies considering the *global* income distribution as a whole are important complements to studies that focus on *national* distributions like ours (Lakner and Milanovic 2016; Milanovic 2016).

<sup>7</sup> For empirical evidence linking international flows of goods and capital to the diffusion of technology across borders see Acharya and Keller (2009) as well as Bloom et al. (2016).

productivity, thereby increasing growth.<sup>8</sup> Some recent literature, however, suggests that while globalization might on average be good for growth, more might not always be better for all. Focusing on financial globalization, Rodrik and Subramanian (2009) point to the possibility that surges in inflows of foreign finance can appreciate real exchange rates and thereby reduce the profitability of traded goods.<sup>9</sup> Ghosh et al. (2016) note that a very high degree of openness to capital flows can increase economic volatility and vulnerability, and might thus on average be associated with stagnating or declining output. Cordella and Ospino (2017) find that high levels of financial globalization can increase financial volatility in turbulent times (and reduce it in more tranquil times). What is more, some trade models also suggest that for very low levels of transport costs “peripheral” nations gain more from globalization than “core” nations (Krugman and Venables 1995). More generally, many highly integrated countries have mature, globalized value chains that are less likely to significantly improve further through additional integration efforts than value chains in initially closed economies.<sup>10</sup> Other theories predict efficiency losses resulting from high levels of inequality (Alesina and Rodrik 1994; Galor and Moav 2004; Galor and Zeira 1993; Persson and Tabellini 1994), which, as a related literature suggests, globalization potentially promotes:<sup>11</sup>

Stolper and Samuelson (1941) have famously extended the Heckscher-Ohlin model to predict that economic integration increases the relative return of the relatively abundant factor. Under the assumption that labor is abundant in poorer countries, this model expects globalization to reduce inequality in developing countries (see Kanbur 2013 for an overview of related theories). More recent models, however, focus on heterogeneous firms within sectors and emphasize dynamics that suggest increases in inequality in both developing and advanced economies (Helpman et al. 2010; Melitz 2003). Similar conclusions are drawn from theories that shift the focus from trade to capital flows and suggest that outsourcing and FDI flows from an advanced to a developing economy increase skill intensity, and thus the wage gap between skilled and unskilled work, in both economies (Feenstra and Hanson 1995, 1996, 1997). Recent evidence on the distributional effects

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<sup>8</sup> See Grossman and Helpman (2015) and the literature cited therein for a useful overview of these models.

<sup>9</sup> Rodrik popularized a broader version of this argument in his (2011) book. He suggests that “hyperglobalization” might have gone too far and “ended up promulgating instability rather than higher investment and more rapid growth” (p. xvii).

<sup>10</sup> We thank Jan-Egbert Sturm for suggesting this argument.

<sup>11</sup> For instance, recent studies focusing on the United States find that increases in trade and offshoring had adverse effects on local worker wages and point to “medium-run efficiency losses associated with adjustment to trade shocks” (Autor et al. 2013: p. 2159; see also Acemoglu et al. 2016; Autor et al. 2014; Ebenstein et al. 2014).

of financial liberalization tends to support this view (Dabla-Norris et al. 2015; de Haan and Sturm 2016; Furceri and Loungani 2018).

In sum, several theories suggest that the impact of globalization on incomes could be nonlinear. In regards to average income levels, countries that are already relatively globalized might gain less from globalizing further than countries that open up relatively closed domestic economies. This is why we contribute to the empirical literature by testing whether there are *diminishing marginal returns to globalization*. In regards to national income distributions, some models predict that globalization should increase inequality in all countries while others expect this effect to be concentrated in advanced economies; we also test these competing hypotheses. The prime objective of our empirical analysis is to estimate the *total* effect of economic integration. This approach also allows us to circumvent the obvious collinearity and simultaneity problems that bias estimates when the effects of multiple interrelated dimensions of globalization (e.g., trade, capital flows, technology diffusion, liberalization policies) that theory models as links between globalization and incomes are tested simultaneously.<sup>12</sup> Understanding economic globalization as a multidimensional process is also closer to the common usage and definitions of the term than an individual indicator like trade openness, and helps to account for the possibility that the comprehensive concept may be more than the sum of its constituent parts. The obvious downside of such an approach, however, is its limited value for identifying the more fine-grained mechanisms underlying the broad effects we find. This is why studies focusing on the individual economic transformations that form part of globalization are important complements to this paper.<sup>13</sup>

A third contribution of this study is the use of a new instrumental variable (IV) strategy to examine these effects. Most existing literature on the relationship between multidimensional measures of globalization and either growth or inequality is limited to providing conditional correlations.<sup>14</sup> These, however, neither say much about the direction of the effect nor can they exclude the possibility that the statistical association is due to omitted factors that are correlated with both

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<sup>12</sup> See section II for details on this point.

<sup>13</sup> Studies analyzing the growth effects of individual components of economic globalization focus, e.g., on trade (Alcalá and Ciccone 2004; Dollar and Kraay 2004; Felbermayr and Gröschl 2013; Frankel and Romer 1999), capital flows (Alfaro et al. 2006; Borensztein et al. 1998), financial openness (Quinn and Toyoda 2008; Ranciere et al. 2006; Rodrik and Subramanian 2009), or changes in tariffs (Topalova and Khandelwal 2011). Studies that look at the effects of individual components of globalization on inequality and, more recently also poverty, focus on the role played by, e.g., trade and FDI (Behar 2016; Jaumotte et al. 2013; Meschi and Vivarelli 2009), exporting (Klein et al. 2013), capital account liberalization (Furceri and Loungani 2018), tariff reforms (Topalova 2010), or on a pro-poor bias of trade resulting from the fact that poorer consumers spend more on sectors that are traded more (Fajgelbaum and Khandelwal 2016). For comprehensive surveys of this literature see the reviews referenced in footnote 5.

<sup>14</sup> In his literature review, Potrafke (2015, p. 510) notes that “one main shortcoming of empirical studies using the KOF indices [is] endogeneity.”



globalization and changes in incomes. It is not far-fetched to presume that countries globalize because they grow economically (and not the other way around) or that governments that pursue policies of trade liberalization also tend to implement other policies with more direct distributional effects. In both scenarios, we would find correlations even in the absence of a causal effect of globalization on incomes. It is, however, equally possible that countries reform and liberalize more when their economy is weak; the evidence on IMF-supported programs, which typically promote liberalization in times of economic crisis, for instance, suggests this (Biglaiser and DeRouen 2010; Chwieroth 2010; Woods 2006). In such cases, simple regressions could *underestimate* the true growth effects of globalization as crises would be correlated with liberalization because of their effect on the likelihood of reforms. We circumvent these potential endogeneity problems with the help of IV panel regressions that exploit the geographically diffusive character of globalization. The instrument we propose is inspired by Acemoglu et al. (2017) and is a country-period specific, inverse-distance weighted average of the lagged globalization scores of all other countries. Consistent with the idea that globalization is transmitted across borders from one period to another particularly between countries that are geographically close to each other, we show that this measure is a strong predictor of a country's level of economic globalization. Similar to Acemoglu et al. (2017), who use a related and analogous measure to identify the effect of democracy on income, we assume that the extent of globalization in geographically close countries only affects income levels and distributions in a given country via the extent of globalization in that country.

Our results show that economic globalization increases many but not all incomes. First, there are indeed *diminishing marginal returns to globalization*. Countries with lower levels of globalization benefit more from globalizing than countries that are already highly globalized. While increasing a country's level of economic integration leads to significantly higher incomes in subsequent years at low and medium levels of globalization, for the most globalized countries we do not find statistically significant effects of further globalizing. Assuming no changes in domestic policies, most low- and middle-income countries, which typically have relatively low levels of globalization would thus be expected to substantially benefit from further globalizing. Most high-income countries, which are typically more globalized, however, cannot anticipate significant additional gains in average income, under the assumption that domestic policies remain unchanged.

When we shift the analysis to how income gains from globalization are distributed *within* countries, we also find globalization to have different effects on different incomes: economic globalization

increases income inequality by lifting absolute incomes for the (very) rich without significantly affecting the incomes of the poor in many countries. In the subsample of developing countries where the gains from globalization are generally larger, however, they also reach the bottom of the income distribution and reduce poverty.

As a caveat, these results are based on the assumption that all else remains equal. They therefore do not take into account the role of policies that could be designed to affect how the gains of globalization are realized and distributed across and within countries. As such, policymakers should not interpret the identified effects as a necessary consequence of globalization, but rather as an indication that domestic policy would need to be adjusted if the benefits of globalization are to be more inclusive. To explore this further, the final section of the paper analyzes the role of redistributive policies and investments in education that provide suggestive evidence that domestic policies have a role in realizing more inclusive gains from globalization.

In the remainder of this paper we initially showcase stylized facts on globalization and income dynamics (section II). The subsequent section III presents our data and the econometric methods we apply. We report our empirical results in section IV, discuss policy implications in section V, and conclude in section VI.

## **II. STYLIZED FACTS AND DESCRIPTIVE EVIDENCE**

We begin the empirical analysis by presenting stylized facts on the general trends of globalization, income levels, and income inequality over the course of the last decades. We group the countries in our sample by their income level following the World Bank’s classification of low income countries (LICs), lower middle income countries (LMICs), upper middle income countries (UMICs) and high income countries (HICs).<sup>15</sup> We first analyze trends in economic globalization using the KOF index and its constituent sub-indices, and illustrate the collinearity problem. Subsequently, we link these trends to dynamics in income levels and income inequality by presenting cross-country and within-country correlations.

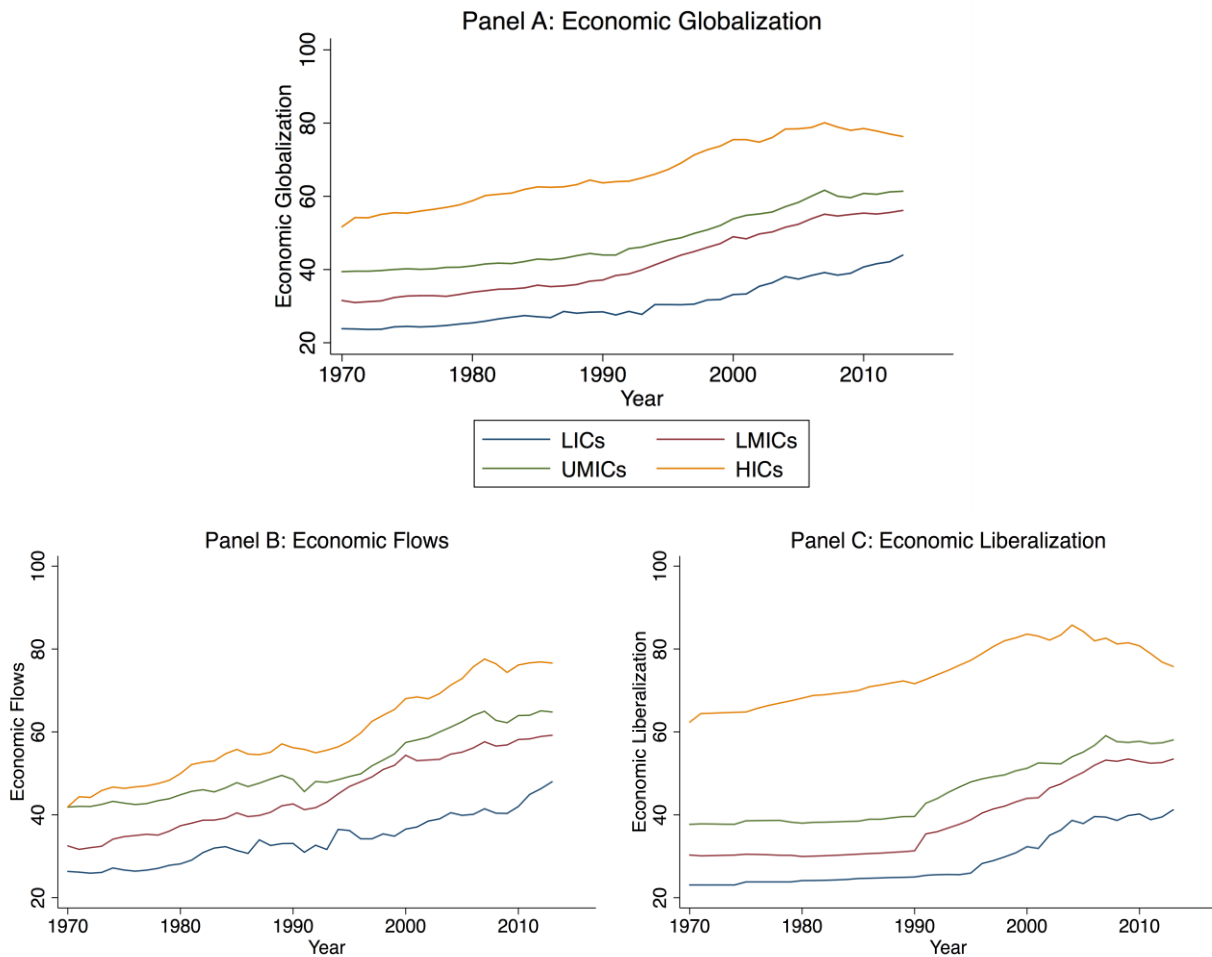
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<sup>15</sup> We classify countries according to their status in 2015 (World Bank 2017a).

## A. Trends in Globalization

To quantify economic globalization, we use the economic dimension of the Index of Globalization provided by the KOF Swiss Economic Institute (Dreher 2006; Dreher et al. 2008; KOF 2016).<sup>16</sup> This widely used index combines eight prominent measures of economic globalization to measure the concept in a multidimensional way.<sup>17</sup> The measure can be split into two sub-indices indicating the (*de facto*) extent of economic flows and the (*de jure*) extent of legal restrictions to these flows.

Figure 1: Trends in Economic Globalization



Note: unweighted means of the respective measure of globalization across the four income classifications over time

<sup>16</sup> More than 100 studies use the KOF index. A list of them is available at <http://globalization.kof.ethz.ch/papers/>. Potrafke (2015) provides a recent survey of the literature using this index.

<sup>17</sup> For more details on the index see section III.

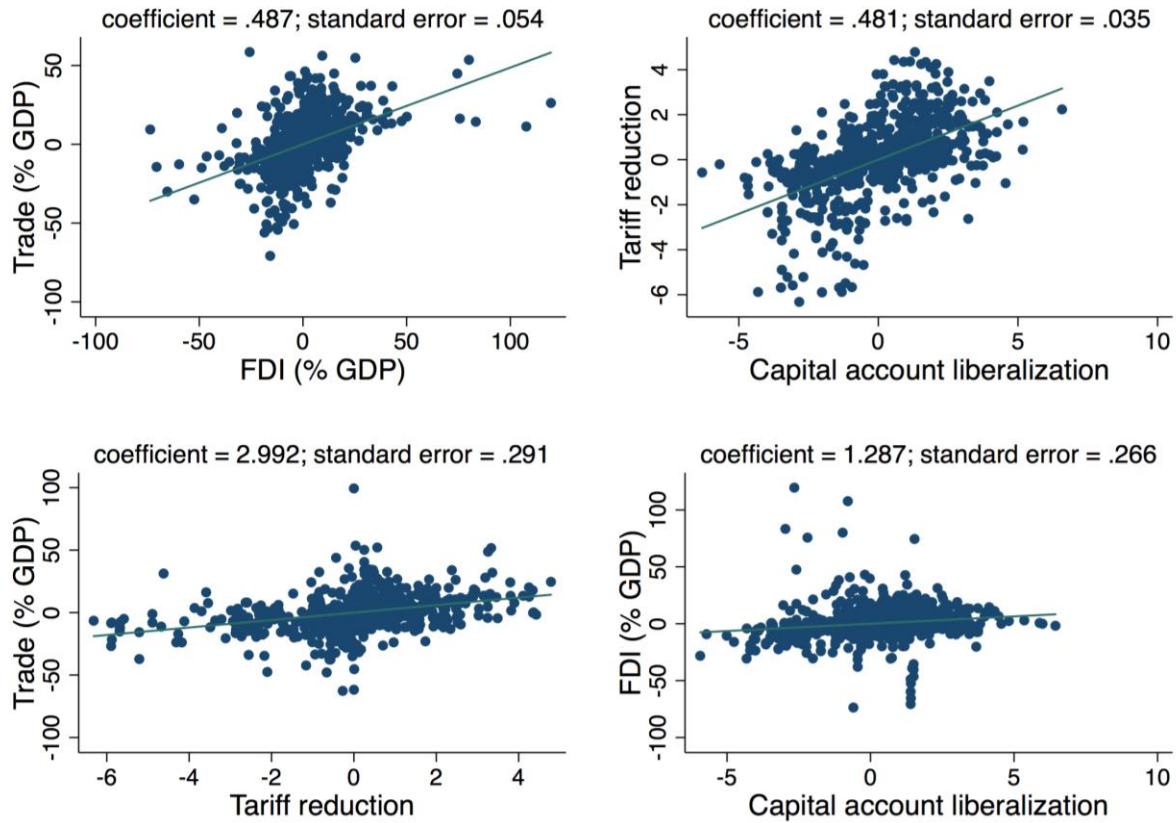
Figure 1 depicts trends in the unweighted cross-country average of economic globalization and its two sub-indices for the four income groups.<sup>18</sup> Several stylized facts emerge. First, today's richer countries have been more globalized than today's poorer countries across all dimensions at all times over the past half century. While inferences concerning causal linkages can obviously not be drawn from this, we can at least record a distinct association between income levels and economic integration. Second, countries of all income classifications have, on average, experienced processes of strong economic globalization. Countries that are HICs today have started the integration process earlier than MICs and LICs. For HICs we see strong increases in both sub-dimensions already in the 1970s; for the average MIC the significant lifting of economic restrictions to cross-border flows began in the early 1990s and the flows themselves increased shortly after; the average LIC followed suit in the mid-1990s. Third, when focusing on the most recent years it becomes visible that HICs reached the highest level of globalization in the late 2000s and are currently experiencing stagnation or even a decline; this trend appears to be particularly driven by decreasing *de jure* openness. To a slightly lesser extent the same is also true for UMICs and LMICs. This observation is consistent with IMF (2016), which has shown that trade liberalization has decelerated in many countries in the last decade. LICs on the other hand still appear to be in a process of strongly globalizing. A fourth observation based on Figure 1 is that the *de jure* and *de facto* dimensions of economic integration are correlated. The dynamics of the two sub-indices within income groups appear to be similar. We look at this in more detail in Table 1 and Figure 2.

*Table 1: Collinearity of Globalization Indicators*

<b>Pairwise correlations (<i>r</i>) (N = 697)</b>	Trade (% GDP)	FDI (% GDP)	Tariff reduction	Capital account restrictions
Trade (% GDP)	1.00	0.59	0.35	0.30
FDI (% GDP)	0.59	1.00	0.37	0.38
Tariff reduction	0.35	0.37	1.00	0.57
Capital account restrictions	0.30	0.38	0.57	1.00

<sup>18</sup> In the KOF index "economic restrictions" measures the absence of the *de jure* restrictions import barriers, tariffs, taxes on trade, and capital account restrictions; we name this dimension "economic liberalization" to clarify that higher values always indicate more globalization. "Economic flows" measure the *de facto* cross-border flows trade, foreign direct investment, portfolio investment and income payments to nonresidents.

Figure 2: Collinearity of Globalization Indicators



Note: added-variable-plots of OLS regressions of the variable plotted on the y-axis on the variable plotted on the x-axis when country fixed effects are controlled for

Table 1 and Figure 2 show pairwise correlations between the four most important indicators of economic globalization that are also used for the construction of the KOF index.<sup>19</sup> The unit of observation is a country-period (5-year-averages). Both the figures and the tables confirm that these individual components are strongly correlated. All correlation coefficients are positive and between 0.30 and 0.59; the pairwise correlations between the two *de facto* flow variables (trade and FDI) and between the two *de jure* restriction variables (tariffs and capital account restrictions) are strongest, as could be expected (0.59 and 0.57, respectively). Figure 2 shows that these strong positive associations hold when unobserved country-specific, time-invariant heterogeneity is netted out by means of country fixed effects. In addition to the association between the two flows and the two restrictions variables, the figures also show the conditional correlations between the two variables related to trade (trade and tariff reduction) and between the two variables related to

<sup>19</sup> To illustrate the collinearity problem in Table 1 and Figure 2 we consider the two *de jure* and the two *de facto* measures for which data coverage is largest.

capital (FDI and capital account liberalization). In sum, these observations suggest that the individual sub-components of economic globalization are highly correlated. This is a key reason why our measure of economic globalization is built on an overall index aggregated from the individual *de jure* and *de facto* measures, without any presumption as to which of the underlying components may be the dominant driver of openness (see Section III).

## **B. Globalization, Growth, and Inequality**

Having established these general stylized facts about globalization trends, we now descriptively link these trends to dynamics in income levels and income inequality. Figure 3 depicts simple cross-country correlations between globalization and both GDP per capita levels and net inequality with the most recent data available for each country.<sup>20</sup> This figure reveals that economic globalization is positively correlated with income level and negatively correlated with income inequality.

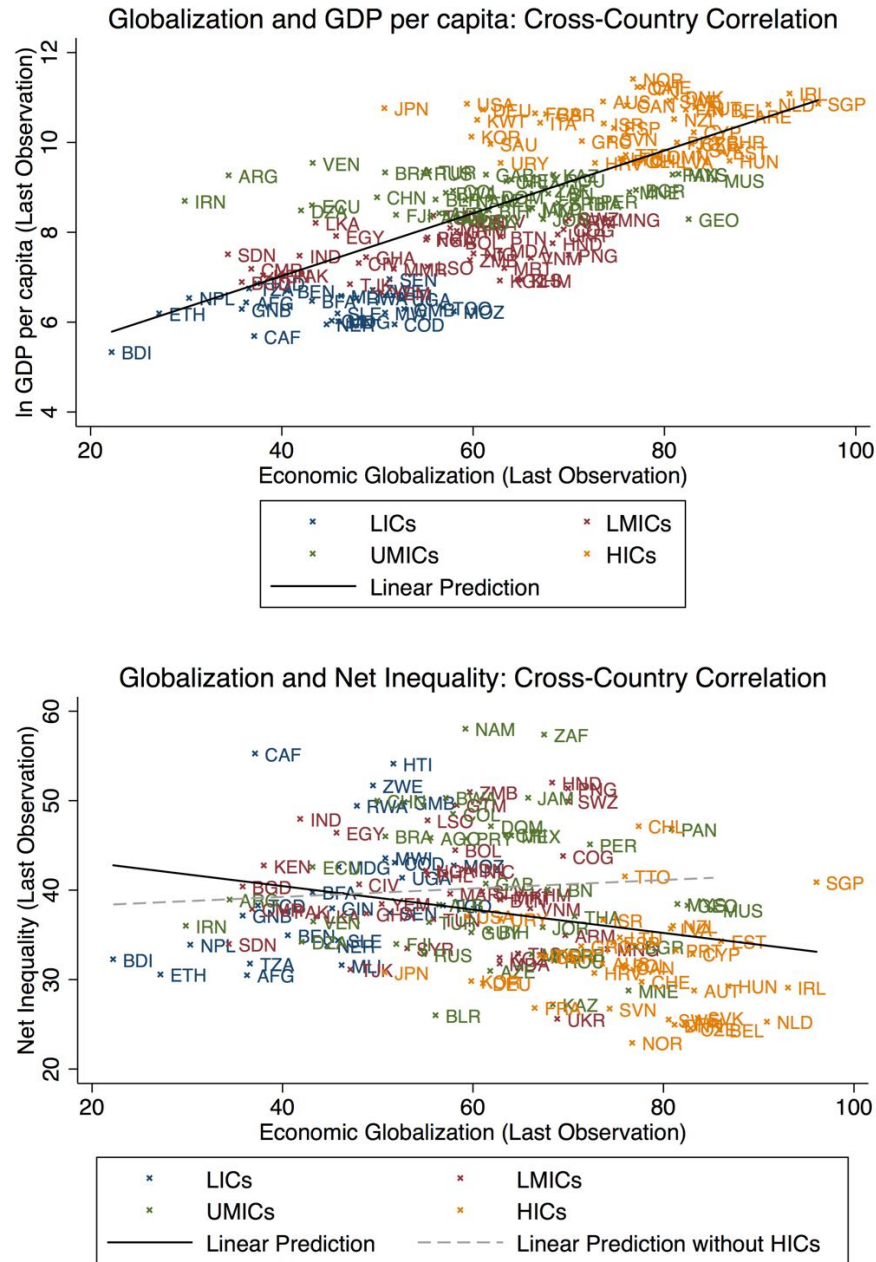
The top panel of Figure 3 shows that most low income countries have a globalization score of around 50 and not one surpasses 60. The scores of middle income countries demonstrate a fairly large amount of variation, with countries like Iran and Argentina at the lower end of the distribution and Georgia and Mauritius at the upper end. Most high income countries have scores higher than 60, with Japan being a noticeable exception. In sum, the figure suggests that there is a fairly strong positive correlation between current income levels and economic integration.

The bottom panel of Figure 3 shows that in countries with currently high levels of economic integration net income is distributed more evenly across society. It also becomes evident, however, that this negative cross-country association is driven by the high income countries in the sample. As the dotted regression line indicates, the negative association turns positive once HICs are excluded. This, on the one hand, points to a difference in the globalization-inequality-nexus between advanced and developing economies, which to a significant extent could be due to the differences in domestic policies with distributional implications (see Section V). On the other hand, it also suggests that simple cross-country correlations miss important parts of the overall picture because they are strongly driven by time-invariant peculiarities of certain countries. To net these out, the within-country dynamics over time need to be considered.

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<sup>20</sup> See section III for details on the data used for this.

Figure 3: Cross-Country Correlations between Globalization, Growth, and Inequality

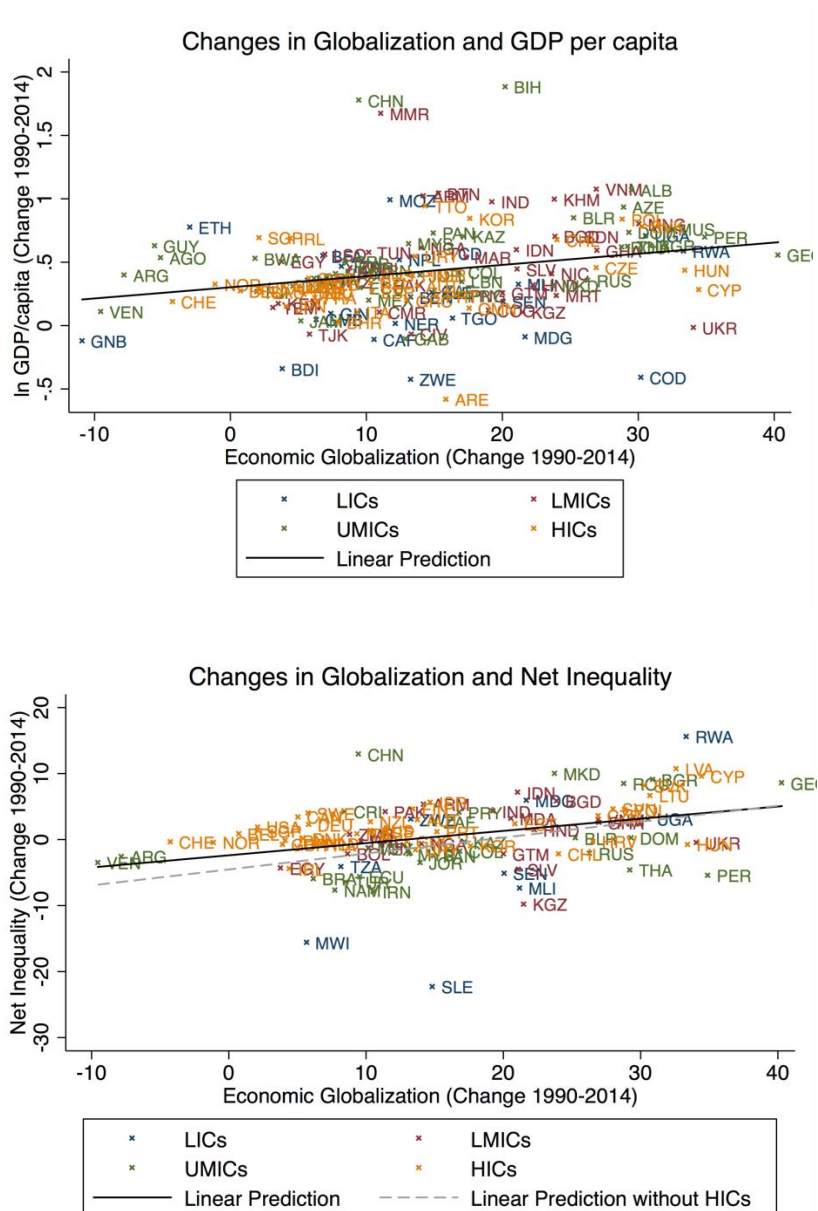


To address these issues, we use Figure 4 to assess the relationship between changes in globalization and income (inequality) within countries over time. The top panel plots the within-country change in globalization between 1990 and 2014 (on the x axis) against the change in the natural logarithm of GDP per capita between 1990 and 2014 (on the y axis).<sup>21</sup> The figure suggests that countries that

<sup>21</sup> Note that we use values from 1990 (instead of 1970 or 1980) for this figure because this allows us to include more countries, especially from the developing world, as inequality data prior to 1990 is frequently missing. Nevertheless the figures with 1970 or 1980 as starting years, which are available upon request, look generally similar.

globalized more over the course of these 25 years also grew more strongly. The bottom panel compares the change in globalization to the change in net inequality over the same period. The countries that globalized more saw, on average, stronger increases in net inequality. This is true for the full sample as well as for developing countries only.

Figure 4: Correlation of Changes in Globalization and Growth / Inequality over Time



In sum, these stylized facts suggest that while globalization is positively associated with growth, its association with income inequality is more mixed. While the dynamics over time within countries suggest that processes of increasing economic globalization and increasing inequality



tend to coincide, the cross-country evidence shows that the highly integrated countries do not exhibit the most unequal income distributions. This indicates that highly globalized (mostly high-income) countries are more likely to have policies that keep net inequality at lower levels and thus points to a role for domestic policies in distributing the benefits of economic globalization more broadly.<sup>22</sup> The findings also illustrate some of the methodological problems associated with studying globalization's effects. Collinearity, unobserved country-specific heterogeneity, and endogeneity need to be taken into account. We thus caution against giving too much weight to this essentially descriptive evidence and turn to a more rigorous econometric analysis in the subsequent section.

### **III. DATA AND METHOD**

#### **A. Measures of Globalization**

A key challenge for any study investigating the effects of globalization is the question of how to define and measure it. Globalization is broadly understood as a process “that erodes national boundaries, integrating national economies, cultures, technology, producing complex relations of mutual interdependence” between actors across the globe (Norris 2000, p. 155). Scholars generally underline that globalization is a multidimensional concept that covers economic, social, and political processes (Keohane and Nye 2000). While this study focuses on the economic dimension, even the narrower concept of “economic globalization” is not unidimensional: On the one hand, it includes the increasing liberalization of restrictions to economic flows across borders. This is often referred to as the *de jure* dimension of economic globalization and includes the reduction of tariffs and other barriers to trade, as well as the liberalization of the capital account. On the other hand, the actual amount of a country's cross-border economic flows clearly also indicates its level of globalization. Standard *de facto* measures of economic globalization thus include the role that trade and foreign investment play for a given domestic economy.

As in this study we are interested in the overall effects of economic globalization, this multidimensionality is a challenge: a single indicator (e.g., trade over GDP) is unlikely to be representative of what we usually think of as economic globalization. Adding multiple indicators

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<sup>22</sup> In section V, we show that redistribution plays an important role in explaining this finding.

to our statistical analyses, however, creates collinearity problems. As we have shown above, the individual indicators of globalization are highly correlated with each other. In joint regression analyses their variations would thus overlap and to a substantial extent cancel each other out. Additionally, the overall effect of economic globalization may be different from the sum of the effects of its constituent parts. This is why we follow the empirical literature on globalization that uses composite indices to measure this multidimensional concept. The most widely used among them is the KOF Index of Globalization (Dreher 2006; Dreher et al. 2008). By means of a principal component analysis that yields weights for each indicator the index combines eight prominent *de facto* and *de jure* measures of economic globalization (*de facto*: trade, FDI, portfolio investment, income payments to nonresidents; *de jure*: import barriers, tariffs, taxes on trade, capital account restrictions).<sup>23</sup> The index ranges from 0 (no globalization) to 100 (maximum globalization) but is slow to change within countries: its median (mean) change from one period to the next is 2.1 (2.9) points. As discussed in the introduction, we suspect that the effect of globalization on income might be different for different stages of the globalization process. To allow for such nonlinearity, we also include the squared term of globalization in the regressions.<sup>24</sup> And while our study focuses on the composite index, we also run empirical analyses with individual components to shed light on the underlying mechanisms.

## B. Dependent Variables

Our goal is to study how income gains and losses from globalization are distributed. To do so, we consider multiple outcome variables. First, we look at the average per capita growth of a country's gross domestic product (GDP) to examine how average income levels within countries are affected. These GDP figures are taken from the most recent version of the World Development Indicators (World Bank 2017a), and we also run robustness tests with data from the Penn World Tables (Feenstra et al. 2015). Second, we go beyond country means and look at the Gini index of income inequality to see how globalization affects the distribution of income within countries. In the baseline we use data on inequality of net incomes from the Standardized World Income Inequality

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<sup>23</sup> Note that this concept of “economic globalization” is similar though somewhat distinct from the concept of “financial globalization.” For a recent discussion on the measurement of the latter, see Cordella and Ospino (2017).

<sup>24</sup> If there are indeed positive but diminishing marginal returns to globalization, not allowing for such nonlinearity by means of including the squared term will lead to a downward bias. The size of this bias will increase over time as average globalization scores have increased. See Arcand et al. (2015) for details and an application of this approach in a related setting.

Database (SWIID) (Solt 2016), but also run robustness tests with the latest data from PovcalNet (World Bank 2017b) and All the Ginis (ATG) (Milanovic 2014). As a third step, we look at income growth by income deciles within countries to see how different parts of the income distribution are affected. These data are taken from the new Global Income and Consumption Project (Lahoti et al. 2016).

The use of these data comes with the usual caveats. GDP and growth figures for many developing – especially sub-Saharan African – economies have repeatedly been criticized for being inaccurate (Jerven 2013). Data on income inequality are often considered even more problematic because they require fine-grained microdata, which especially for many developing countries in earlier periods were not gathered frequently and reliably enough, thus limiting coverage. For many countries the data underlying the inequality measures are, furthermore, based on different measurement methods (e.g., household level vs. individual level, income vs. consumption, net income vs. market income), thus limiting comparability. The existing datasets deal with these issues in different ways: PovcalNet and ATG disregard the country-year observations for which no or no good data are available. If multiple Gini indices exist for a given country-year observation they pick the one with the highest quality (“choice by precedence”) (Milanovic 2014; World Bank 2016). SWIID and GCIP, on the other hand, apply interpolation and imputation methods that use the available information from multiple sources to calculate estimates for some missing country-year observations to increase coverage and adjust others to increase comparability (Lahoti et al. 2016; Solt 2016). For our baseline regressions we use SWIID and GCIP data, but show that our results are robust to using data from PovcalNet and ATG.<sup>25</sup> We thus make sure that this study is based on the most reliable, most standard, and most up-to-date data sources that currently exist for a large panel of countries. Nevertheless, we explicitly ask readers to be aware of these shortcomings,

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<sup>25</sup> We report the results of these robustness regressions in section IV.E. and Appendix 3. We use both kinds of data because we acknowledge that there are trade-offs between coverage, comparability, and precision of inequality data. For the purpose of our study, the bias resulting from not being able to consider a large number of country-period observations is arguably more severe than larger measurement error in the dependent variable: While inequality data is unlikely to be missing at random (potential correlates include, for instance, the quality of institutions), we have no reason to expect a systematic measurement bias in either direction that results from interpolation and imputation and is correlated with our explanatory variables of interest. This is why in the baseline we aim to maximize coverage. To be sure, measurement error is likely to be larger when interpolated and imputed values are used but this only increases standard errors and reduces the likelihood of detecting statistically significant effects even if they exist. Our focus on 5-year-averages further mitigates this concern. In contrast to studies that aim to report exact figures for country-year specific levels of inequality our focus is on establishing broad long-term links between trends in globalization and inequality for which some idiosyncratic imprecision for individual observations is less of a problem. Note that the correlation between the Ginis taken from the SWIID and the Ginis taken from PovcalNet and ATG is  $p = .89$  in our sample. For recent contributions to the discussion on cross-national inequality data see Ferreira, Lustig, and Teles (2015), Jenkins (2015), Solt (2015), and World Bank (2016). For a recently published study that is closely related to ours and based on the SWIID, see Furceri and Loungani (2018).

which this study shares with all similar analyses of the determinants of income growth and income inequality based on times-series cross-country data.

### C. Control Variables

In the choice of our control variables we aim to be as close to the existing, related literature as possible.<sup>26</sup> As is common in most growth regressions we include the natural logarithm of GDP per capita (in constant US dollars) of the previous 5-year-period to control for convergence as predicted by the Solow model. In the inequality regressions we additionally include a squared term of logged GDP per capita to control for a potential non-linear association between income levels and income inequality as predicted by Kuznets (1955).<sup>27</sup> Additional standard control variables of growth regressions that we add include the rate of population growth, average life expectancy as a proxy for the country's health level, and average years of schooling as a proxy for its education level. We also add the Polity index to control for the quality and openness of political institutions. For all of these variables we use the average of the previous 5-year period.<sup>28</sup>

When applying our IV we also run regressions without these control variables. They are then not necessary for identification because we assume that our exclusion restriction will hold without conditioning on these covariates.<sup>29</sup> The covariates, however, are potentially “bad controls,” as they could themselves be outcomes of changes in globalization (Angrist and Pischke 2008). If globalization, for instance, increases health or education levels, which in turn are plausible determinants of income levels, then controlling for these variables would prevent the regression from attributing this effect to the estimated effect of globalization. This is why our baseline regressions include either no or only a parsimonious set of lagged controls. Nevertheless, in robustness tests, we show that our results are not affected upon adding a more extensive set of controls including investment, debt, and government expenditure (all as a share of GDP), which in our setting are more likely to be bad controls but are often controlled for in the related literature.

In addition to these variables, we exploit the panel structure of our data and control for period fixed effects and country fixed effects. The former control for all global time trends such as economic

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<sup>26</sup> See, for instance, Acemoglu et al. (2017), Barro (2003), Dreher (2006), and Ostry et al. (2014).

<sup>27</sup> See also Milanovic (2016).

<sup>28</sup> See Appendix 2 for sources and descriptive statistics of all variables used in this study.

<sup>29</sup> See the next section (III.D.) for details of the identification strategy.

and technological shocks.<sup>30</sup> The latter absorb all country-specific time-invariant characteristics such as a country’s geography, colonial history, legal origin, natural resource endowment, *etc.*

## D. Identification

Based on these data we estimate the following dynamic panel regression:

$$y_{it} = \beta g_{it-1} + \mathbf{X}'_{it-1}\delta + \mu_i + \vartheta_t + \varepsilon_{it} \quad (1)$$

where  $y$  represents one of the dependent variables of interest (i.e., income growth, income inequality, income growth by decile).  $g$  denotes one of our measures of globalization,  $\mathbf{X}'$  the vector of control variables described above.  $\mu_i$  and  $\vartheta_t$  are full sets of country fixed effects and period fixed effects, respectively.  $\varepsilon$  is the error term. All variables enter as averages of 5-year-periods (indicated by  $t$ ) in a given country (indicated by  $i$ ).

Initially we run standard OLS fixed effects regressions to identify the conditional correlations between globalization and our outcome variables. While we find such conditional correlations interesting in themselves, in this setting we cannot exclude the possibility that these correlations are driven by omitted variables or reverse causality. In additional regressions, we thus address this potential endogeneity of globalization by means of IV regressions in which  $g$  is substituted by  $\hat{g}$ , denoting the fitted values of a first stage regression of  $g$  on an excluded IV as well as  $\mathbf{X}'$ ,  $\mu_i$ , and  $\vartheta_t$ .<sup>31</sup>

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<sup>30</sup> We decide against controlling for a country-period specific control variable for technology because, as mentioned above, we consider technological diffusion, at least on the macro level, to be inextricably linked to economic flows. Arguably, the existing technology is the same for all countries in a given year and thus in principle available; what differs, however, is countries’ *access* to this technology. This access, we argue, is a direct function of a countries’ economic openness and controlling for it would take out the arguably important effects of globalization operating via enhancing such access to globally available technology. This is consistent with Grossman and Helpman (1991, 2015), who consider and model the diffusion of technology as an important channel for the effect of trade on incomes, and with Rodrik (2017, p. 10), who argues that for effects on wages “a sharp distinction between trade and technology has become harder to make.” See also Ebenstein et al. (2014). For studies aiming to disentangle these effects see Dabla-Norris et al. (2015) and Jaumotte et al. (2013).

<sup>31</sup> An alternative empirical strategy of addressing endogeneity we explicitly decide against is employing the difference or system generalized methods of moments (GMM) estimators proposed by Arellano and Bond (1991) and Blundell and Bond (1998) particularly for the use in dynamic “large-N small-T panels”. These GMM estimators instrument potentially endogenous explanatory variables using lagged values and first differences of the same variables. Having been used frequently in related research (particularly in growth empirics), the most recent literature has become highly skeptical as to whether the underlying assumptions are fulfilled in most settings: Bazzi and Clemens (2013) show that weak instrument bias is widespread and often masked when employing the system GMM estimator. More recently, Kraay (2015) demonstrates the fragility of estimated effects in recent studies when accounting for this bias. In addition, many scholars have raised doubts as to whether the internal instruments used in GMM estimations actually fulfill the exclusion restriction in most growth regressions (Acemoglu 2010; Deaton 2009; Dreher and Langlotz 2017).

Our IV exploits the geographically diffusive character of globalization. Due to geographical transmission effects it is likely that a country's degree of globalization is affected by the globalization score that countries in its geographical vicinity had in the previous period. At the same time, it is unlikely that the lagged globalization scores of these countries affect the levels and the distribution of income in the given country through channels other than the country's globalization score itself, when country fixed effects and period fixed effects are netted out. This argument is inspired by the identification strategy in Acemoglu et al. (2017) who, in similar growth regressions, instrument for democracy with democratizations in geographically close countries. They argue that democratization in nearby countries should affect income levels only through democratization in the given country. In analogy, we argue that globalization in nearby countries should affect a country's average income and its distribution only through globalization in that country.

As is true for all IV-based identification strategies it is impossible to rule out all alternative channels that would violate the exclusion restriction with absolute certainty. In our setting, such violations would occur if economic shocks in country  $i$ 's neighboring countries affected their own globalization score as well as incomes in country  $i$ , independent of country  $i$ 's level of globalization. While the existence of shocks affecting the two former measures is plausible, it is unlikely that they operate independently of country  $i$ 's level of globalization. In other words, these shocks would be likely to also affect globalization in this country, and the estimation would correctly attribute this effect to the coefficient of interest. In addition to concerns regarding exclusion restrictions, weaknesses of IV-based strategies include their limitation of only identifying a Local Average Treatment Effect (LATE) (Imbens and Angrist 1994) and their sensitivity to outliers (Young 2017). We further address these limitations when discussing results and their robustness but also note that our main findings emerge in both IV and OLS regressions, and thus in estimations with different identifying assumptions and different sets of strengths and weaknesses.

Specifically, we instrument the globalization score of country  $i$  (with  $i \in I$ , the set of countries) at time  $t$  with the one-period-lagged, inverse-distance-weighted globalization scores of all other countries  $j \neq i$  (with  $j, i \in I$ ) at time  $t-1$ . To further reduce the likelihood of capturing unobserved confounders we lag the IV by one period, thus combining the spatial lag with a temporal lag:

$$IV_{it-1} = \frac{\sum_{j \neq i} \left( \frac{1}{distance_{ij}} \times g_{jt-1} \right)}{\sum_{j \neq i} \frac{1}{distance_{ij}}} \quad \forall j, i \in I \quad (2)$$

The geographical distance between two countries  $i$  and  $j$  ( $distance_{ij}$ ) is the population-weighted distance between all agglomerations of the two countries (Mayer and Zignago 2011).

Our first stage regression is thus:

$$g_{it-1} = \alpha IV_{it-2} + \mathbf{X}'_{it-1} \gamma + \mu_i + \vartheta_t + u_{it} \quad (3)$$

We use this regression to calculate fitted values  $\hat{g}$  for the second stage of our 2SLS dynamic panel regressions (equation 1). Note that we run these 2SLS regressions also without the control variables  $\mathbf{X}'_{it-1}$  described above, because we assume the exclusion restriction to hold without conditioning on them. Formally, the identifying assumption is:

$$E(IV_{it-2} \varepsilon_{it} \mid \mu_i, \vartheta_t) = E(IV_{it-2} \varepsilon_{it} \mid \mu_i, \vartheta_t, \mathbf{X}'_{it-1}) = 0 \quad (4)$$

The subsequent chapter presents the results of these regressions.

## IV. RESULTS

### A. Growth: Main Results

We begin our regression analyses by looking at the effect of economic globalization on rates of economic growth in the subsequent 5-year period. In general, we find that economic globalization increases growth; these gains from globalizing, however, get smaller the more globalized the country already is.

[\[Table 2 here\]](#)

In Table 2 we first estimate OLS fixed effects regressions of 5-year growth rates on average economic globalization in the previous period that control for country and year fixed effects and the level of GDP per capita in the previous period. In column 2 we add the set of covariates described above. The controls that are statistically significant at conventional levels enter with the expected sign: Higher life expectancy and more democratic institutions are associated with higher

per capita growth rates while population growth is negatively associated. Turning to the coefficient of interest, we find a positive, but economically weak conditional correlation between lagged economic globalization and growth in these two regressions. A one-point increase in globalization is associated with an increase in the 5-year growth rate by 0.3 percentage points (translating into an average annual growth effect of 0.06 percentage points). In columns 3 and 4, we apply our IV strategy to account for potential endogeneity. The first stage diagnostics show that the instrument is relevant: The IV's coefficient in the first stage ( $\alpha = 0.66$ ) is highly significant ( $t = 4.81$ ,  $p < 0.001$ ) and the Kleibergen-Paap (K-P) statistics pass standard tests of instrument relevance.<sup>32</sup> In these regressions the coefficient loses statistical significance at conventional levels as the standard errors get larger and the sample gets smaller<sup>33</sup> when we employ the IV (columns 3 and 4). However, when we allow the effect to be non-linear, we find that the linearity assumption in columns 1-4 masks an important heterogeneity: Irrespective of whether we run OLS or IV regressions (in columns 5 and 6, respectively), these estimations provide strong evidence for significantly positive, yet diminishing marginal effects of globalization on growth.<sup>34</sup> This is indicated by the positive sign on the globalization index and the negative sign on its squared term; the corresponding marginal effects are visualized in Figure 5.

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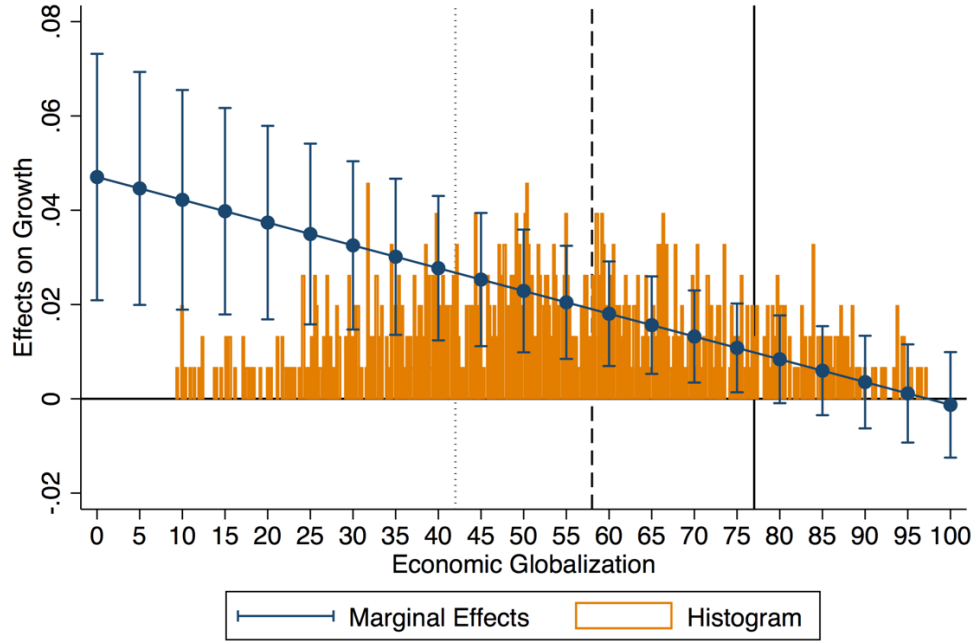
<sup>32</sup> The Kleibergen-Paap weak identification F-statistics show that the IV surpasses the relevant thresholds calculated by Stock and Yogo (2005), i.e., 16.38 for the regressions with one endogenous regressor and 7.03 for the regressions with two endogenous regressors. Surpassing these critical values ensures that the 2SLS size distortion potentially resulting from weak identification is smaller than 10%. Adding the covariates in column 4 does not significantly affect the IV's coefficient in the first stage ( $\alpha = 0.66$ ;  $t = 4.83$ ,  $p < 0.001$ ).

<sup>33</sup> As the IV is lagged by two periods relative to the outcome variable, we can use one period less than in the OLS specification.

<sup>34</sup> The second instrumental variable used to additionally instrument the squared term of economic globalization is the squared IV. Figure 5 is based on the results of this IV regression (column 6).



Figure 5: *Diminishing Marginal Returns to Globalization*



The figure visualizes the result of the growth regression reported in table 2, column 6. The blue line depicts the marginal effect (and 95%-confidence intervals) of a one-point-increase in economic globalization depending on a given level of economic globalization. A histogram of the distribution of globalization levels across the sample is shown in orange. The three vertical lines indicate the current average globalization score of LICs (dotted), MICs (dashed), and HICs (solid).

Figure 5 shows that in most countries – namely in those where the level of globalization is low or medium – increasing globalization leads to higher growth. The higher globalization already is, the smaller this effect becomes. The growth effect stops being statistically significant at the five percent level at a globalization score of about 77 – the current level of countries like Canada, Chile, and Norway. Our results suggest that countries with this relatively high degree of economic globalization – which about 14 percent of country-period observations in the sample surpass – do not, on average, receive additional income growth from globalizing further. For countries with lower globalization scores, however, the growth effects are economically substantial. As the vertical lines in the figure indicate, the average low income country in the last sample period – as an example take Burkina Faso, which had an average globalization score of 41 in the most recent period – would be expected to increase its total 5-year-period growth rate by about 2.2 percentage points when increasing globalization by one point. For the average middle income country the expected growth effect would be at 1.8 percentage points. This translates into average annual growth effects of about 0.40 percentage points for the average LIC (0.36 for the average MIC).

Considering that the mean (median) increase in the economic globalization index is about three (two) points from one period to the next, this is an economically substantial effect. In columns 7 and 8 we restrict the sample to low and middle income countries, which are on average less globalized than high income countries. These regressions further support the nonlinearity of the effect by showing that the average growth effect of globalization is economically and statistically significant in this sample.<sup>35</sup>

In sum, the evidence suggests that the growth effect of economic globalization is positive but diminishing. While countries that are only weakly globalized benefit substantially from globalization, countries that are already well integrated in the global economy can, on average, not expect significant additional growth gains from globalization.

## **B. Inequality: Main Results**

Having analyzed how economic globalization affects average income levels, we now turn to its effect on the distribution of these incomes. In general, our findings indicate that globalization results in higher income inequality within countries. The results that we present in Table 3 show that there is a robustly positive and statistically significant effect of economic globalization on the Gini coefficient of net incomes.

[\[Table 3 here\]](#)

Table 3 is structured analogously to Table 2. In columns 1 and 2 we report the results of OLS fixed effects regressions with and without control variables. The control variables that are statistically significant enter with the expected sign: Both higher education levels and more democratic institutions are associated with lower levels of income inequality. The coefficients on GDP and its square suggest that there is weak evidence for a Kuznets curve in the full sample and statistically significant evidence for such a relationship in the sample of developing countries. Turning to the coefficient of interest, we find a positive association between the economic globalization score and the Gini index in the subsequent period that is statistically significant at the one percent level. When we account for endogeneity by means of our IV strategy in columns 3 and 4 we continue to find this positive effect. Adding control variables does not affect these inferences. According to these

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<sup>35</sup> Note, however, that in the IV specification (column 8) weak instrument bias cannot be ruled out in this smaller sample ( $F = 5.2$ ).

estimates, a one-point increase in economic globalization leads to a rise in the Gini index of about one third of a point.<sup>36</sup> Considering again the average change in the economic globalization index of about three points per period, this is an economically substantial effect. According to a method proposed by Blackburn (1989), a change in the Gini coefficient by one point, which such a change in globalization would thus approximately induce, is equivalent to an increase in inequality resulting from a lump-sum transfer of two percent of the country's mean income from the bottom half of the income distribution to the upper half.

In analogy to the growth regressions, we then allow for non-linear effects. As discussed, most theories expect globalization to increase inequality in strongly globalized, advanced economies, but the theoretical literature disagrees as to whether this also applies to less globalized, developing countries. The empirical evidence our analysis produces in this regard is to a certain extent reflective of this controversy. It does not fully resolve it but allows us to draw some more cautious inferences. On the one hand, there is no evidence for a significant nonlinearity of the effect (columns 5 and 6). Consistent with this, the evidence from OLS regressions suggests that the positive association between globalization and inequality holds for developing countries (column 7).<sup>37</sup> On the other hand however, the marginal effects of the IV specification (plotted in Figure 6) shows that the effect is consistently positive for virtually all values of globalization but statistically significant only for values larger than 60, the level the average MIC currently reaches. Highly globalized countries thus appear to drive much of the average effect, but the evidence for a differential effect depending on the level of globalization is not statistically significant. It is consistent with this that the IV specification in the developing countries sample (column 8) yields a positive but statistically insignificant coefficient. A limitation of this regression, however, is that the IV in this smaller sample is not strong enough to allow us to rule out a weak instrument bias. Summing up the evidence on a differential effect, the inequality-increasing effect of globalization appears to be particularly strong in highly globalized, advanced economies, while a positive, albeit weaker, association between globalization and inequality in the subsample of developing countries cannot be ruled out. At the same time, the evidence on the average effect is unambiguous: When

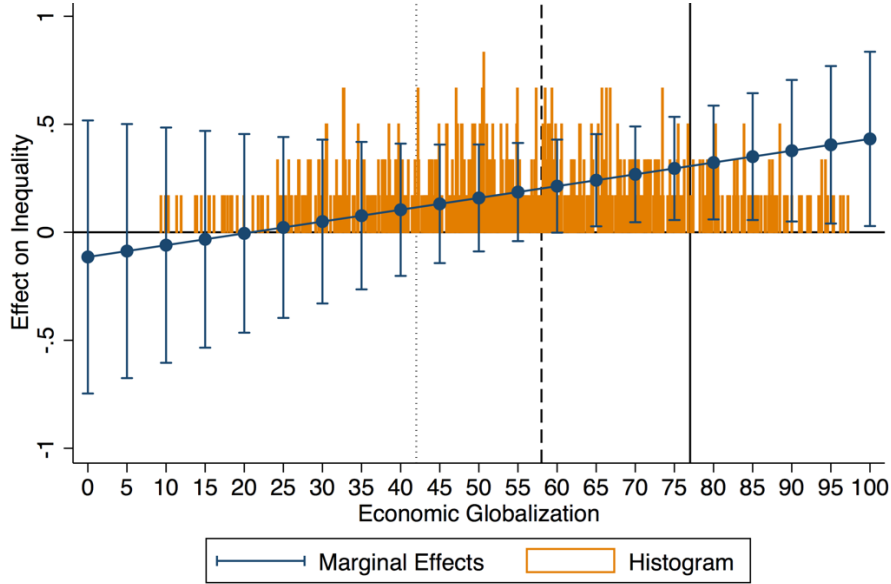
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<sup>36</sup> The results thus suggest that not accounting for endogeneity introduces a downward bias and that the causal effect is larger than what the OLS regressions indicate.

<sup>37</sup> See also the analogous robustness regression with alternative inequality data in Table R3, which suggests that this association is statistically significant at the 1%-level.

the full set of countries is considered, economic globalization is strongly and robustly related to rising income inequality.

*Figure 6: Globalization and Inequality*



Note: The figure visualizes the result of the inequality regression reported in table 3, column 6. The blue line depicts the marginal effect (and 95%-confidence intervals) of a one-point-increase in economic globalization depending on a given level of economic globalization. A histogram of the distribution of globalization levels across the sample is shown in orange. The three vertical lines indicate the current average globalization score of LICs (dotted), MICs (dashed), and HICs (solid).

### C. Income Growth by Decile

Next, we bring together our main results on growth and inequality. Instead of treating them as two separate outcomes we now substitute our dependent variable by the income growth of various income quintiles taken from the new GCIP database. The results from this analysis are consistent with the above findings and suggest that the gains from economic globalization are substantial but concentrated at the top deciles of the national income distributions. There is also evidence for a poverty-reducing effect in developing countries and no evidence for income losses in absolute terms for any decile.

Columns 1-10 of Table 4 (Panel A) present the results of our preferred inequality regression (IV-estimation, baseline controls) when the outcome variable is the period-specific income growth of income deciles 1-10.<sup>38</sup> Columns 11 and 12 additionally consider income growth at the 95<sup>th</sup>

<sup>38</sup> We additionally control for the respective decile's income in the previous period.

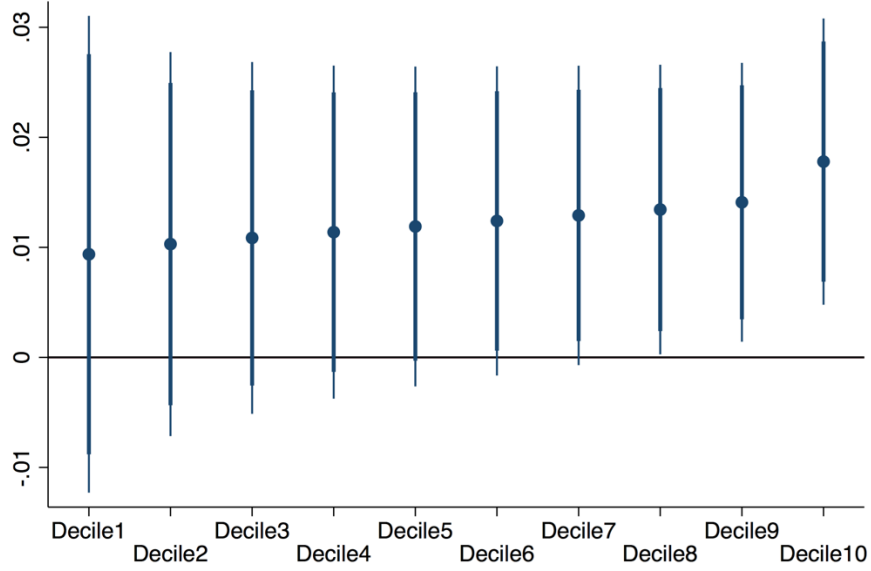
percentile and at the 99<sup>th</sup> percentile as the dependent variables. The point estimate is largest for the top decile and statistically significant at the 10 percent level (five percent level) only for the top four (two) deciles. For the poorest 60 percent of the income distribution the effect is not statistically significant effect in the full sample (Figure 7). These results further specify the previous findings: For the relatively rich in an average country, there is a statistically significant, positive effect of economic globalization. The incomes of the relatively poor in the average country are not significantly affected.

Analogous to the above analyses, we then restrict the sample to developing countries only (in Panel B of Table 4). In these regressions, we find evidence for a growth-enhancing effect of globalization for all income deciles. This supports the view that globalization helps reduce poverty in developing countries (Fajgelbaum and Khandelwal 2016). The point estimates of the coefficients of interest are also substantially larger than in the full sample, further supporting the previous finding that economic globalization has stronger growth effects in the developing world. Although the coefficients of these regressions appear to suggest a mildly equalizing effect of globalization in developing countries the confidence intervals for the respective coefficients all overlap, and inferences regarding distributional effects can thus not be drawn from this analysis.

More generally, the results of these regressions should be interpreted with caution. As before, in the developing country sample, weak instrument bias could be an issue (even though most regressions at least surpass the critical value of 5.53 that allows a maximal IV size bias of 25 percent). A further limitation is that the underlying GCIP data come from a dataset that was published only recently and has thus so far not been subject to the same amount of scholarly scrutiny as the other data we use. The method used to generate these data relies on substantial interpolation and extrapolation and its precision is thus limited. This is likely to be a reason behind the broad confidence bands these regressions yield. The imprecisely estimated coefficients are not statistically significantly different from each other and we can thus only interpret the fact that for some deciles we can reject the null hypothesis while for others we cannot. Our cautious interpretation of these results is that they are generally in line with our main results on growth and inequality and suggest that inequality increases because the rich gain and not because the poor lose.

[\[Table 4 here\]](#)

Figure 7: Income Growth by Decile – Coefficient Plot



Note: point estimates and 95%- and 90%-confidence intervals of the coefficients on economic globalization in the regressions of decile-specific income growth, reported in Table 4, Panel A, columns 1-10

#### D. Channels

As discussed above, the focus of this study is on the *total* effect of economic globalization. Our empirical approach is thus tailored to answering this question and its applicability to testing individual channels is limited. What our approach, however, allows us to do is to unpack economic globalization in its two main components (*de jure* liberalization and *de facto* flows) and separately add these to the baseline regressions. The respective IVs are modified accordingly<sup>39</sup> and it is reassuring that they still surpass the relevant thresholds for first stage diagnostics. Irrespective of whether economic *de jure* or *de facto* globalization is considered, geographical diffusion explains a significant part of these processes. In the growth regressions, the results, which are presented in Table 5, suggest that both the *de jure* and the *de facto* dimension of globalization contribute to the positive growth effect identified above. The nonlinearity is also visible for both dimensions.<sup>40</sup> Irrespective of whether we run OLS or IV regressions and of whether the *de facto* or the *de jure* dimension is considered, the results are very similar as compared to the regressions based on the

<sup>39</sup> For the *de jure* (*de facto*) regression, only the *de jure* (*de facto*) scores of countries  $j \neq i$  are used to calculate the IV.

<sup>40</sup> While in one of the four specifications (column 2, *de jure* liberalization, IV) the interaction term is negative but not statistically significant, calculating the marginal effects shows that the effect is not significant for high levels of *de jure* liberalization.

composite index. This further supports the view that economic globalization can be understood as a multidimensional process and suggests that the regulatory and economic processes that together form this overall process have congruent effects on incomes.

Our IV strategy reaches its limit when we further unpack the concept of economic globalization. When we try to predict values of individual indicators, the analogous IVs based on the same indicators for other countries are not relevant enough to pass conventional first stage tests. This shows that the IV does not pick up just a single indicator and suggests that economic globalization is a geographically diffusing process only when understood as a multidimensional concept. To still provide some (correlational) evidence on underlying channels, we run OLS fixed effects regressions based on these indicators. The results, which are presented in columns 5-12 of Table 5, show that each of the four major indicators of economic globalization is positively associated with growth rates. However, the nonlinearity – i.e., the marginally diminishing positive association – is only significant for capital account liberalization. While we cannot rule out that endogeneity biases these results, these findings, on the one hand, suggest that the major processes typically associated with economic globalization are generally correlated with higher growth rates. On the other hand, they also support recent research suggesting that high levels of financial liberalization and deregulation of capital flows can have adverse effects on growth (Furceri et al. 2017; Ghosh et al. 2016; Ostry et al. 2016; Rodrik 2011; Rodrik and Subramanian 2009).<sup>41</sup> To trade-related indicators, however, the nonlinearity does not seem to apply: their association with growth is positive at all levels.

[\[Table 5 here\]](#)

Turning to the channels for distributional effects, we again decompose our measure of economic globalization. We find that both the regulatory and economic dimensions of economic globalization contribute to increasing inequality.<sup>42</sup> The regressions reported in columns 1-4 of Table 6 show that

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<sup>41</sup> By extension, the findings are also in line with studies arguing that there are diminishing marginal returns to financial development and that “too much finance” can be detrimental to growth (Arcand et al. 2015).

<sup>42</sup> Note that in the smaller sample of the inequality regressions, the modified IV for the *de jure* regression only surpasses Stock and Yogo’s critical values when refraining from lagging it in the first stage.

the effect is statistically significant for both the *de jure* and the *de facto* measure<sup>43</sup> and we can again conclude that these two dimensions of the globalization process have congruent effects. Contrary to the growth regressions, however, there are more significant differences when examining correlational associations between inequality and the major indicators of economic globalization: The results presented in columns 5-8 suggest that increases in foreign direct investments are significantly associated with rising inequality. For other globalization indicators, notably trade, there is no significant evidence for such an association. This supports the view that it is capital flows rather than trade flows that tend to drive the inequality-increasing effect of globalization. This is consistent with the theoretical expectation that FDI particularly benefits high-skilled workers and thereby increases wage differentials (Feenstra and Hanson 1995, 1996, 1997). This finding is also in line with the recent empirical literature on the distributional effects of capital account liberalization (de Haan and Sturm 2016; Furceri et al. 2017; Furceri and Loungani 2018). These studies suggest that greater openness to foreign capital flows may exacerbate unequal financial access and can increase the likelihood of financial crises that raise income inequality.

[\[Table 6 here\]](#)

## E. Robustness

Before turning to additional robustness exercises, note first that all baseline regressions presented above were shown to be robust to OLS and IV estimation and to including and excluding standard control variables. As discussed, these different specifications are based on different assumptions and have different strengths and weaknesses. While endogeneity bias cannot be ruled out in the OLS estimations, the IV estimations – under the assumption that the exclusion restriction holds – identify only a Local Average Treatment Effect on the countries “complying” with the first stage effect. Even though we consider it unlikely that the effect of globalization on incomes in the “complying” countries that globalize as a consequence of geographical diffusion processes differs systematically from the average effect, this assumption – like the exclusion restriction itself – is untestable. If such compliers, for instance, learn from the positive globalization experiences of

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<sup>43</sup> In the OLS regression based on the *de facto* dimension, the coefficient marginally misses statistical significance at the ten percent level ( $p = .103$ ).



neighboring countries and by doing so are able to globalize in a way that is more beneficial for growth, the LATE our IV identifies would be larger than the average effect. Another trade-off concerns control variables. While including them increases the efficiency of the estimation and reduces the likelihood of omitted variable bias, the possibility that they are “bad controls” and thereby introduce another bias cannot be ruled out. While we thus consider it reassuring that the main results hold for specifications with different strengths, we also emphasize the general caveat that none of them are without weaknesses. To further challenge the robustness of our main results, we run additional tests as a final step of the empirical exercise:

First, we change the data used for the outcome variables. In Table 8 we use GDP data from the Penn World Tables and replicate the baseline growth regressions reported in Table 2. The coefficients and significance levels are barely affected and inferences do not change. A minor difference is that the *linear* effect on growth in the full sample is now statistically significant at the ten percent level in the IV regressions.

In Table 9 we use Gini indices from other data sources to replicate the inequality regressions reported in Table 3. As discussed above, several scholars criticize the SWIID’s approach and recommend refraining from using imputed and interpolated values of Gini indices. In this robustness exercise we follow this advice and use Gini indices from All the Ginis and PovcalNet instead of the SWIID. As these Gini indices are not standardized and based on different concepts (income and consumption, household and individual, gross and net), we use only Gini indices based on a single underlying concept for each country. Specifically, for each country we check which concept was used most frequently in the observation period and drop all observations that are based on other concepts. As we control for country fixed effects in all regressions, it is unproblematic that different countries use different concepts. It is important to note that the sample we can use for these regressions is significantly smaller than the baseline sample. Nevertheless the results are remarkably similar: The coefficient on economic globalization is always positive, of a similar size as compared to the baseline and, except in column 2, always statistically significant at the five percent level.

Then, we substitute the dependent variable of the regressions of income growth by decile and use *relative shares* of national income of each decile (as well as of the top 5 percent and the top 1 percent) instead of decile-specific absolute growth (Table 10). Consistent with the previous results we find that, in relative terms, people at the bottom of the income distribution lose while those at

the very top benefit most from economic globalization. Interestingly, only the top ten percent gain significantly in relative terms. A one point increase in the globalization score increases the top 10 percent's income share by about 0.33 percentage points and the top 1 percent's share by 0.24 percentage points. Figure 7 illustrates these effects for all ten deciles. These results support and add to recent research documenting that recent periods of income growth have disproportionately benefitted the very top of the income distribution in several advanced and emerging economies (Alvaredo et al. 2013, 2017; Novokmet et al. 2017; Piketty et al. 2016; World Inequality Lab 2017). Our estimates for the decile-specific relative growth effects of globalization suggest that economic globalization is one of the forces behind this trend.

As a next step, we test the robustness of our main estimates to additional modifications of the econometric specifications. We conduct the same robustness tests for both the growth regressions (Table 11) and the inequality regressions (Table 12). First, we add investment, debt, and government expenditure (all as a share of GDP) as additional control variables to the baseline OLS and IV regressions. Second, we remove all control variables. Coefficients and significance levels are barely affected by these changes. Third, we refrain from lagging the variable of interest and look at the contemporaneous effect of economic globalization on growth and inequality. In the growth regressions the point estimates stay statistically significant and get slightly smaller, suggesting that it takes some time for globalization to take full effect. The coefficients in the inequality regressions are only negligibly affected.

Fourth, we drop all observations from the sample's last decade (the 2005-2014 period). During this period, countries, on average, reached the highest levels of globalization. As we find that economic integration ceases to significantly promote growth when high levels are reached, we consider it relevant to see the estimates for this subsample. Interestingly, the average effect on growth is positive and statistically significant in this sample, thus supporting the view that the high levels of economic globalization reached in this recent period did not result in substantial increases in GDP. In the inequality regressions, the coefficients of interest lose statistical significance in this shorter panel. This is not surprising because inequality data for many countries are available only from the late 1980s onwards; this leaves only about four periods for many countries and hence only very limited variation in a fixed effects specification. Nevertheless, had we conducted the same analysis ten years ago without the more recent data we have today, our inferences regarding both the average

growth effects and the distributional effects of economic globalization would have been more optimistic.<sup>44</sup>

Fifth, as IV regressions are known to be sensitive to outliers (Young 2017), we demonstrate that our results are not driven by influential observations. On the one hand, we “winsorize” the variable of interest, the outcome variable and the instrumental variable at the 1<sup>st</sup> and the 99<sup>th</sup> percentile and find virtually the same results.<sup>45</sup> On the other hand, we follow Young (2017) and test the sensitivity of our coefficients of interest to dropping individual countries. Figure 12 plots the coefficients on economic globalization and its square in regressions in which each country that is included in the baseline regression is left out once. Figure 13 reports the results of the analogous exercise for the inequality baseline. It is evident that point estimates and confidence intervals are not sensitive to the exclusion of any single country.

As a final test, in the last column of Tables 11 and 12, we modify the instrumental variable by using the simple distance between two countries’ largest agglomerations instead of the distance between all their major agglomerations weighted by population. While, as could be expected, instrument relevance slightly decreases, the IV still passes the relevant tests and second stage estimates are not affected.

## **V. THE ROLE OF DOMESTIC POLICIES**

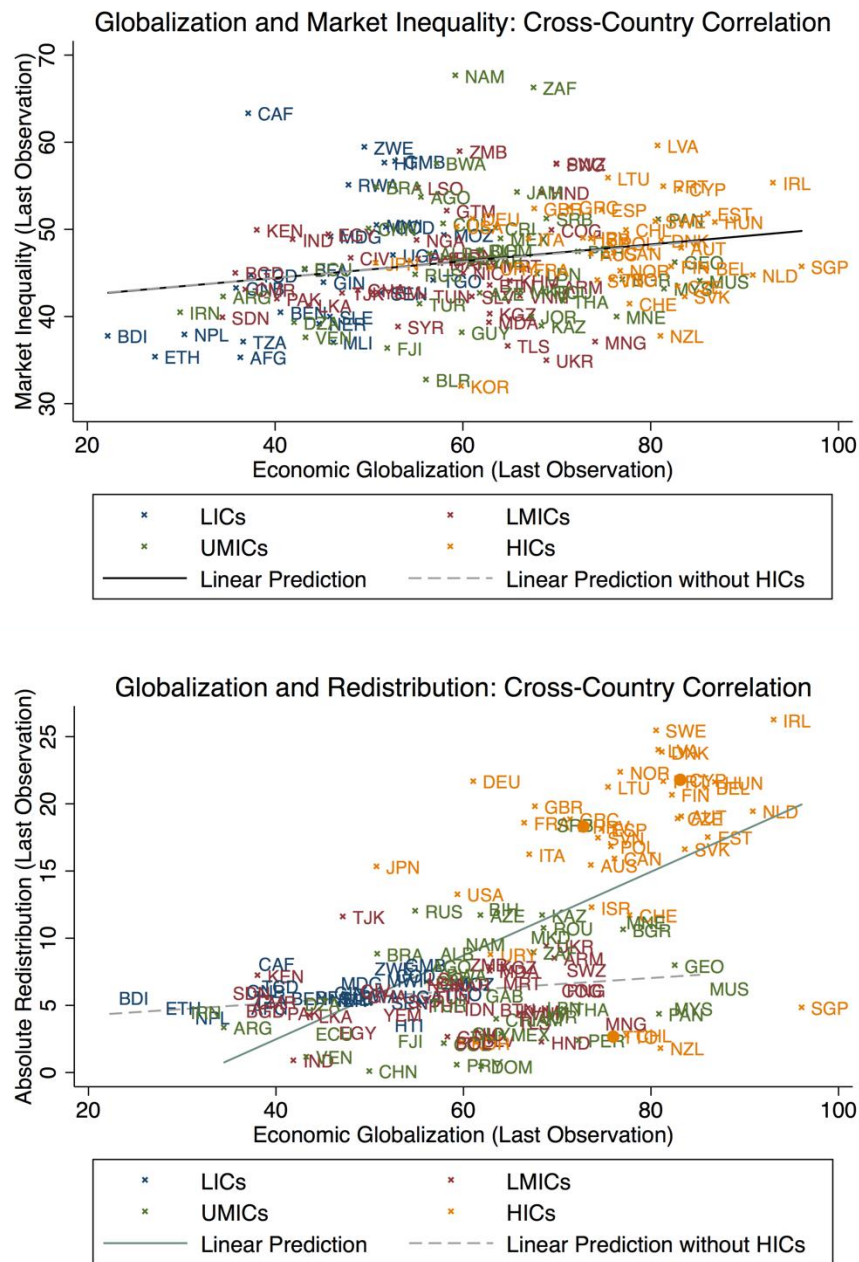
So far, our results suggest that economic globalization increases both average incomes and income inequality in many countries. For governments this raises the question whether they can use some of the additional resources resulting from economic globalization to finance domestic policies that mitigate its adverse distributional effects. In general, governments can affect the distribution of gains from globalization via two main channels: they can redistribute market income by means of taxes and transfers, and they can implement policies that alter the distribution of market income. In this section, we consider the role of such domestic policies for realizing more inclusive gains from globalization.

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<sup>44</sup> Compare, for instance, with Dreher 2006.

<sup>45</sup> This method, named after Charles Winsor, sets all values above/below certain percentiles to these percentiles.

Figure 8: Globalization and Redistribution



In Figure 8 we initially visualize the relationship between current levels of globalization and redistribution, as measured by the difference between market and net inequality. The upper panel shows that today's more globalized countries are more unequal in terms of *market* income before taxes and transfers. This stands in an interesting contrast to Figure 3, which showed the opposite

relationship when inequality in terms of *net* income was considered. The lower panel<sup>46</sup> explains this difference: More globalized economies redistribute more. This is a basic finding of the political economy literature, and is often interpreted as an indication for governments' attempts to compensate those who are hurt by economic openness (Adsera and Boix 2002; Cameron 1978; Rodrik 1998; Ruggie 1982; Walter 2010).<sup>47</sup> However, as is also clear, once high income countries are excluded, this association is substantially weaker (indicated by the dashed line in the figure). This is suggestive that low and middle income countries would need to substantially expand their domestic redistributive policies if they aimed to mitigate the globalization-induced increases in inequality in the same way as most high-income countries. Given that our results suggest that average output growth will be particularly substantial in low and middle income countries, economic globalization is likely to increase the amount of resources available for such policies in these countries.

That said, our main results, which are regressions of *net* inequality, show that the extent of redistribution is too small to offset the entire rise in inequality caused by globalization. When we repeat the baseline inequality regressions using the Gini index of *market* income as the dependent variable, the results further support this (Table 7, columns 1-4): Globalization's effect on inequality of market incomes is slightly larger than on inequality of net incomes, suggesting that taxes and transfers do succeed in mitigating globalization-induced inequality increases, but only partly. While taxes and transfers thus appear to be an effective tool for countering the inequality-increasing effects of globalization, such redistributive policies, at least in their current shape, do not offset the entire rise in inequality resulting from economic globalization.

[\[Table 7 here\]](#)

An obvious complement to affecting inequality in net incomes via redistribution, are policies that prevent inequality of market incomes from rising in the first place. Research suggests that

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<sup>46</sup> Note that for the observations plotted as circles (rather than crosses) the data on the extent of redistribution is less reliable. Here the difference between market and net Ginis rather than the SWIID's measure of "absolute redistribution" is plotted. See Solt (2016: 1274-5) for details. While these data points should be treated with caution, the figure looks very similar if these observations are omitted.

<sup>47</sup> A prominent explanation for this finding is that more intensive exposure to global markets and the risks and volatilities associated with it leads to increased political pressure for insurances and redistribution (Walter 2010). See Potrafke (2009, 2013) for related evidence.

education in particular has an important role to play in this regard (Checchi and van de Werfhorst 2014; De Gregorio and Lee 2002; Galor and Moav 2004; Goldin and Katz 2010; Gruber and Kosack 2014; Kosack and Tobin 2015). Consistent with Galor and Moav's (2004) unified growth theory, the general view in this literature is that higher levels and a more equal distribution of human capital help societies to reap the gains from economic openness and distribute them more equally. Kosack and Tobin (2015), for instance, show that trade benefits societies with high levels of human capital more. Others find that broad access to education promotes economic inclusion and thus lowers inequality (De Gregorio and Lee 2002; Goldin and Katz 2010; OECD 2011). Our baseline inequality regressions support these findings: an increase in average years of schooling by one year is associated with a drop in the Gini index of one point (Table 3, column 2).

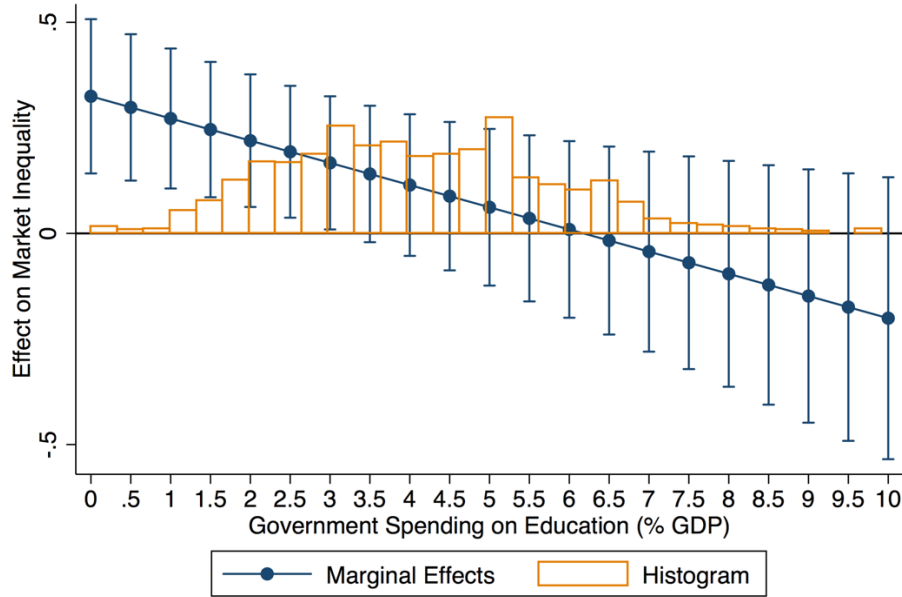
To further investigate the role of education policy in our setting we interact the globalization index with a country's government expenditure on education (as a percentage of GDP) in regressions of market inequality. If investments in education can help ensure a more equal distribution of the gains from globalization, we would expect the effect of globalization on inequality to be smaller in countries that spend more resources on the education sector. In these regressions we drop the education variable from the set of covariates as we naturally expect the effect of government expenditure on education to run through increases in education levels.<sup>48</sup> As we lack a source of exogenous variation in education expenditure we are restricted to OLS regressions for this analysis. In the full sample we do not find a statistically significant interaction effect. When we restrict the sample to developing countries, however, the interaction term enters with a statistically significant negative sign, indicating that the positive association between globalization and inequality gets smaller the more countries spend on education.<sup>49</sup> Figure 10 illustrates this result by plotting marginal effects. These estimates suggest that globalization is significantly linked to rising inequality in developing countries that spend less than 3 percent of their GDP on education. In those that spend more than that the association is not statistically significant. We interpret this as suggestive evidence for the idea that investment in education is an appropriate strategy for governments of developing countries that aim to ensure that the gains from globalization are equally spread across society.

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<sup>48</sup> When we add the education control, the result turns insignificant, supporting this natural expectation.

<sup>49</sup> The lower amount of variation in education expenditure in advanced countries ( $SD = 1.45$  vs.  $SD = 2.49$  in developing countries) is a potential explanation for this difference. But of course, the insignificance of the result might also indicate that education policy is not as effective in mitigating adverse distributional effects of globalization in advanced countries. We recommend further analysis on this heterogeneity.

Figure 9: Globalization, Inequality, and Education Expenditure



The figure visualizes the result of the market inequality regression reported in table 7, column 6. The blue line depicts the marginal effect (and 95%-confidence intervals) of a one-point-increase in economic globalization depending on a given level of government spending on education (% GDP). A histogram of the distribution of government spending on education across the sample of developing countries is shown in orange.

## VI. CONCLUSION

Our analysis finds that economic globalization – defined as a multidimensional process encompassing the increasing economic importance and legal liberalization of economic flows across borders – leads to substantial income gains. These gains are, however, distributed unequally both *across* and *within* countries.

*Across* countries, we find positive yet *diminishing marginal returns to globalization*. In countries at the early and medium stages of the integration process economic globalization significantly increases rates of economic growth. The growth effects from globalizing further get smaller the more globalized countries already are, and for the most globalized economies we do not find significant effects on average income growth.

*Within* countries, income inequality increases as a consequence of globalization. The income gains resulting from globalization tend to go primarily to the top of the national income distributions and in many countries do not significantly affect incomes of the poor. We find these adverse

distributional effects to be particularly pronounced in the most integrated economies and also find some evidence of a poverty reducing effect of globalization in developing countries. The findings also point to the important role played by domestic policies such as taxes and transfers, and government investments in education that raise skill levels, for realizing more inclusive gains from globalization.

Taken together, these results relate to one of the last decades' major trends of how incomes across the globe are distributed: The global inequality of incomes between individuals is increasingly driven by within-country inequality and decreasingly by between-country inequality (World Bank 2016). Our findings suggest that economic globalization is one of the forces behind this trend. It results in income convergence across countries through its substantial average growth effects on relatively poor countries and income divergence within countries by disproportionately benefitting the countries' relatively rich individuals.

One implication of these results is that future research on the consequences of globalization is likely to benefit from going beyond treating income levels and income distributions as two separate outcomes. Shedding more light on the complex interplay between globalization, growth, and inequality is a fruitful avenue for future research. For instance, an important research question that emerges from our findings is whether globalization's adverse distributional implications affect its growth-enhancing potential (cf. Antràs et al. 2017).

At a more general level, this study supports the view that the effects of globalization crucially depend on its extent (Rodrik 2011). It suggests that when assessing the implications of globalizing further, the current level of globalization needs to be taken into account. Looking ahead, we recommend further research on the consequences of globalization that goes beyond studying linear effects. Our analysis points to this non-linearity by illuminating the broad links between globalization and income dynamics but leaves important questions on individual mechanisms open. For a comprehensive understanding of globalization's effects on incomes it thus needs to be considered in concert with fine-grained analyses of policy-specific and country-specific evidence.



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## TABLES

*Table 2: Growth – Main Results*

Estimation Method	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	IV	IV	OLS	IV	OLS	IV
Economic Globalization	0.0033*** (0.0009)	0.0031*** (0.0009)	0.0016 (0.0052)	0.0018 (0.0048)	0.0101*** (0.0025)	0.0470*** (0.0133)	0.0041*** (0.0012)	0.0492** (0.0215)
Economic Globalization <sup>2</sup>					-0.0001*** (0.0000)	-0.0002*** (0.0001)		
GDP/capita (ln)	-0.1958*** (0.0422)	-0.1892*** (0.0413)	-0.2415*** (0.0685)	-0.2379*** (0.0659)	-0.1839*** (0.0389)	-0.3587*** (0.0697)	-0.1914*** (0.0524)	-0.5192*** (0.1579)
Population Growth (%)		-0.0199** (0.0081)		-0.0188** (0.0075)	-0.0151** (0.0075)	-0.0016 (0.0088)	-0.0145 (0.0120)	0.0138 (0.0234)
Education		-0.0133 (0.0092)		-0.0122 (0.0105)	-0.0121 (0.0087)	-0.0007 (0.0151)	-0.0150 (0.0118)	-0.0078 (0.0413)
Democracy (Polity IV)		0.0010 (0.0013)		0.0024* (0.0014)	0.0000 (0.0013)	-0.0036 (0.0029)	-0.0014 (0.0016)	-0.0086 (0.0059)
Life Expectancy		0.0048*** (0.0017)		0.0068*** (0.0021)	0.0030* (0.0017)	-0.0034 (0.0045)	0.0050*** (0.0017)	-0.0072 (0.0092)
Period FE and Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full	Developing	Developing
Observations	852	852	767	767	852	767	575	516
R <sup>2</sup>	0.225	0.249			0.269		0.314	
K-P underidentification test (p)			0.001	0.001		0.000		0.061
K-P weak identification test (F)			23.171	23.755		11.858		5.219

Note: Dependent variable: GDP/capita growth. Averages of 5 year periods. All explanatory variables are lagged by one period. OLS and 2SLS fixed effects regressions, standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01.

Table 3: *Inequality – Main Results*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	IV	IV	OLS	IV	OLS	IV
Economic Globalization	0.104*** (0.039)	0.098*** (0.038)	0.368** (0.160)	0.359** (0.148)	0.043 (0.141)	-0.254 (0.336)	0.104* (0.061)	0.343 (0.359)
Economic Globalization <sup>2</sup>					0.001 (0.001)	0.004 (0.003)		
GDP/capita (ln, WDI)	5.181 (7.696)	8.239 (7.722)	6.844 (7.351)	9.397 (7.547)	9.817 (8.956)	23.509** (11.492)	31.960*** (9.014)	29.250*** (10.338)
GDP/capita (ln, squared)	-0.111 (0.393)	-0.288 (0.410)	-0.269 (0.389)	-0.428 (0.413)	-0.390 (0.480)	-1.282* (0.671)	-1.878*** (0.560)	-1.727*** (0.655)
Population Growth (%)		-0.080 (0.327)		0.021 (0.324)	-0.101 (0.343)	-0.078 (0.345)	-0.280 (0.425)	-0.236 (0.439)
Education		-0.915** (0.376)		-0.422 (0.358)	-0.905** (0.376)	-0.413 (0.330)	-0.094 (0.535)	0.186 (0.462)
Democracy (Polity IV)		-0.137* (0.078)		-0.121 (0.080)	-0.134* (0.079)	-0.111 (0.081)	-0.027 (0.095)	-0.024 (0.100)
Life Expectancy		-0.066 (0.110)		-0.046 (0.113)	-0.056 (0.114)	0.054 (0.127)	-0.059 (0.112)	-0.043 (0.132)
Period and Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full	Developing	Developing
Observations	658	658	608	608	658	608	419	387
R <sup>2</sup>	0.114	0.150			0.151		0.205	
K-P underidentification test (p)			0.002	0.002		0.001		0.085
K-P weak identification test (F)			18.864	18.529		11.178		4.213

Note: Dependent variable: Gini index of net income. Averages of 5 year periods. All explanatory variables are lagged by one period. OLS and 2SLS fixed effects regressions, standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01

Table 4: *Income Growth by Decile*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Full Sample												
Dependent Variable: Income Growth of Decile:	1	2	3	4	5	6	7	8	9	10	top 5%	top 1%
Economic Globalization	0.005 (0.010)	0.008 (0.008)	0.009 (0.008)	0.010 (0.007)	0.011 (0.007)	0.011 (0.007)	0.012* (0.007)	0.012* (0.006)	0.013** (0.006)	0.016** (0.006)	0.017** (0.008)	0.017** (0.008)
Observations	624	624	624	624	624	624	624	624	624	624	624	624
K-P underid. test (p)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001
K-P weak id. test (F)	20.614	19.429	18.671	18.311	18.280	18.532	19.052	19.867	21.099	23.409	20.102	21.982
Panel B: Developing Countries												
Dependent Variable: Income Growth of Decile:	1	2	3	4	5	6	7	8	9	10	top 5%	top 1%
Economic Globalization	0.056* (0.033)	0.051* (0.027)	0.049** (0.024)	0.046** (0.023)	0.044** (0.021)	0.042** (0.020)	0.040** (0.019)	0.038** (0.017)	0.036** (0.016)	0.030** (0.013)	0.039* (0.021)	0.039* (0.021)
Observations	425	425	425	425	425	425	425	425	425	425	425	425
K-P underid. test (p)	0.035	0.038	0.041	0.043	0.044	0.044	0.043	0.041	0.037	0.030	0.040	0.033
K-P weak id. test (F)	6.122	5.816	5.571	5.424	5.368	5.398	5.517	5.740	6.102	6.860	5.852	6.556

Note: 2SLS fixed effects regressions. Averages of 5-year-periods. All explanatory variables are lagged by one period. Standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01. All regressions include country FE, period FE, the lagged baseline control variables and the lagged income level of the respective income quantile.

Table 5: Growth – Channels

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	IV	OLS	IV	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Economic Liberalization	0.447*** (0.170)	1.472*** (0.541)										
Economic Liberalization <sup>2</sup>	-0.003** (0.001)	-0.003 (0.005)										
Economic Flows			0.883*** (0.233)	3.410*** (1.154)								
Economic Flows <sup>2</sup>			-0.007*** (0.002)	-0.024** (0.010)								
Tariff Reductions					0.748** (0.322)	1.894** (0.853)						
Tariffs						-0.134 (0.085)						
Reductions <sup>2</sup>												
Capital Account Liberalization							0.640** (0.290)	2.109** (0.827)				
Capital Account Liberalization <sup>2</sup>								-0.165*** (0.076)				
Trade (% GDP)									0.148*** (0.043)	0.190*** (0.069)		
Trade <sup>2</sup>										-0.000 (0.000)		
FDI stock (% GDP)											0.042** (0.016)	-0.066 (0.044)
FDI stock <sup>2</sup> (% GDP)												0.000*** (0.000)
Period and Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	840	757	866	779	550	550	769	769	863	863	689	689
K-P underid. (p)		0.000		0.001								
K-P weak id. (F)		17.325		6.122								

Note: Dependent Variable GDP/capita growth. All explanatory variables are lagged by one period. Averages of 5 year periods. OLS and 2SLS fixed effects regressions. Standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01. Coefficients are multiplied by 100 for readability.

Table 6: *Inequality – Channels*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	OLS	OLS	OLS
Economic Liberalization	0.062** (0.028)	0.304** (0.138)						
Economic Flows			0.044 (0.027)	0.156* (0.081)				
Tariff Reductions					0.190 (0.141)			
Capital Account Liberalization						0.011 (0.089)		
Trade (% GDP)							-0.001 (0.012)	
FDI stock (% GDP)								0.032** (0.015)
Period and Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	656	653	663	612	497	617	663	566
K-P underid. (p)		0.000		0.000				
K-P weak id. (F)		19.941		27.133				

Note: Dependent variable: Gini index of net income. All explanatory variables are lagged by one period. Averages of 5 year periods. OLS and 2SLS fixed effects regressions. Standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01. Coefficients are multiplied by 100 for readability.

*Table 7: Market Gini and Education Spending*

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	IV	OLS	OLS
Economic Globalization	0.176*** (0.046)	0.495*** (0.199)	0.164** (0.070)	0.532 (0.421)	0.174** (0.074)	0.325*** (0.081)
Economic Globalization x Education Exp. (%GDP)					-0.003 (0.013)	-0.053*** (0.017)
Education Exp. (%GDP)					-0.170 (0.728)	1.888** (0.850)
Period and Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	w/o education	w/o education
Sample	Full	Full	Developing	Developing	Full	Developing
Observations	649	598	410	377	632	404
K-P underid. test (p)		0.002		0.083		
K-P weak id. test (F)		18.737		4.154		

Note: Dependent Variable: Gini index of market income. Averages of 5 year periods. All explanatory variables are lagged by one period. OLS and 2SLS fixed effects regressions. Standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01

## APPENDICES

### Appendix 1: List of Countries Included in the Analysis

Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belarus, Belgium, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Congo, Dem. Rep., Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Korea, Republic of, Kuwait, Kyrgyz Republic, Latvia, Lebanon, Lesotho, Libya, Lithuania, Macedonia, FYR, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Rwanda, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Venezuela, Vietnam, Yemen, Republic of, Zambia, Zimbabwe



## Appendix 2: Descriptive Statistics and Data Sources

	Mean	S. D.	Min	Max	Source
Economic Globalization	51.77	19.10	9.31	97.24	KOF (2016)
Economic Restrictions	51.38	23.09	4.42	95.98	KOF (2016)
Economic Flows	52.69	20.94	3.40	99.35	KOF (2016)
Trade (% GDP)	75.82	45.19	0.67	410.25	KOF (2016), based on World Bank data
FDI Stock (% GDP)	16.84	21.14	0.00	209.11	KOF (2016), based on UNCTAD data
Tariff Reduction	7.08	2.34	0.00	10.00	KOF (2016), based on data from Gwartney et al.
Capital Account Liberalization	3.80	2.95	0.00	10.00	KOF (2016), based on data from Gwartney et al.
IV	42.16	10.22	21.38	65.17	Own calculations based on Mayer and Zignago (2011) and KOF (2016)
GDP/Capita Growth (WDI)	0.09	0.15	-0.82	1.08	World Bank (2017a)
GDP/Capita (ln, WDI)	8.18	1.57	5.02	11.52	World Bank (2017a)
GDP/Capita Growth (PWT)	0.09	0.15	-0.82	1.00	Feenstra et al. (2015)
GDP/Capita (ln, PWT)	8.85	1.24	5.81	12.10	Feenstra et al. (2015)
Gini (Net Income)	38.17	8.94	18.15	63.90	Solt (2016)
Gini (Market Income)	46.39	7.23	23.00	73.42	Solt (2016)
Gini (ATG & PovcalNet)	39.97	9.44	17.50	69.70	Milanovic (2014) and World Bank (2017b)

Population Growth	1.75	1.44	-3.77	15.53	World Bank (2017a)
Education	6.59	3.07	0.45	13.18	Barro and Lee (2013)
Democracy (Polity IV)	2.62	6.93	-10.00	10.00	Marshall et al. (2011)
Life Expectancy	65.39	10.81	29.27	83.09	World Bank (2017a)
Investment (% GDP)	23.12	7.37	3.58	58.97	World Bank (2017a)
Debt (% GDP)	74.18	94.22	1.38	1042.64	World Bank (2017a)
Government Expenditure (% GDP)	15.65	6.46	0.00	88.43	World Bank (2017a)
Education Expenditure (% GDP)	4.22	2.28	0.00	36.39	World Bank (2017a) and IMF (2017)
Mean Income of Decile 1 (ln)	5.80	1.60	2.09	8.98	Lahoti et al. (2016)
Mean Income of Decile 2 (ln)	6.38	1.48	3.26	9.34	Lahoti et al. (2016)
Mean Income of Decile 3 (ln)	6.71	1.42	3.90	9.54	Lahoti et al. (2016)
Mean Income of Decile 4 (ln)	6.97	1.37	4.25	9.68	Lahoti et al. (2016)
Mean Income of Decile 5 (ln)	7.19	1.33	4.55	9.80	Lahoti et al. (2016)
Mean Income of Decile 6 (ln)	7.40	1.28	4.84	9.91	Lahoti et al. (2016)
Mean Income of Decile 7 (ln)	7.62	1.24	5.13	10.09	Lahoti et al. (2016)
Mean Income of Decile 8 (ln)	7.87	1.19	5.48	10.28	Lahoti et al. (2016)
Mean Income of Decile 9 (ln)	8.20	1.13	5.94	10.54	Lahoti et al. (2016)
Mean Income of Decile 10 (ln)	9.11	0.94	6.42	11.34	Lahoti et al. (2016)
Mean Income at 95 <sup>th</sup> Percentile (ln)	8.72	1.05	6.25	11.13	Lahoti et al. (2016)
Mean Income at 99 <sup>th</sup> Percentile (ln)	11.20	1.05	8.73	13.61	Lahoti et al. (2016)
Income Share of Decile 1	1.67	1.02	0.06	4.84	Lahoti et al. (2016)
Income Share of Decile 2	2.75	1.29	0.28	6.19	Lahoti et al. (2016)
Income Share of Decile 3	3.71	1.45	0.65	7.21	Lahoti et al. (2016)

Income Share of Decile 4	4.69	1.53	1.18	8.10	Lahoti et al. (2016)
Income Share of Decile 5	5.78	1.56	1.96	8.95	Lahoti et al. (2016)
Income Share of Decile 6	7.06	1.52	2.95	9.92	Lahoti et al. (2016)
Income Share of Decile 7	8.69	1.40	4.27	11.99	Lahoti et al. (2016)
Income Share of Decile 8	11.04	1.16	6.53	14.71	Lahoti et al. (2016)
Income Share of Decile 9	15.23	0.97	11.35	18.15	Lahoti et al. (2016)
Income Share of Decile 10	39.38	10.76	18.48	69.55	Lahoti et al. (2016)
Income Share of Top 1 Percent	13.81	8.14	2.29	43.75	Lahoti et al. (2016)
Income Share of Top 5 Percent	28.52	10.48	10.21	60.62	Lahoti et al. (2016)

### Appendix 3: Robustness Tests

Table 8: Robustness – GDP Figures from Penn World Tables

Estimation Method	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Economic Globalization	OLS 0.0043*** (0.0010)	OLS 0.0039*** (0.0010)	IV 0.0073* (0.0043)	IV 0.0072* (0.0041)	OLS 0.0085*** (0.0029)	IV 0.0410*** (0.0124)	OLS 0.0046*** (0.0014)	IV 0.0452*** (0.0165)
Economic Globalization <sup>2</sup>					-0.0000* (0.0000)	-0.0002** (0.0001)		
GDP/capita (ln, PWT)	-0.2484*** (0.0351)	-0.2393*** (0.0352)	-0.3229*** (0.0549)	-0.3214*** (0.0539)	-0.2366*** (0.0349)	-0.3960*** (0.0613)	-0.2304*** (0.0443)	-0.5045*** (0.1242)
Population Growth (%)		-0.0177** (0.0078)		-0.0181*** (0.0069)	-0.0154* (0.0079)	-0.0046 (0.0083)	-0.0017 (0.0120)	0.0247 (0.0225)
Education		-0.0136 (0.0099)		-0.0103 (0.0114)	-0.0128 (0.0093)	-0.0011 (0.0151)	-0.0150 (0.0126)	-0.0038 (0.0369)
Democracy (Polity IV)		0.0006 (0.0013)		0.0011 (0.0016)	0.0000 (0.0013)	-0.0038 (0.0026)	-0.0012 (0.0017)	-0.0073 (0.0050)
Life Expectancy		0.0065*** (0.0024)		0.0073*** (0.0025)	0.0054** (0.0025)	0.0001 (0.0042)	0.0060** (0.0024)	-0.0051 (0.0076)
Period and Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full	Developing	Developing
Observations	901	901	797	797	901	797	593	524
K-P underid. (p)			0.000	0.000		0.000		0.031
K-P weak id. (F)			31.969	32.163		12.311		8.170

Note: Dependent Variable GDP/capita growth (Penn World Tables). Averages of 5 year periods. All explanatory variables are lagged by one period. OLS and 2SLS fixed effects regressions, standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01.

Table 9: Robustness – Gini Indices from PovcalNet and All the Ginis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	IV	IV	OLS	IV	OLS	IV
Economic Globalization	0.104** (0.047)	0.065 (0.046)	0.457** (0.221)	0.464** (0.225)	0.190 (0.133)	-0.470 (0.367)	0.149*** (0.051)	0.635 (0.468)
Economic Globalization <sup>2</sup>					-0.001 (0.001)	0.005* (0.003)		
GDP/capita (ln, WDI)	-0.172 (6.438)	-0.533 (6.956)	-3.374 (7.197)	-2.604 (7.680)	-4.392 (8.355)	17.981 (13.107)	1.522 (12.237)	-3.331 (13.746)
GDP/capita (ln, squared, WDI)	0.072 (0.382)	0.176 (0.441)	0.132 (0.433)	0.127 (0.496)	0.439 (0.522)	-1.092 (0.839)	0.060 (0.841)	0.195 (0.915)
Population Growth (% , WDI)		-0.743 (0.623)		-0.438 (0.702)	-0.707 (0.634)	-0.836 (0.645)	-1.008 (0.737)	-0.862 (0.798)
Education (prim+sec+ter, B&L)		-0.434 (0.393)		-0.437 (0.494)	-0.416 (0.393)	-0.427 (0.425)	0.007 (0.568)	-0.170 (0.819)
Democracy (Polity IV)		-0.008 (0.108)		-0.022 (0.109)	-0.011 (0.108)	-0.015 (0.113)	0.047 (0.125)	0.015 (0.121)
Life Expectancy		0.005 (0.159)		-0.044 (0.164)	-0.005 (0.162)	0.054 (0.163)	-0.050 (0.157)	-0.108 (0.179)
Period and Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	565	510	534	484	510	484	316	303
Sample	Full	Full	Full	Full	Full	Full	Developing	Developing
K-P underidentification test (p)			0.006	0.012		0.001		0.158
K-P weak identification test (F)			11.722	9.970		9.562		2.554

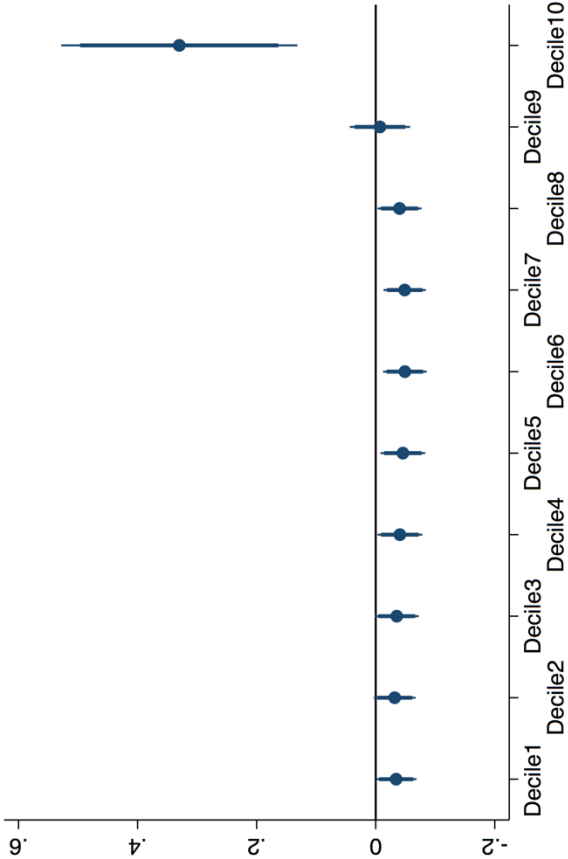
Note: Dependent variable: Gini indices from PovcalNet and All the Ginis. OLS and 2SLS regressions. Averages of 5 year periods. All explanatory variables are lagged by one period. Standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01  
The difference to Table 3 is in the dependent variable. Instead of data from the SWIID, in this table Gini indices from All the Ginis supplemented with Gini indices from PovcalNet are used. For each country we use only Gini indices that use the same underlying concepts (income vs. consumption, household vs. individual, gross vs. net). If Ginis based on various concepts are reported for one country we drop all observations except those based on the most frequently used concept.

Table 10: Robustness – Relative Income Shares

Dependent Variable: Income Share of Decile:	1	2	3	4	5	6	7	8	9	10	top 5%	top 1%
Economic Globalization	-0.034** (0.017)	-0.032* (0.018)	-0.035* (0.019)	-0.041** (0.019)	-0.046** (0.019)	-0.049*** (0.019)	-0.049*** (0.018)	-0.040** (0.019)	-0.007 (0.026)	0.330*** (0.101)	0.363*** (0.113)	0.240** (0.097)
Observations	645	645	645	645	645	645	645	645	645	645	645	645
K-P underid. test (p)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
K-P weak id. test (F)	19.508	18.507	17.874	17.564	17.526	17.721	18.138	18.795	19.785	21.424	19.131	19.131

Note: 2SLS regressions. Averages of 5 year periods. All explanatory variables are lagged by one period. Standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01. All regressions include country FE, period FE, the lagged baseline control variables and the lagged income level of the respective income quantile.

Figure 10: Relative Income Shares (Visualization of Table 10)



Note: visualization of results reported in Table 10: coefficients on economic globalization with 95 (and 90) percent confidence intervals

Table 11: Additional Robustness Tests of Growth Regressions

	more controls		no controls		no lag		without last decade		winsorized variables		simple distance
	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV	(9) OLS	(10) IV	(11) IV
Economic Globalization (t-1)	0.007*** (0.003)	0.042*** (0.014)	0.012*** (0.002)	0.057*** (0.014)			0.005*** (0.001)	0.023** (0.009)	0.010*** (0.002)	0.042*** (0.011)	0.055*** (0.017)
Economic Globalization <sup>2</sup> (t-1)	-0.000* (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)					-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Economic Globalization (t)					0.008*** (0.002)	0.026*** (0.008)					
Economic Globalization <sup>2</sup> (t)					-0.000* (0.000)	-0.000** (0.000)					
GDP/capita (ln, t-1)	-0.231*** (0.031)	-0.332*** (0.058)			-0.180*** (0.038)	-0.215*** (0.049)	-0.254*** (0.049)	-0.452*** (0.074)	-0.175*** (0.034)	-0.326*** (0.056)	-0.385*** (0.077)
Population Growth (% , t-1)	-0.012 (0.008)	0.001 (0.010)			-0.017** (0.008)	-0.009 (0.007)	-0.009 (0.012)	-0.005 (0.012)	-0.015** (0.007)	-0.003 (0.008)	0.001 (0.010)
Education (t-1)	-0.002 (0.008)	0.000 (0.014)			-0.013 (0.009)	-0.007 (0.009)	-0.002 (0.012)	0.029 (0.025)	-0.012 (0.008)	-0.002 (0.013)	0.002 (0.018)
Democracy (Polity IV, t-1)	0.000 (0.001)	-0.001 (0.002)			0.000 (0.001)	-0.003 (0.002)	-0.002 (0.001)	-0.001 (0.002)	0.000 (0.001)	-0.003 (0.003)	-0.005 (0.004)
Life Expectancy (t-1)	0.003 (0.002)	-0.001 (0.004)			0.003** (0.002)	-0.001 (0.002)	0.004 (0.002)	0.005 (0.004)	0.003* (0.002)	-0.002 (0.004)	-0.005 (0.006)
Investment (% GDP, t-1)	0.000 (0.001)	-0.0005* (0.0003)									
Debt (% GDP, t-1)	-0.000 (0.000)	0.000 (0.000)									
Government Exp. (% GDP, t-1)	-0.002 (0.002)	-0.006* (0.003)									
Observations	807	731	981	884	854	853	604	521	852	768	768
K-P underid. (p)		0.000		0.000		0.000		0.003		0.000	0.001
K-P weak id. (F)		8.344		12.362		12.916		11.912		14.293	6.783

Note: Dependent Variable GDP/capita growth. OLS and 2SLS regressions. Averages of 5 year periods. Country and year fixed effects, standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01

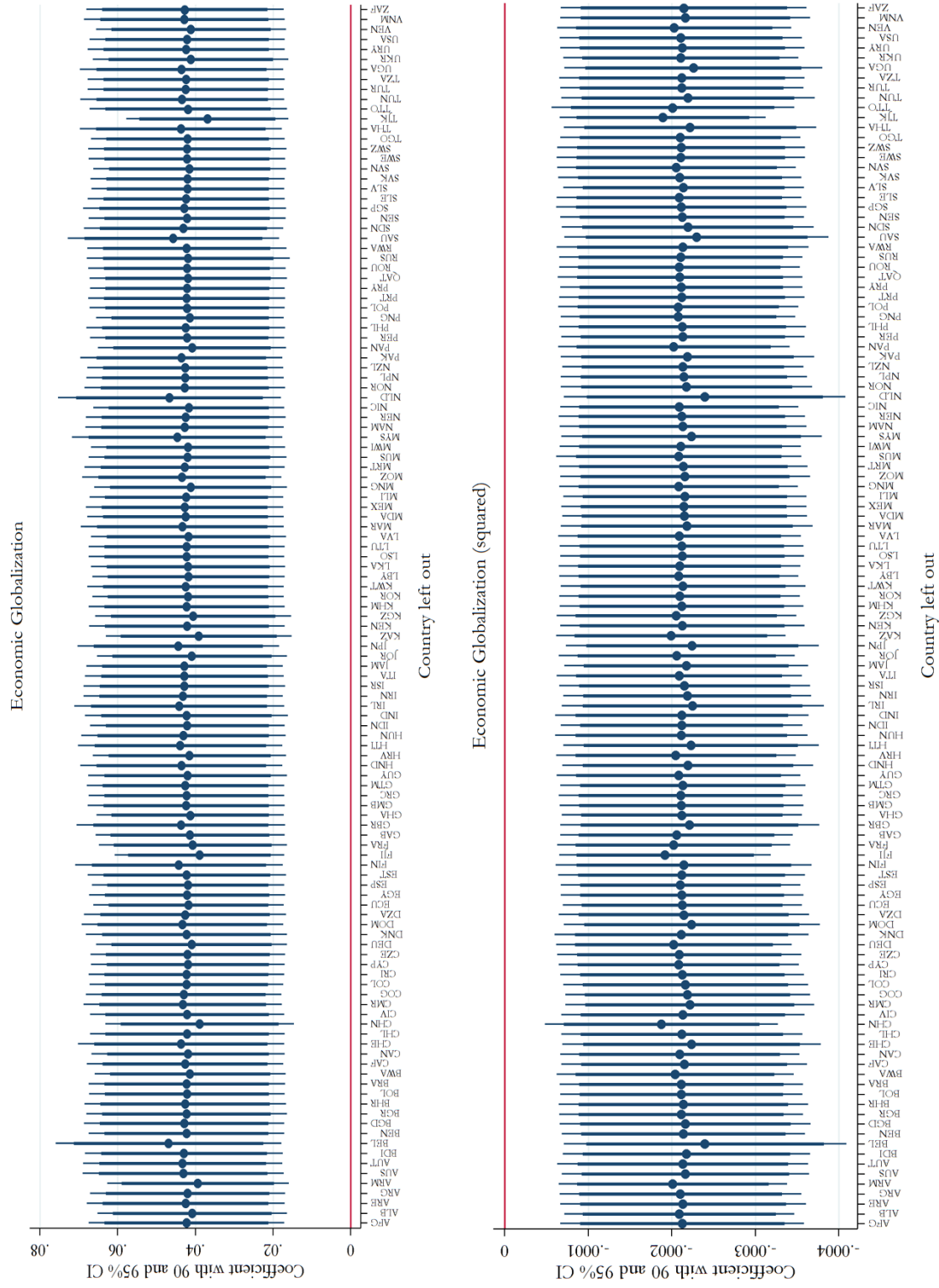
Table 12: Additional Robustness Tests of Inequality Regressions

	more controls		no controls		no lag		without last decade		winsorized variables		simple distance
	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV	(9) OLS	(10) IV	(11) IV
Economic Globalization (t-1)	0.093** (0.036)	0.304** (0.123)	0.123*** (0.037)	0.345*** (0.116)			0.075 (0.056)	0.183 (0.170)	0.092** (0.037)	0.336** (0.141)	0.339** (0.139)
Economic Globalization (t)					0.113*** (0.040)	0.437** (0.192)					
GDP/capita (ln, t-1)	6.991 (7.230)	11.095 (7.568)			6.756 (8.072)	2.710 (9.019)	8.672 (9.763)	16.470* (8.574)	8.105 (7.745)	8.953 (7.520)	9.478 (7.463)
GDP/capita (ln, squared, t-1)	-0.249 (0.389)	-0.532 (0.413)			-0.193 (0.425)	-0.030 (0.484)	-0.438 (0.547)	-0.923* (0.502)	-0.279 (0.411)	-0.390 (0.413)	-0.427 (0.408)
Population Growth (% , t-1)	-0.021 (0.315)	0.043 (0.311)			-0.052 (0.331)	0.061 (0.329)	0.231 (0.339)	0.341 (0.334)	-0.109 (0.324)	-0.003 (0.319)	0.022 (0.323)
Education (t-1)	-0.885** (0.365)	-0.384 (0.345)			-0.916** (0.382)	-0.721* (0.397)	-0.689 (0.488)	-0.237 (0.533)	-0.959** (0.374)	-0.473 (0.352)	-0.433 (0.352)
Democracy (Polity IV, t-1)	-0.138* (0.083)	-0.123 (0.081)			-0.151* (0.080)	-0.187** (0.088)	-0.077 (0.077)	-0.067 (0.087)	-0.136* (0.078)	-0.120 (0.079)	-0.122 (0.080)
Life Expectancy (t-1)	-0.014 (0.108)	-0.019 (0.106)			-0.074 (0.110)	-0.125 (0.120)	-0.079 (0.205)	-0.025 (0.237)	-0.072 (0.109)	-0.047 (0.111)	-0.043 (0.112)
Investment (% GDP)	-0.032 (0.058)	-0.040 (0.055)									
Debt (% GDP)	0.307 (0.348)	0.555 (0.487)									
Government Exp. (% GDP)	0.077 (0.076)	0.042 (0.081)									
Observations	642	599	774	718	659	658	457	413	658	608	608
K-P underid. (p)		0.001		0.000		0.018		0.011		0.002	0.004
K-P weak id. (F)		18.511		24.119		8.721		7.897		17.948	21.336

Note. Dependent variable: Gini index of net income. OLS and 2SLS regressions. Averages of 5 year periods. Country and year fixed effects, standard errors clustered at the country-level in parentheses, significance levels: \* p<.10, \*\* p<.05, \*\*\* p<.01

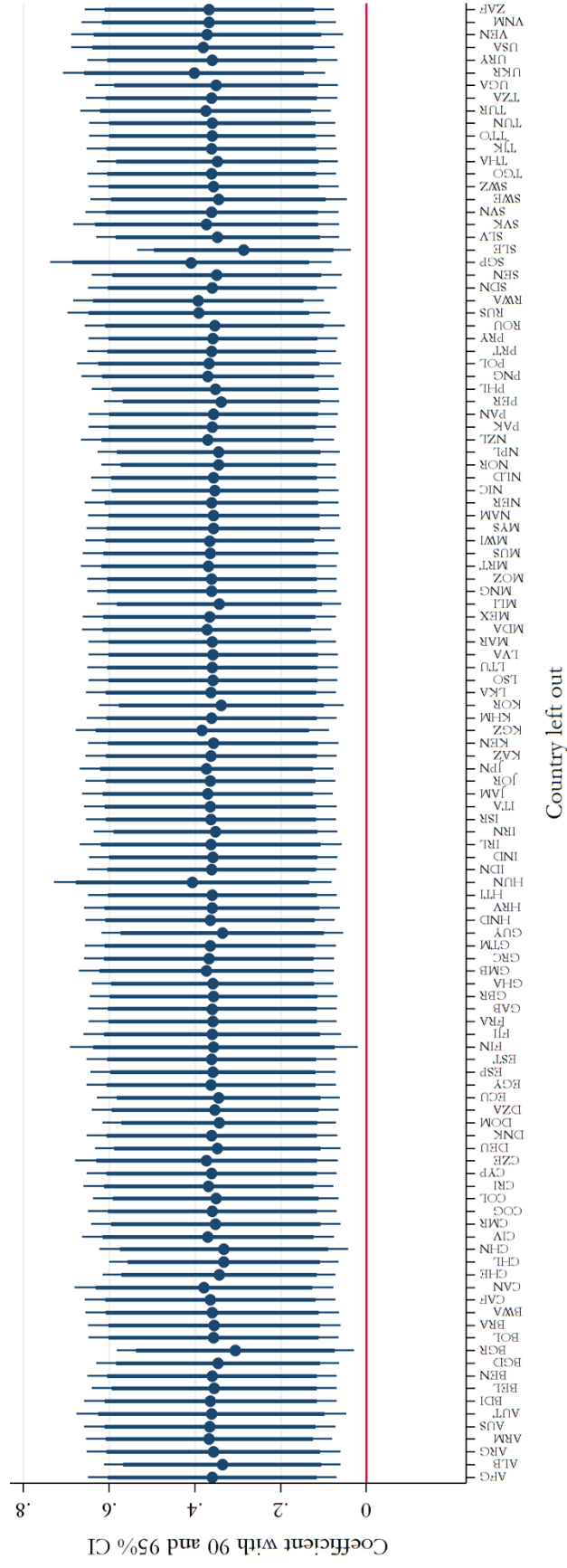


Figure 11: Globalization and Growth: Sensitivity of Coefficients (Jackknife Test)



Note: coefficients with 95 (and 90) percent confidence intervals of globalization and globalization squared of the baseline growth regression (Table 2, column 6) when the country listed on the x-axis is left out

Figure 12: Globalization and Inequality: Sensitivity of Coefficients (Jackknife Test)



Note: coefficients with 95 (and 90) percent confidence intervals of globalization of the baseline inequality regression (Table 3, column 4) when the country listed on the x-axis is left out