The Global Distribution of Gains from Globalization

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Abstract: Over the past decades, incomes converged across countries yet diverged within countries, changing the structure of global inequality. We provide theory and evidence suggesting that globalization promotes this dual global trend. Our model predicts diminishing marginal gains of globalization across countries and increasing inequality within countries. Our empirical analysis uses global panel data at the country-decile level and exploits geographic diffusion of liberalization policies for identification. Globalization since 1970 has led to a) convergence across countries, because income gains diminish and ultimately disappear for highly globalized countries and b) divergence within countries, because gains are concentrated in the richest decile.

Keywords: Globalization, Growth, Inequality

JEL codes: F63, O15, O47

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1 Introduction

Over the course of the past half century, incomes for many people around the world have substantially increased. The size of these income gains, however, differed markedly across and within countries. Income growth was concentrated in many developing and emerging economies and at the top of the income distributions in many advanced economies. People in the lower halves of national income distributions in advanced economies were among those with the lowest income gains (Lakner and Milanovic 2016; Milanovic 2016).[1] While inequality rose in numerous countries, income differences across countries declined (Patel et al. 2021). As a result, global income inequality is now increasingly driven by inequality within countries and to a decreasing extent by income differences across countries (Alvaredo et al. 2017a; Bourguignon 2015; Hammar and Waldenström 2020; World Bank 2016).

These changes in the global income distribution were coincident with economic globalization. Over the same period, most countries have opened up their economies and experienced an unprecedented rise in the flow of goods and capital across borders. This simultaneity raised the question of whether globalization is an underlying cause of these global distributional changes (Bourguignon 2015; Milanovic 2016; Ravallion 2018). Since evidence on this question is so far mainly descriptive, our goal in this paper is to examine if and how globalization contributes to changes in global inequality between individuals. With both theory and empirical evidence, we investigate how, over the past half century, income gains from globalization have been distributed globally across and within countries. Under a unified framework, we analyze how globalization influences incomes across countries at different stages of the integration process and how it affects different income groups within countries differently.

In the first part of our paper, we develop a simple quantitative model that allows us to analyze globalization's effect on income levels and distributions across countries and for different stages of the globalization process. In our model's environment, agents are endowed with a unit of labor that they use to produce a distinct task associated with the production of a final good. Unobservable heterogeneity in productivity across agents generates income inequality, and globalization allows the final good to be produced with a wider range of differentiated tasks. In line with the previous literature, we show that openness in this environment increases both average incomes and inequality because more productive agents export more and thereby increase their incomes more than less productive agents (Antràs et al. 2017). The main new result of our model is that these gains diminish along the globalization process and with higher inequality. Countries at earlier stages of the integration process and more equal countries benefit more from globalization than highly globalized and highly unequal ones.

[1] This result is illustrated in what became known as the "elephant graph," a global growth incidence curve first depicted in Lakner and Milanovic (2016).

In the second part of our paper, we empirically test the predictions of our model and make two main contributions. First, the empirical analysis, just like the model, studies the impact of globalization on the distribution of income across and within countries jointly. We combine measures of income growth and income inequality with data on country-decile-specific income growth across the global income distribution. These panel data allow us to trace the distributional effects of globalization at the country-decile level across 141 countries between 1970 and 2014, covering more than 80 percent of the global population in most periods. The results that emerge from these different types of data are consistent with each other and with the model's predictions. Together, they show how globalization has contributed to fundamental changes in the global income distribution over the past half century.

Second, we propose a new empirical approach to estimate the global effects of globalization. We measure economic globalization in a multidimensional way – based on a comprehensive, newly available globalization measure that combines indicators of trade and finance, flows and regulations (Gygli et al. 2019, Dreher 2006) – and exploit the geographic diffusion of liberalization policies across borders for identification. The empirical strategy is based on the finding that liberalization policies in one country increase the probability that countries in geographic proximity implement similar policies in the subsequent period. Consistent with the concept of 'policy diffusion' (Simmons et al. 2006), we show that an inverse-distance-weighted measure of formally adopted liberalization policies in neighboring countries strongly predicts a country's level of economic globalization in the subsequent period. Analogous to Acemoglu et al. (2019), who exploit political liberalization (democratization) in neighboring countries to identify the effect of democracy on incomes, we use economic liberalization policies in neighboring countries to identify the effect of globalization on incomes. All results are robust to relaxing the exclusion restriction behind this approach, to estimating by OLS, and to a variety of robustness and sensitivity tests.

Our results suggest that economic globalization promotes both income convergence across countries and income divergence within countries. As a consequence, globalization decisively contributes to the fact that global inequality is now increasingly due to within-country inequalities while the contribution of cross-country inequality to global inequality declines. More specifically, we find strong evidence for 'diminishing marginal returns to globalization.' Globalizing leads to significantly higher incomes for countries at low and medium levels of globalization, but this effect disappears for the most globalized countries. This promotes income convergence across countries. At the same time, only the richest decile in the average country gains from globalization in relative terms, leading to substantially higher income inequality within countries.

Our paper is related to both the theoretical and the empirical literature on the distributional effects of globalization. As regards the former, our model follows a long tradition of theories according to which globalization increases aggregate incomes by promoting specialization, the flow of knowledge and technological diffusion, and extending the market for innovators.[2] It also connects to theories on the distributional effects of globalization that focus on heterogeneous agents and emphasize dynamics that suggest increases in inequality in both developing and advanced economies (Helpman et al. 2010; Melitz 2003). Our quantitative model is most closely related to Antràs et al. (2017), who study the impact of globalization on inequality and welfare in the United States. There is an extensive literature examining the effects of globalization on income inequality using different links between the labor market and income inequality (Amiti and Davis 2012; Helpman 2016; Sampson 2014; Vogel and Costinot 2010; Yeaple 2005). Our model is simpler than most of the models in this literature, but the mechanism through which it generates trade-induced inequality is similar and its implications are generally in line. In contrast to existing work, our model focuses on the nonlinearity of globalization's effect on incomes and shows that there are diminishing marginal returns to globalization. While this result is, according to the best of our knowledge, new, it is related to the view that very high levels of globalization – or "hyperglobalization" (Rodrik 2011) – can be associated with stagnating or declining output (Cordella and Ospino 2017; Ghosh et al. 2016; Rodrik and Subramanian 2009). It also relates to theories that predict efficiency losses resulting from high levels of (globalization-induced) inequality (Alesina and Rodrik 1994; Antràs et al. 2017; Arcand et al. 2015; Galor and Moav 2004; Galor and Zeira 1993; Ostry et al. 2014; Persson and Tabellini 1994).[3]

To the existing empirical literature on the effects of globalization, we add the focus on the global interpersonal income distribution. We consider our main empirical contribution to be the finding that globalization simultaneously promotes convergence across countries and divergence within countries, thereby increasing the relative importance of national inequalities for global inequality. Existing work has examined this topic descriptively (Lakner and Milanovic 2016; Milanovic 2016; Ravallion 2018). Other related work has either focused on globalization's effect on inequality within countries or, separately, on its effect on aggregate growth. Our results speak to these two strands of the literature, which are often separate (see Artuc et al. 2019; Galle et al. 2017, for exceptions). As regards evidence on the effect of globalization on inequality within countries, our results support the dominant view that

[2] See Grossman and Helpman (2015) and the literature cited therein for an overview.

[3] 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).

globalization increases inequality within countries (see Goldberg and Pavcnik, 2007, Harrison, McLaren, and McMillan, 2010, Kanbur, 2013, Helpman, 2016, de Haan and Sturm, 2017, and Heimberger, 2020 for reviews). A new result of our analysis is that this change in relative incomes is driven by absolute income gains for the rich – in particular for the richest ten percent – and not by income losses for the poor. As regards evidence on aggregate growth effects of globalization, results support the dominant view of a positive effect (see Prasad et al., 2007, Grossman and Helpman, 2015, and IMF, World Bank, and WTO 2017 for reviews). To this literature, we add the finding that globalization's effect on aggregate growth diminishes along the globalization process and is smaller in more unequal countries.

Methodologically, we add to the literature that aims to estimate causal effects of globalization. In recent years, a large empirical literature emerged that uses methods for causal inference to study various dimensions of globalization. Among the dimensions studied are import competition (Autor et al. 2013), trade volumes (Egger et al. 2019; Felbermayr and Gröschl 2013), changes in tariffs (Fajgelbaum et al. 2020; Topalova 2010; Topalova and Khandelwal 2011), capital flows (Behar 2016; Jaumotte et al. 2013; Meschi and Vivarelli 2009), exporting (Klein et al. 2013), export quota reforms (Khandelwal et al. 2013), capital account liberalization (Furceri and Loungani 2018), and travel (Campante and Yanagizawa-Drott 2017). Like these contributions, we focus on causal identification, but in contrast to them, we estimate the effect of economic globalization on incomes when understood as a process consisting of multiple interconnected components, rather than disentangling and separating individual mechanisms. We thus speak to previous research based on multidimensional measures of globalization – including trade and finance, flows and regulations – which is so far often limited to providing conditional correlations (see Potrafke, 2015, for a review). The advantage of understanding economic globalization as a multidimensional process helps to account for the possibility that the comprehensive concept may be more than the sum of its constituent parts and solves simultaneity issues. It is also closer to the common usage of the term 'globalization' than any individual indicator. 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. Research on individual economic transformations that form part of globalization are thus important complements to this paper.

The remainder of this paper proceeds as follows. In section 2, we present our theoretical model and its results. In section 3, we describe our data and the identification strategy for the empirical analysis. Section 4 presents the results of the empirical analysis and relates them to the results of the theoretical model. Section 5 concludes.

2 Theoretical Model

We propose a theoretical framework to study how income gains from globalization are distributed both across and within countries. The model has two interrelated implications. First, across countries, the effect of globalization on incomes is positive but diminishes along the globalization process. Second, within countries, these income gains are larger for the rich than for the poor.

2.1 Economic Environment

We consider an open-economy model formed by two symmetric regions like Antràs et al. (2017). Agents in each region produce a differentiated good (intermediary inputs) according to a linear technology in their labor effort. We assume that the aggregate final goods produced in different regions are perfect substitutes and, due to symmetry, are not traded across regions. Conversely, all tasks worldwide are imperfectly substitutable. Hence, trade integration allows the final good to be produced more efficiently by combining a greater diversity of tasks provided by agents as in Melitz (2003).

Agents can market their task in the local market at no cost, while in order to sell the output of their task to another market they pay a fixed and a variable cost that is common across agents. Agents differ in their productivity to produce their good which generates heterogeneity in the decision to export.

Preferences. Agents have preferences over consumption of an aggregated good c and labor l:

$$u(c,l) = c - \frac{l^{\gamma}}{\gamma} \tag{1}$$

where the parameter $\gamma \geq 1$ controls the Frisch elasticity of labor supply, which is given by $1/(\gamma - 1)$ and is decreasing in γ.

Technology. Agents have access to a linear production function that uses labor inputs. They produce output $y = \varphi l$ of their own variety, where φ is the individual intrinsic ability, which is distributed according to $H(\mu, \sigma^2)$.

Tasks performed by different agents are imperfect substitutes and are combined in the production of the aggregate final consumption good according to

$$Q = \left(\int y_{\varphi}^{\beta}\, dH\right)^{1/\beta}, \tag{2}$$

where $\beta \in (0,1]$ is the parameter that controls the elasticity of substitution $1/(1-\beta)$ across intermediary inputs.

Trade costs. Agents need to pay an iceberg cost f and a variable cost d in the form of a shipping cost to access international markets. For each $d > 1$ unit of shipped intermediary inputs only one unit reaches the foreign market.

2.2 Optimization Problem

Agents choose their labor supply, decide whether to export to foreign markets, and optimally allocate the total output of their intermediary inputs across markets. Under the model assumptions the demand q of an input is given by:

$$q = Q(\frac{p}{P})^{\frac{-1}{1-\beta}} \tag{3}$$

, where p is the price of the input and P is the price of the final good that is normalized to 1.[4] Under this condition, agents' revenue from selling only domestically is given by:

$$r = Q^{1-\beta} y^{\beta}. \tag{4}$$

While agent's revenue from selling to both domestic and foreign markets is given by:

$$r^* = Q^{*1-\beta}(\tfrac{q^*}{d})^{\beta} + \quad Q^{1-\beta}(\varphi l - q^*)^{\beta} - f, \tag{5}$$

where Q^* is the foreign market aggregate demand. Note that in this environment, revenue r^* can be higher when sales occur in domestic and foreign markets, because marginal revenue in each market is higher relative to a situation where all output is sold only in one particular location.

2.3 Calibration

In order to run a numerical exercise, we calibrate our model to match key moments of the US economy (see Table 1). Two parameters are chosen exogenously: the Frisch elasticity of labor supply γ and the parameter that governs the elasticity of substitution between different tasks β. Following Antràs et al. (2017), we choose γ to be equal to 2.8 and β to be equal to 0.8 resulting in an elasticity of substitution $\frac{1}{1-\beta} = 5$. We assume that the ability distribution H is lognormal. The two parameters that determine the lognormal distribution are calibrated together with the iceberg cost f and variable cost d to match the average income of each decile of the US income distribution,[5] the share of exports over output, and the share of foreign exporting firms (Bernard et al. 2007).

[4] The price of the final good is given by $P = \left(\int p_{\phi}^{-\frac{\beta}{1-\beta}} dH_{\phi}\right)^{-(1-\beta)/\beta}$

[5] We use data from GCIP which we also use in the empirical analyses below.

2.4 Numerical Exercise

We are now ready to perform a numerical exercise based on the model. Starting from our calibrated economy, we reduce the variable trade cost d letting exports increase from 15 to 30 percent of GDP and analyze the impact on income growth across and within countries.[6]

Table 1 – Calibration Parameters

Parameter	Value	Source
Frisch Elasticity: γ	2.80	Antràs et al. (2017)
Task Elasticity of Substitution: β	0.80	Antràs et al. (2017)
Ability Distribution: μ, σ	0.002, 0.7806	GCIP (2016)
Iceberg Cost: f	5.15	Arkolakis et al. (2019)
Variable Cost: d	1.37	Bernard et al. (2007)

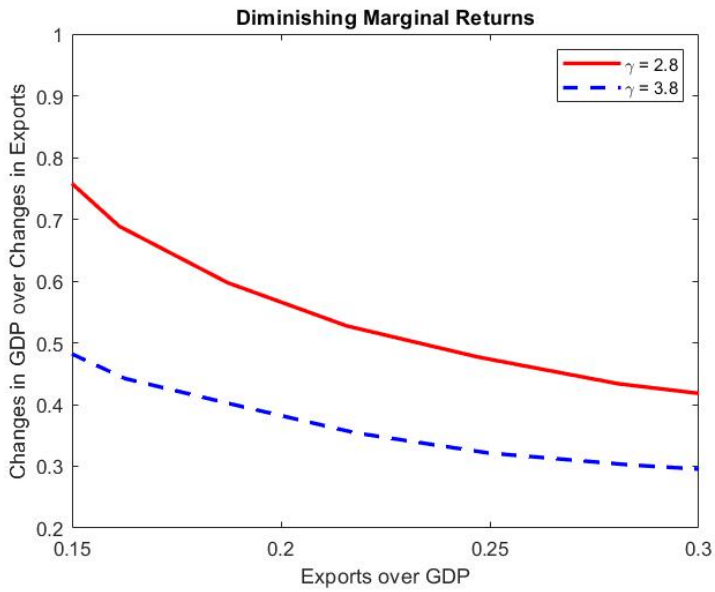
Income Growth Across Countries: Diminishing Marginal Returns

A reduction in the variable trade cost leads to an increase in the return of exporting. As a result, agents that are already exporting choose to export more (intensive margin) and some agents that were not exporting start to export (extensive margin). As new agents start to export, the final good is produced more efficiently because it is combining a greater diversity of tasks leading to an increase in aggregate demand. Higher aggregate demand benefits all agents in the economy including those that only sell domestically. The impact of reducing the variable cost on output is positive and exhibits diminishing marginal returns (Figure 1). As countries increase their openness, the growth rate of the economy relative to the change in exports declines.

These diminishing marginal returns arise from agents' concave labor supply decision. The concavity of the labor supply implies that agents' extra effort to produce an extra unit of output increases with production. To illustrate this mechanism, we simulate the impact of globalization on two different economies: one with a high elasticity of labor supply ($\gamma = 2.8$) and one with a low elasticity of labor supply ($\gamma = 3.8$), where the initial export shares in the two economies are kept the same by adjusting the iceberg cost. As Figure 1 indicates, the economy with a higher elasticity of labor supply benefits more from trade openness. However, the benefit of openness declines faster in the high-elasticity economy causing larger diminishing marginal returns.

[6] Such an increase in the exports-to-GDP ratio from 15 to 30 percent roughly corresponds to the global increase in the exports-to-GDP ratio from 1970 to 2014, our observation period in the empirical analysis below.

Figure 1 – Income Growth Across Countries

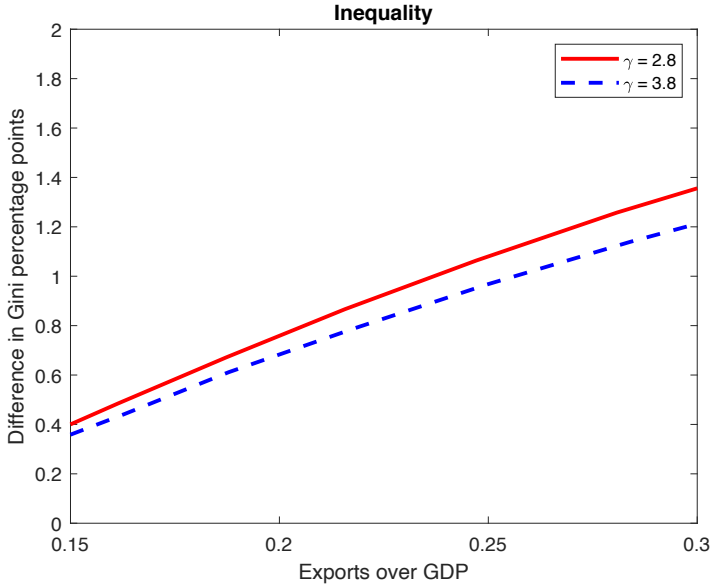


Note: Change in output divided by change in exports from a reduction in the variable trade cost in 0.05 increments. One economy with a high elasticity of labor supply ($\gamma = 2.8$) and one economy with a low elasticity of labor supply ($\gamma = 3.8$).

Income Growth Within Countries: Increasing Inequality

Next, we assess how these income gains are distributed within countries. We find that globalization generates an increase in income inequality because it benefits richer agents more than poor agents. A decline in the trade cost increases the exporting revenue of agents that are already exporting, which are richer. While poorer agents also benefit from an increase in aggregate demand, they benefit less because poor agents only sell on the domestic market. This translates into an increase in inequality. This is visualized in Figure 2, which plots the difference between the Gini coefficient in the benchmark economy and in increasingly open economies. Again, the exercise is conducted for economies with low and high elasticities of labor supply.

Figure 2 – Inequality Within Countries

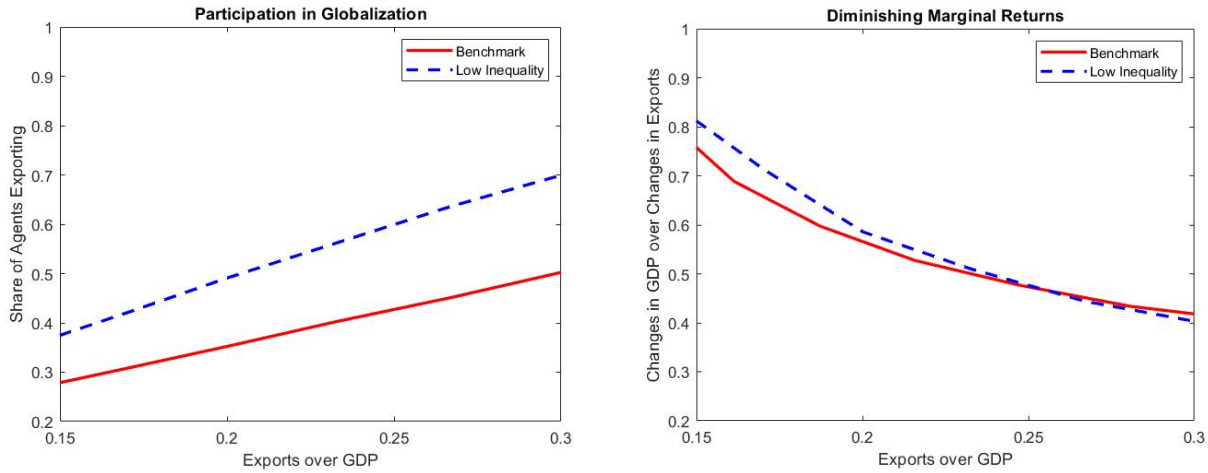


Note: Difference in the Gini between the benchmark economy and economies with lower variable trade costs. One economy with a high elasticity of labor supply ($\gamma = 2.8$) and one economy with a low elasticity of labor supply ($\gamma = 3.8$).

Corollary: The Role of Initial Conditions

As a final step of the quantitative analysis, we examine how different initial inequality levels affect this result. We find that countries with lower inequality levels benefit more from globalization because a larger share of the population participates in trade in these countries. To illustrate this result, we simulate the impact of globalization on both the share of exporters and on output growth in two economies: the benchmark economy and an alternative economy with a lower initial level of inequality. To ensure that these two economies are comparable, we increase the variance and reduce the mean of the ability distribution in order to model two economies with the same average ability level. We also adjust the iceberg cost to ensure that they start with the same share of exports over GDP. Figure 3 plots the results and indicates that the economy with a low level of inequality benefits more from globalization than the benchmark economy. Participation is larger in the low-inequality economy and, as a result, a reduction in trade cost leads to greater diversity of tasks in the low inequality economy thereby generating larger productivity gains.

Figure 3 – The Role of Initial Conditions



Note: The graph on the left-hand side plots the change of the share of exporting agents when exports increase for the benchmark and a low-inequality economy. The graph on the right-hand side plots the change in GDP relative to the change in exports for the same two economies.

3 Data and Method

In this section, we present our approach to test these theoretical predictions empirically. We describe our key variables, present descriptive evidence, and develop our empirical strategy.

3.1 Dependent Variables

Our goal is to study how global income gains and losses from globalization are globally distributed among individuals across and within countries. 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 in countries are affected at different stages of the globalization process. These GDP figures are taken from the World Development Indicators (World Bank 2017a), and we run robustness tests with 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 gross incomes from the Standardized World Income Inequality Database (SWIID) (Solt 2016), but also run robustness tests with 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 in absolute terms and in relation to each other. These data are taken from the Global Income and Consumption Project (GCIP) (Lahoti et al. 2016).

The use of these data comes with the typical caveats. GDP and growth figures for many developing – especially African – economies have repeatedly been criticized for being inaccurate (Jerven 2013). Data on income inequality are often considered problematic because they require fine-grained microdata, which were not gathered frequently and reliably enough in earlier periods, particularly for many developing countries. This limits data coverage. Furthermore, for many countries the data underlying the inequality measures are based on different measurement methods (e.g., household level vs. individual level, income vs. consumption, net income vs. market income). This limits data comparability. The existing datasets deal with these issues in different ways: PovcalNet and ATG disregard the country-year observations for which no or no satisfactory data are available. If multiple measures exist for a given country-year observation the score with the highest quality is selected ("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 other estimates to increase comparability (Lahoti et al. 2016; Solt 2016). We use SWIID and GCIP data for our baseline regressions, but also show that our results are robust to using data from PovcalNet and ATG.[7] We thus make sure that our analysis is based on the most standard, most reliable, and most up-to-date data sources that currently exist for a large panel of countries. In most periods, the data cover more than 80 percent of the global population.

3.2 Measuring Globalization

A key challenge for any study investigating the effects of globalization is the question of how to define and measure this multifaceted concept. We follow a long tradition of research that generally understands

[7] We report the results of these robustness regressions in section 4.5. and Appendix 5. 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 the reason why we aim to maximize coverage in the baseline. 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 five-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 $r = .89$ 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).

globalization 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). More specifically, we focus on the *economic* rather than on the *political* or *social* dimension of globalization (Gygli et al. 2019, Keohane and Nye 2000). Research generally underlines that the concept of *economic globalization* is multidimensional, covering flows of goods and capital, and containing both a *de jure* dimension (i.e., the amount of legal restrictions to economic flows), and a *de facto* dimension (the actual amount of these flows) (Dreher 2006; Gygli et al. 2019).

This multidimensionality is a challenge for estimating the overall effects of economic globalization. A single indicator (e.g., trade over GDP) is unlikely to be representative of this multidimensional process and of what people usually think of as economic globalization. Adding multiple indicators to the statistical analyses, however, creates collinearity problems as the individual indicators are highly correlated with each other. In joint regression analyses their variations would thus overlap and cancel each other out to a substantial extent. We illustrate this issue in Table 2 and Figure 4.

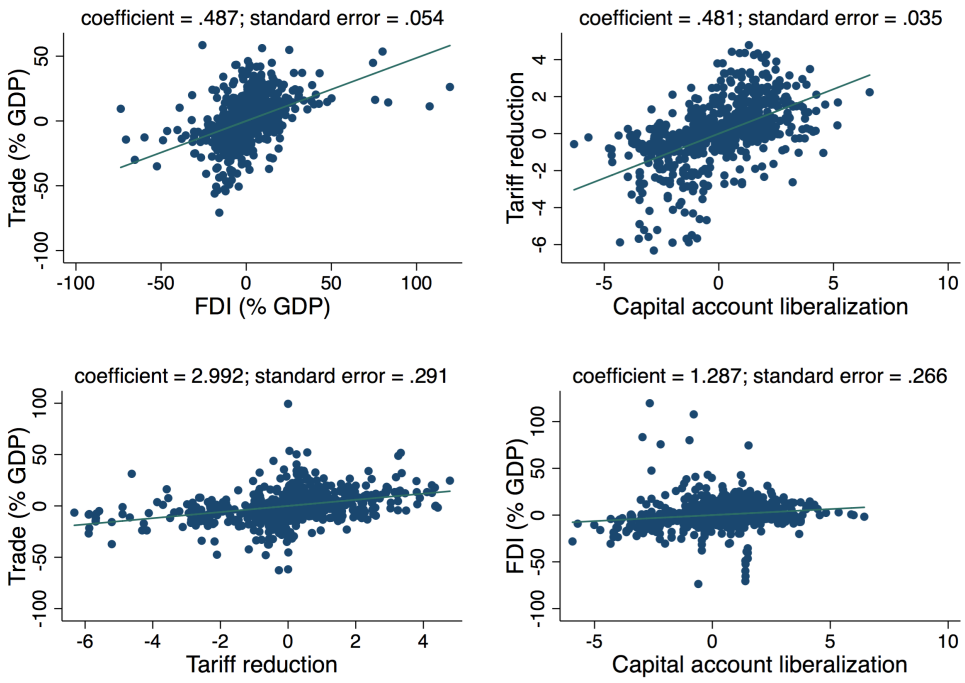
Table 2 shows pairwise correlations between four key indicators of economic globalization: measures of trade and FDI volumes as well as tariff reduction and capital account liberalization.[8] All correlation coefficients in Table 2 are positive and between 0.30 and 0.59. Figure 4 shows that these relatively 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 *de facto* and the *de jure* variables, the figures also show the conditional correlations of the two variables related to trade (trade and tariff reduction) as well as of the two variables related to finance (FDI and capital account liberalization). In sum, these observations suggest that the individual sub-components of economic globalization are highly collinear.

Table 2: Collinearity of Globalization Indicators

Pairwise correlations (*r*) (N = 697)	Trade (% GDP)	FDI (% GDP)	Tariff reduction	Capital account liberalization
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 liberalization	0.30	0.38	0.57	1.00

[8] The unit of observation in Table 2 and Figure 4 is a country-period (5-year-averages). Data are from KOF (2016).

Figure 4: Collinearity of Globalization Indicators



Note: Added-variable-plots of OLS-FE regressions of the variable plotted on the y-axis on the variable plotted on the x-axis controlling for country fixed effects.

In addition to the facts that one indicator does not capture the multidimensionality of economic globalization and that its overall effect may be different from the sum of the effects of its constituent parts, this collinearity is the key reason why we follow the empirical literature that uses composite indices to measure globalization. The most widely used among them has long been the *KOF Index of Globalization* (Dreher 2006; Dreher et al. 2008; KOF 2016).[9] This popular index was revised comprehensively in 2019 to cover a substantially larger amount of globalization indicators than the original version (Gygli et al. 2019). By means of a principal component analysis yielding weights for each indicator this index combines 14 prominent measures of economic globalization (trade in goods, trade in services, trade partner diversity, foreign direct investments, portfolio investment, international debt, international reserves, international income payments, trade regulations, trade taxes, tariffs trade agreements, investment restrictions, capital account openness, international investment agreements). The index ranges from 0 (no globalization) to 100 (maximum globalization) and is typically slow to change within countries: its median (mean) change from one period to the next is 2.1 (2.9) points.[10] To our knowledge, this study is the first to use this new KOF index for examining the distributional effects of globalization.

[9] More than 100 studies use the KOF index. Potrafke (2015) provides a survey of the literature using this index.
[10] In Appendix 2 we illustrate and describe the main trends of globalization across countries that this index captures.

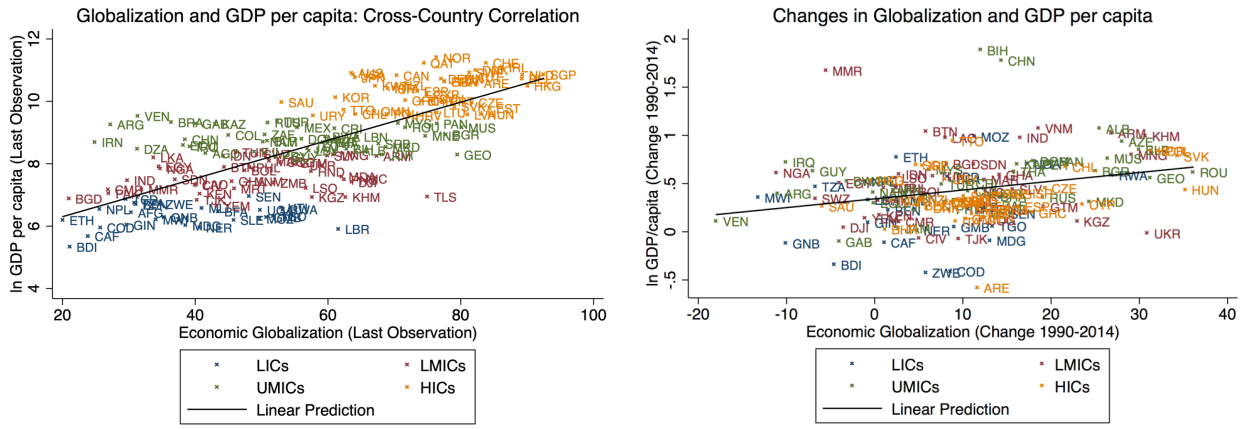
3.3 Descriptive Evidence

To give a first impression of the main data used in this study, Figure 5 shows how levels and over-time changes of globalization correlate with levels and over-time changes of income levels. Panel A shows a strong positive cross-country correlation of globalization and GDP per capita levels. Panel B plots the within-country change of globalization between 1990 and 2014 against the growth of GDP per capita in the same period, showing that countries that globalized more over also grew more strongly in this period. [11]

Figure 6 repeats the same analyses for inequality as measured by the Gini index of market income. Panel A shows a positive association between globalization and market inequality across countries, while panel B points to the same positive association when over-time variation within countries is looked at. In sum, increases in globalization tend to coincide with increases in both income levels and income inequality. These associations are in line with the view that globalization promotes both average income levels and income inequality but they only provide descriptive and correlational evidence. The next section turns to a more rigorous econometric analysis.

Figure 5 – Descriptive Evidence: Globalization and Growth

Panel A *Panel B*

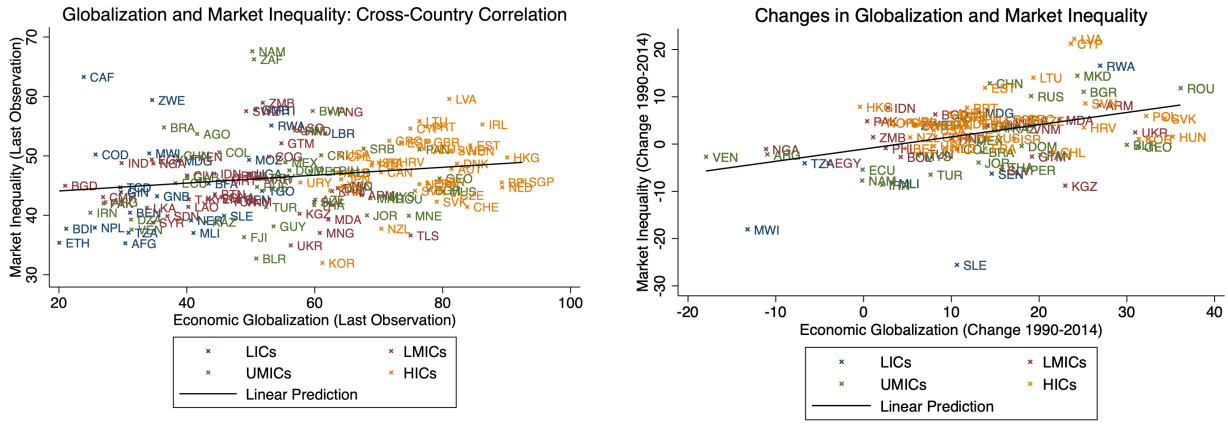


Note: Correlations of (over-time changes of) economic globalization and GDP per capita. Each country's income group according to the World Bank's 2015 classification of low-income countries (LICs), lower middle-income countries (LMICs), upper middle-income countries (UMICs) and high-income countries (HICs) is also indicated.
Panel A: Cross-country correlation of globalization and GDP per capita (latest values)
Panel B: Correlation of over-time changes of globalization and GDP per capita (between 1990 and 2014)

[11] We use values from 1990 for this figure because this allows us to include more countries, especially from the developing world. Figures with 1970 or 1980 as starting years look very similar.

Figure 6 – Descriptive Evidence: Globalization and Inequality

Panel A *Panel B*



Note: Correlations of (over-time changes of) economic globalization and the Gini index of market inequality. Each country's income group according to the World Bank's 2015 classification is also indicated.
Panel A: Cross-country correlation of globalization and inequality (latest values)
Panel B: Correlation of over-time changes of globalization and inequality (between 1990 and 2014)

3.4 Identification

We are interested in panel regressions of the following type:

$$y_{dit} \;=\; \beta\, g_{it-1} \;+\; \boldsymbol{X'}_{\boldsymbol{it-1}}\delta \;+\; \mu_i \;+\; \vartheta_t \;+\; \varepsilon_{it} \tag{6}$$

where y represents one of the dependent variables of interest (i.e., income growth, income inequality, income growth of decile d), g denotes the globalization index, and $\boldsymbol{X'}$ is a vector of control variables, which we describe in the next section. μ_i and ϑ_t are full sets of country fixed effects and period fixed effects, respectively, and ε describes the error term. All variables enter as averages of five-year-periods (indicated by t) in the given country (indicated by i). Our sample covers a maximum of 141 countries between 1970 and 2014. In additional regressions, we also include the square of g to allow for nonlinear effects of globalization.[12]

Initially, we run standard OLS fixed-effects regressions to estimate the conditional correlations between changes in globalization and the outcome variables. Even though such conditional correlations are interesting in themselves, we cannot exclude the possibility that these correlations are driven by omitted

[12] If there are positive but diminishing marginal returns to globalization, not allowing for nonlinearity 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.

variables or reverse causality in this setting. In additional regressions, we 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 $\boldsymbol{X}'$, μ_i, and ϑ_t.[13]

$$y_{it} \;=\; \beta\, \hat{g}_{it-1} \;+\; \boldsymbol{X'}_{\boldsymbol{it-1}}\delta \;+\; \mu_i \;+\; \vartheta_t \;+\; \varepsilon_{it} \tag{7}$$

Instrumental variable approach. Our IV exploits the geographical diffusion of policies that promote economic liberalization. According to prominent findings in the political science literature, policies 'diffuse' across borders due to learning, competition, and emulation processes (e.g., Simmons et al. 2006). Hence, the implementation of economic liberalization policies in a country increases the probability that countries in the geographical vicinity implement similar policies in subsequent periods. As a consequence, economic globalization in a given country is more likely to increase if countries in its geographical vicinity implemented policy reforms that promoted economic liberalization in the previous period. At the same time, it is unlikely that liberalization policies of other countries in previous periods affect incomes in the given country through other channels than increasing economic globalization in this country. This argument is closely related to the identification strategy in Acemoglu et al. (2019) who, in a similar setting, instrument for democracy with democratizations in geographically close countries. They argue that political liberalization (i.e., democratization) in nearby countries should affect incomes only through democratization in the given country. In analogy, we argue that economic liberalization policies in nearby countries should affect incomes only through globalization in the given country. As in their setting, we always absorb country fixed effects and period fixed effects and control for initial income and democracy levels.

Specifically, we instrument the globalization score of country i (with $i \in I$, the set of countries) at time t with the inverse-distance-weighted index of liberalization policies (lib_{jt-1}) of other countries $j \neq i$ (with $j, i \in I$) in period $t-1$:

$$IV_{it-1} = \; NeighborhoodLiberalization_{it-1} = \frac{\sum_{j \neq i}(\frac{1}{distance_{ij}}\, lib_{jt-1})}{\sum_{j \neq i}\frac{1}{distance_{ij}}} \quad \forall\; j,\; i \in I \tag{8}$$

[13] An alternative empirical strategy of addressing endogeneity, which 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). 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 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).

As a measure of liberalization policies (lib_{jt-1}), we use the *de jure* dimension of the KOF index of economic globalization. This composite index combines a total of seven measures of legal restrictions to trade and financial flows. It is only based on laws and does not capture any economic flows. 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:

$$g_{it-1} \;=\; \alpha\, IV_{it-2} \;+\; \boldsymbol{X'}_{\boldsymbol{it-1}}\, \gamma \;+\; \mu_i \;+\; \vartheta_t \;+\; u_{it} \tag{9}$$

We use this regression to calculate fitted values $\hat{g}$ for the second stage of our 2SLS panel regressions (7). We run these regressions with and without the control variables $\boldsymbol{X'}_{\boldsymbol{it-1}}$ (described below), because we assume the exclusion restriction to hold without conditioning on them. Formally, the identifying assumption is:

$$E(IV_{it-2}\; \varepsilon_{it} \mid \mu_i, \vartheta_t\;) \;=\; E(IV_{it-2}\; \varepsilon_{it} \mid \mu_i, \vartheta_t,\; \boldsymbol{X'}_{\boldsymbol{it-1}}) \;=\; 0 \tag{10}$$

Plausibly exogenous. In robustness regressions, we relax this assumption and assume instead that our exclusion restriction is only "plausibly exogenous" (Conley et al. 2012); i.e., the expression in equation (10) is only assumed to be close to 0 and not exactly equal to 0. Arguably, this is a plausible assumption in macroeconomic settings like ours, where one can only claim to approximate causal effects. We then estimate the extent to which this exclusion restriction can be violated without threatening our inferences. These estimations suggest that the IV could have a considerable direct effect without changing the results (see Figure A3 in the Appendix).[14] At the same time, it is worthwhile to mention that all main findings that emerge when estimating by IV also emerge when estimating by OLS.

Control variables. In the choice of our country-period-specific control variables, $\boldsymbol{X'}_{it-1}$, we aim to be as close to the existing, related literature as possible.[15] 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).[16] Additional standard control variables of growth regressions that we add include the rate of population growth, average life

[14] In addition to concerns regarding exclusion restrictions, weaknesses of IV-based strategies include their limitation of only identifying a Local Average Treatment Effect (Imbens and Angrist 1994) and their sensitivity to outliers (Young 2017). We further address these limitations when discussing results and their robustness in section 4.

[15] See, for instance, Acemoglu et al. (2019), Barro (2003), Dreher (2006), and Ostry et al. (2014).

[16] See also Milanovic (2016).

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 IV index in order to control for the quality and openness of political institutions. For all of variables we use the average of the previous five-year period.[17]

When applying the IV approach we also run regressions without these control variables. They are then not necessary for identification because we assume that our exclusion restriction holds without conditioning on these covariates. Furthermore, some of the covariates could themselves be outcomes of changes in globalization. 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, we show in robustness tests that our results are not affected when adding more extensive sets of controls including investment, debt, and government expenditure (all as a share of GDP). These covariates are more likely to be 'bad controls' in our setting 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 and technological shocks.[18] The latter absorb all country-specific time-invariant characteristics such as a country's geography, colonial history, legal origin, natural resource endowment, *etc.*

[17] See Appendix 3 for sources and descriptive statistics of all variables used in this analysis.

[18] 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, in turn, 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).

4 Empirical Results

4.1 Income Growth

We begin our regression analyses by looking at the effect of economic globalization on a country's rate of aggregate economic growth in the subsequent five-year period. In general, we find that globalization increases growth. These gains from globalizing, however, get smaller the more globalized the country already is. There are diminishing marginal returns to globalization.

In Table 3, we report the results of two-way fixed-effects regressions of five-year growth rates on levels of economic globalization. In column 1, we estimate by OLS, absorb country and period fixed effects, and control for the level of GDP per capita in the previous period. Column 2 adds the set of control variables described above. The covariates 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.

Table 3 – Globalization and Income Growth

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation Method	**OLS**	**OLS**	**IV**	**IV**	**OLS**	**IV**
Economic Globalization $_{t-1}$	0.0027**	0.0021*	0.0011	0.0011	0.0157***	0.0588***
	(0.0012)	(0.0012)	(0.0036)	(0.0034)	(0.0038)	(0.0142)
Economic Globalization $_{t-1}^2$					-0.0001***	-0.0004***
					(0.0000)	(0.0001)
GDP/capita (ln) $_{t-1}$	-0.2550***	-0.2488***	-0.2485***	-0.2442***	-0.2523***	-0.3249***
	(0.0409)	(0.0406)	(0.0463)	(0.0456)	(0.0354)	(0.0497)
Population Growth (%) $_{t-1}$		-0.0052		-0.0051	0.0010	0.0132
		(0.0131)		(0.0130)	(0.0130)	(0.0134)
Education $_{t-1}$		-0.0115		-0.0118	-0.0093	-0.0015
		(0.0113)		(0.0111)	(0.0100)	(0.0137)
Democracy $_{t-1}$		0.0025*		0.0026*	0.0008	-0.0041
		(0.0014)		(0.0014)	(0.0015)	(0.0027)
Life Expectancy $_{t-1}$		0.0072***		0.0074***	0.0053**	-0.0014
		(0.0019)		(0.0020)	(0.0021)	(0.0038)
Period FE and Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	787	787	786	786	787	787
R^2	0.266	0.288	0.263	0.287	0.321	0.269
First-Stage Estimates						
Neighborhood Liberalization $_{t-2}$			0.9269***	0.9536***		1.3386**
			(0.1563)	(0.1556)		(0.5821)
K-P underidentification (p)			0.000	0.000		0.000
K-P weak identification (F)			35.166	37.554		7.132

Note: Dependent variable: GDP/capita growth. Averages of five-year periods. OLS and 2SLS fixed effects regressions. Standard errors clustered at the country-level in parentheses. Full first-stage estimates are reported in Table A1. Significance levels: * p<.10, ** p<.05, *** p<.01.

The coefficient of interest indicates a positive, statistically significant, but economically small conditional correlation between economic globalization and growth in these two regressions. A one-point increase in globalization is associated with an increase in the five-year growth rate by 0.2-0.3 percentage points. In column 3, we apply our IV strategy to account for potential endogeneity. The first-stage diagnostics show that the instrument is relevant: The coefficient of the IV in the first stage ($a = 0.93$) is statistically significant ($t = 5.93$, $p < 0.001$) and the Kleibergen-Paap (K-P) F-statistics comfortably pass standard tests of instrument relevance.[19] This implies that the implementation of economic liberalization policies in a country's neighborhood strongly predicts an increase in the country's level of globalization in the subsequent period. Adding control variables (column 4) barely affects the estimates, suggesting that this association is not due to observable confounders. In the second stage, the coefficient on globalization loses statistical significance at conventional levels as standard errors get larger when this approach is used in the linear specifications (column 3-4). However, when allowing for nonlinearity, it becomes obvious that the linearity assumption in columns 1-4 masks a strong heterogeneity. In both OLS and IV estimations (columns 5 and 6), the coefficients are positive on the linear term, negative on the squared term, and both are statistically significant ($p < 0.001$). Together, these estimates provide strong evidence for significantly positive, yet diminishing marginal effects of globalization on growth.

Figure 7 visualizes the marginal effects based on our preferred model (column 6). It shows that in countries where the level of globalization is low, increasing globalization leads to substantially stronger growth. The higher globalization already is, the smaller the effect becomes. The growth effect stops being statistically significant at the five percent level at a globalization score of about 66 – roughly the current level of countries like Poland, Chile, and Australia. Our results suggest that countries with this relatively high[20] degree of economic globalization do, on average, not gain additional significant 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 Nigeria, which had an average globalization score of 41 in the most recent period – would be expected to increase its total five-year-period growth rate by about 2 percentage points when increasing globalization by one point. For the average middle-income country, the expected growth effect is estimated at approximately 1 percentage point. This is an

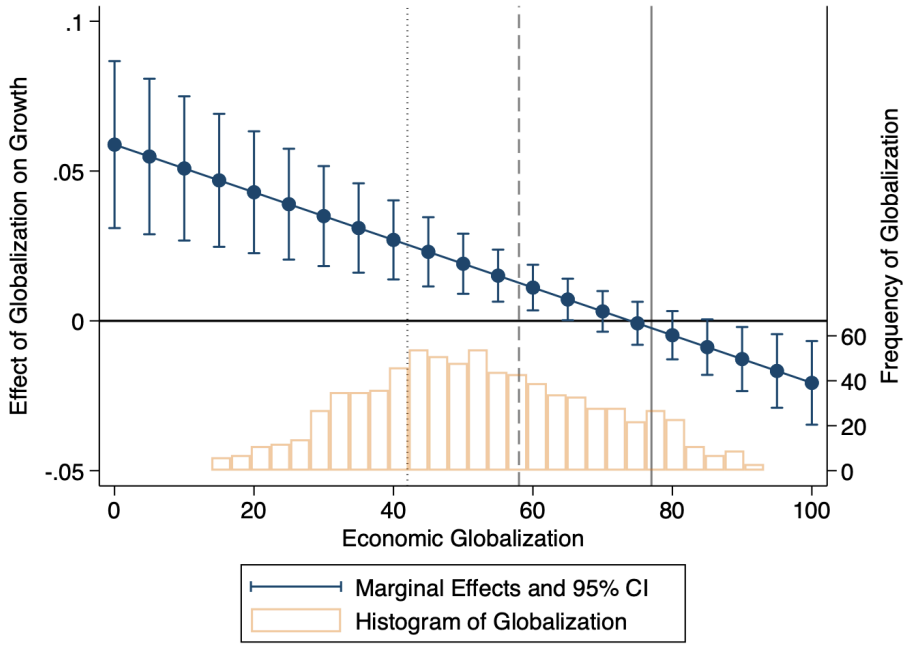
[19] The Kleibergen-Paap weak identification F-statistics show that the IV surpasses the relevant thresholds calculated by Stock and Yogo (2005), i.e., 16.38 for the regressions with one endogenous regressor and 7.03 for the regressions with two endogenous regressors. Surpassing these critical values ensures that the 2SLS size distortion potentially resulting from weak identification is smaller than 10 percent. In the regressions with two endogenous regressors (globalization and its squared term) the squared IV is the second excluded instrument. Full first-stage estimates are reported in Table A1.

[20] About 18 percent of country-period observations in the sample surpass the value of 66.

economically substantial effect, considering that the mean (median) increase in the economic globalization index from one period to the next is about three (two) points.

In sum, this empirical evidence matches the predictions of our quantitative model in section 2. It suggests that the growth effect of economic globalization is positive, but also diminishing with an increasing degree of globalization. While weakly globalized countries substantially benefit from globalizing, countries gain considerably less the more they are already integrated in the global economy. For the world's most globalized countries, there is no evidence for a positive effect of globalizing further.

Figure 7 – Diminishing Marginal Returns to Globalization



The figure visualizes the result of the growth regression reported in table 3, column 6. The blue line depicts the marginal effect (and 95 percent 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 below. The three vertical lines indicate the current average globalization score of LICs (dotted), MICs (dashed), and HICs (solid).

4.2 Income Inequality

Having analyzed how the gains from globalization are distributed *across* countries, we now turn to the distribution of these gains *within* countries. In general, our findings indicate that globalization leads to higher income inequality within countries. These results, which are presented in Table 4, show that there is a robustly positive and statistically significant effect of economic globalization on the Gini coefficient of net incomes.

Table 4 is structured analogously to Table 3. In columns 1 and 2, we report the results of OLS fixed-effects regressions with and without control variables. The control variables enter with the expected signs. Higher education levels and more democratic institutions are weakly associated with lower levels of income inequality. The coefficient on globalization indicates a positive association between economic globalization and the Gini index. When endogeneity is accounted for by means of the IV strategy in columns 3 and 4, we continue to find this positive effect. The inclusion of control variables does not affect this results in either specification. In analogy to the growth regressions, we also allow for nonlinear effects in columns 5 and 6. There is no empirical evidence for a significant nonlinearity of the effect. According to these estimates, a one-point increase in economic globalization leads to a rise in the Gini

Table 4 – Globalization and Inequality

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	OLS	**OLS**	**IV**	**IV**	**OLS**	**IV**
Economic Globalization	0.125**	0.127**	0.457**	0.436**	0.152	0.424
	(0.051)	(0.049)	(0.202)	(0.192)	(0.198)	(0.535)
Economic Globalization^2					-0.000	0.000
					(0.002)	(0.004)
GDP/capita (ln)	-1.393	2.284	0.023	4.395	1.618	4.622
	(7.905)	(7.767)	(8.546)	(8.413)	(9.353)	(13.324)
GDP/capita (ln, squared)	0.371	0.129	0.147	-0.129	0.171	-0.142
	(0.424)	(0.435)	(0.489)	(0.499)	(0.518)	(0.774)
Population Growth (%)		0.325		0.403	0.334	0.399
		(0.396)		(0.383)	(0.410)	(0.415)
Education		-0.600		-0.538	-0.603	-0.538
		(0.402)		(0.392)	(0.403)	(0.392)
Democracy		-0.161		-0.168*	-0.163	-0.167*
		(0.101)		(0.093)	(0.103)	(0.097)
Life Expectancy		-0.021		-0.063	-0.023	-0.062
		(0.127)		(0.128)	(0.129)	(0.138)
Period FE and Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	618	618	618	618	618	618
R^2	0.145	0.167	0.008	0.049	0.167	0.051
First-Stage Estimates						
Neighborhood Liberalization $_{t-2}$			0.807***	0.827***		1.530**
			(0.173)	(0.176)		(0.597)
K-P underidentification (p)			0.000	0.000		0.000
K-P weak identification (F)			21.804	22.152		6.176

Note: Dependent variable: Gini index of net income. Averages of five-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. Full first-stage estimates are reported in Table A2. Significance levels: * p<.10, ** p<.05, *** p<.01.

index of about 0.4-0.5 points. This is an economically substantial effect, considering that the average change in the economic globalization index amounts to an increase of three points per period. According to a method proposed by Blackburn (1989), a change in the Gini coefficient by 1.5 points, which such a change in globalization would approximately induce, is equivalent to an increase in inequality resulting from a lump-sum transfer of 3 percent of the country's mean income from the bottom half of the income distribution to the upper half.

4.3 Income Growth by Decile

Next, we bring our empirical results on growth and inequality together. Instead of treating them as two separate outcomes, we substitute the dependent variable by changes in incomes of various parts of the income distribution. We look at country-decile-specific income shares and income growth based on the GCIP database. The results from this analysis are consistent with the above findings and suggest that the gains from economic globalization are positive and substantial but concentrated at the top of the national income distributions. Specifically, we find that globalization promotes inequality by increasing incomes at the top rather than by decreasing incomes at the bottom and particularly benefits the top 10 percent.

Table 5 reports the results of our preferred inequality regression (IV-estimation, baseline controls) when the outcome variable is the period-specific income share of income deciles 1-10 (columns 1-10). Columns 11 and 12 additionally consider the income share of those above the 95th percentile and the 99th percentile as the dependent variable. 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. What stands out in this analysis, is that only the top decile gains significantly in relative terms. All other deciles face relative losses or are not affected. Specifically, a one-point increase in the globalization score increases the top ten percent's income share by about 0.23 percentage points. Figure 8 illustrates these effects for all ten deciles. These results support and add to research documenting that recent periods of income growth have disproportionally benefitted the very top of the income distribution in several economies (Alvaredo et al. 2017b). Our estimates suggest that economic globalization is one of the factors contributing to this trend.

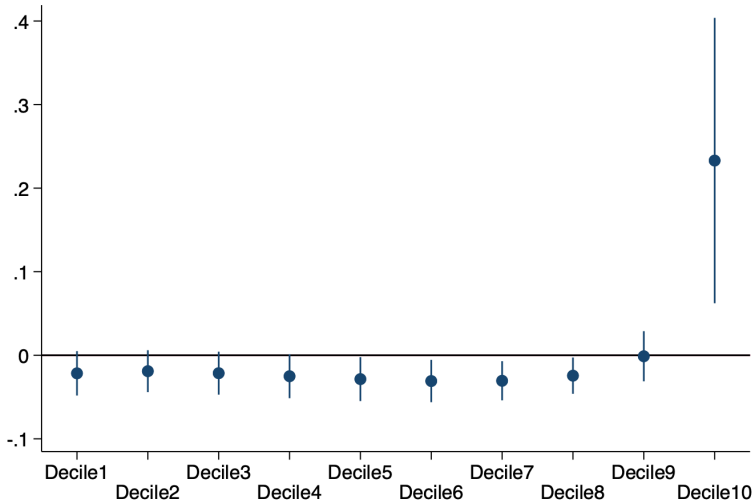
In Table A3 and Figure A2 in the Appendix, we repeat the same analysis but use absolute decile-specific income growth rather than relative income shares as outcome variables. These regressions show changes in absolute incomes rather than in relative incomes shares. The most notable result of this analysis is that all coefficients are positive. While the point estimates for decile-specific growth effects

Table 5 – Globalization and Income Growth by Decile

Outcome Variable: Income Share of Decile:	1	2	3	4	5	6	7	8	9	10	top 5%	top 1%
Economic Globalization	-0.022	-0.019	-0.021	-0.025	-0.029*	-0.031**	-0.031**	-0.024*	-0.001	0.233**	0.217**	0.127*
	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)	(0.015)	(0.014)	(0.013)	(0.018)	(0.104)	(0.095)	(0.076)
Observations	657	657	657	657	657	657	657	657	657	657	657	657
First-stage Estimates												
Neighborhood	0.823***	0.811***	0.809***	0.810***	0.814***	0.819***	0.824***	0.830***	0.837***	0.844***	0.836***	0.836***
Liberalization $_{t-2}$	(0.169)	(0.170)	(0.171)	(0.171)	(0.171)	(0.171)	(0.171)	(0.170)	(0.170)	(0.170)	(0.171)	(0.171)
K-P weak identif. (F)	23.629	22.706	22.444	22.474	22.668	22.962	23.322	23.730	24.177	24.619	23.954	23.953

Note: 2SLS regressions. Averages of five-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 8 – Relative Income Shares: Coefficient Plot



Note: visualization of results reported in Table 5: coefficients on economic globalization with 90 percent confidence intervals

are larger for higher deciles than for lower deciles, there is no evidence that globalization reduces incomes for any income group across countries. Hence, the rise in national inequalities is driven by rising incomes for the rich rather than by falling incomes for the poor. This is in line with our theoretical model in section 2 as well as with the national-level results on income growth across and within countries.

4.4 Initial Conditions

As a next step, we bring an additional prediction of our model to the data. The model suggests that the effect of globalization on growth depends on the initial level of inequality in an economy and predicts lower gains from globalizing for more unequal countries. We test this by adding an interaction term of globalization and the level of inequality to the baseline regression (Table 6).[21] This interaction term enters with a statistically significant, negative sign and thus suggests that the association of globalization with inequality gets more negative the more unequal a country is. Adding control variables does not affect this result (column 2). Figure 9 plots the marginal effects of the full model and points to a significantly positive association of globalization with growth only for countries with a Gini index below 45. Above this inequality level, the association is not statistically significant at conventional levels. This supports the corollary of the model that the total gains from globalization are larger in more equal countries because in such economies more agents will participate in globalization.

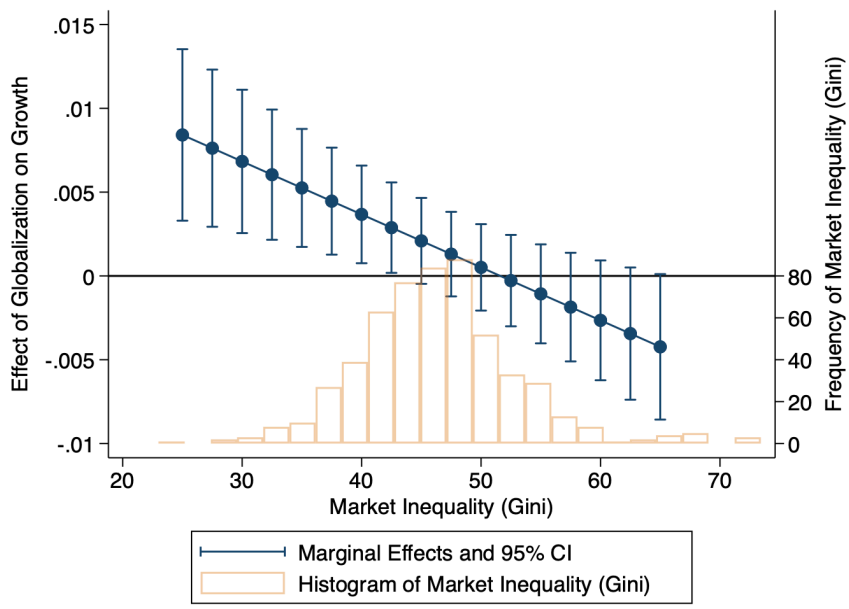
Table 6 – Initial Conditions

	(1)	(2)
Economic Globalization	0.0175***	0.0163***
	(0.0046)	(0.0050)
Gini index	0.0172***	0.0164***
	(0.0055)	(0.0058)
Economic Globalization x Gini index	-0.0003***	-0.0003***
	(0.0001)	(0.0001)
Country and period FE	Yes	Yes
Controls	No	Yes
Observations	598	598
R^2	0.348	0.370

Note. Dependent variable: Economic growth. OLS-FE regressions with country FE and period FE. 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

[21] We use the OLS model rather than the IV model because we are not aware of an exogenous source of variation in inequality that could be exploited in this model. Note, however, that IV and OLS results are similar in the baseline.

Figure 9 – The Effect of Globalization on Growth Depends on Initial Inequality



The figure visualizes the result of the growth regression reported in Table 6, column 2. The blue line depicts the marginal effect (and 95 percent confidence intervals) of a one-point-increase in economic globalization depending on a given level of initial inequality. A histogram of the distribution of inequality levels across the sample is shown in orange.

4.5 Robustness

To examine the robustness of our results, we conduct several tests that fall into three categories. First, we challenge our identification strategy and show that more conservative approaches produce the same results. Second, we use alternative measures based on alternative datasets for all key concepts in our model (growth, inequality, globalization). Third, we run a wide range of sensitivity tests and additional models with alternative specification choices. The following section summarizes these results. Appendix 5 presents them in more detail.

Identification strategy. Initially, it is important to note that all baseline results presented above were shown to be robust to OLS and IV estimation as well as to the inclusion and exclusion of standard control variables. We consider it reassuring that all main results hold for such different models and in the following further probe the IV estimation, our preferred specification.

First, we relax the exclusion restriction the IV is based on. So far, we applied the standard assumption of 'strict exogeneity' for the IV. This means that in the model

$$y_{it} = \gamma\, IV_{it-2} + \beta\, g_{it-1} + \boldsymbol{X'}_{\boldsymbol{it-1}}\delta + \mu_i + \vartheta_t + \varepsilon_{it} \qquad (11)$$

where g is endogenous, we assumed that $\gamma = 0$. We argued above why we expect that this assumption holds. However, we acknowledge that in macroeconomic settings like ours it might, as an alternative,

be reasonable to assume that γ is close to 0 but not exactly equal to 0. Such an assumption corresponds to what Conley et al. (2012) define as "plausibly exogenous." Consider the following example: If a country j that is geographically close to country i implements liberalization policies, this could lead to increasing income opportunities for individuals in country i. In order for these increasing income opportunities to have an effect on incomes in country i, we would expect the globalization score g of country i to be affected, because economic flows between countries i and j would increase. In this case, γ would be exactly equal to 0 because there would be no direct effect that is independent of the endogenous variable g. If, however, the globalization score did not adequately capture these increasing flows, because, e.g., individuals from country i derive income from commuting to informal employments in country j, there would be a direct effect of globalization in country j on incomes in country i. In such a case γ would be close to 0 but not exactly 0. To account for such unobserved channels, we employ Conley et al.'s (2012) method and re-estimate our results for different values of γ. We consider it reasonable to use values of γ that are smaller than $\hat{\beta}$, as country i's economy will have a stronger effect on incomes in country i than economies of other countries. We focus on the inequality regressions and plot results for different values of γ in Figure A3 in the Appendix. The results indicate that in order to reduce the point estimate to zero the instrumental variable (Liberalization in countries $j \neq i$) would need to have a direct effect on inequality in country i without affecting globalization in country i that is equivalent to more than 80 percent of globalization's estimated effect.

Alternative Data. Next, we change the datasets used to measure all key concepts (growth, inequality, globalization). In Table A4 we, first, use GDP data from the Penn World Tables and replicate the baseline growth regressions reported in Table 3. The coefficients and significance levels are barely affected by this modification and inferences do not change. Second, in Table A5 we use Gini indices from other data sources to replicate the inequality regressions reported in Table 4. As discussed above, some 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. More precisely, we check for each country which concept was used most frequently in the observation period and drop all observations that are based on other concepts. As country fixed effects are absorbed 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 substantially smaller than the baseline sample. Nevertheless, the results are remarkably similar. Third, we use an alternative measure of globalization. Instead of the new KOF index developed by Gygli et al. (2019) we use the old version developed by Dreher (2006) and re-estimate all baseline regressions. The two indices are based on different indicators (8 new indicators in the revised version), different numbers of indicators (14 vs. 8), and different aggregation methods (different restrictions on weights, different sub-indices). Despite these substantial differences in the way that these two indices measure globalization all results hold (Tables A6-A9).

Alternative Specifications. Then, we test the robustness of our main estimates to several additional modifications of the econometric specifications. We conduct the same robustness tests for both the growth regressions (Table A10) and the inequality regressions (Table A11). 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 remain statistically significant and become 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, 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 1st and the 99th percentile and virtually find the same results.[22] On the other hand, we follow Young (2017) and test the sensitivity of our coefficients of interest to dropping individual countries. Figure A4 plots the coefficients on economic globalization and its square in regressions in which each country is left out once. Figure A5 reports the results of the analogous exercise for the inequality baseline regression. It is visible that point estimates and confidence intervals are not sensitive to the exclusion of any single country. Fifth, in the last column of Tables A10 and A11, 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.

Redistribution Policies. In Appendix 6, we examine differences between inequality before and after redistribution. We find evidence suggesting that national redistribution policies mitigate – but do not fully prevent – the distributional effects of globalization.

[22] This method, named after Charles Winsor, sets all values above and below certain percentiles to these percentiles.

5 Conclusion

Economic globalization – defined as a multidimensional process encompassing the increasing economic importance and legal liberalization of goods and capital flows across borders – leads to substantial income gains for many. These gains, however, are unequally distributed between people around the world.

Across countries, globalization substantially increases incomes in countries at early and medium stages of the economic integration process, but the growth effects from further globalizing diminish with increasing levels of globalization. For the most globalized countries, there is no evidence of a positive growth effect. Within countries, globalization increases inequality. Gains from globalization primarily go to the top ten percent of national income distributions and, on average, do not significantly affect incomes of the poor.

These results suggest that globalization is an important force behind the well-established stylized fact that global inequality is increasingly driven by within-country inequality and to a decreasing extent by between-country inequality. According to our results, globalization promotes 'convergence across countries' through a substantial growth effects on countries in the early stage of the globalization process, and 'divergence within countries' due to a tendency to disproportionally benefit the richest decile.

The finding of positive yet 'diminishing marginal returns to globalization' suggests that the benefits of globalization decrease over the course of the globalization process, while its distributional costs increase. This is consistent with rising skepticism of globalization in highly globalized countries, where, according to our results, income gains from globalization are small while distributional costs are high.

Looking ahead, this analysis provides a very general discussion of globalization's effects on global incomes. While we point to broad trends and the links between them, we emphasize that our results need to be considered in concert with fine-grained analyses on underlying mechanisms, as well as with country-specific and policy-specific evidence. Only such analyses can disentangle the multiple processes underlying the broad effects of economic globalization that we find. Our results are intended to inform such future research and point to important heterogeneities in the effects of globalization on incomes across the globe.

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ONLINE APPENDICES

Appendix 1: List of Countries Included in the Analysis

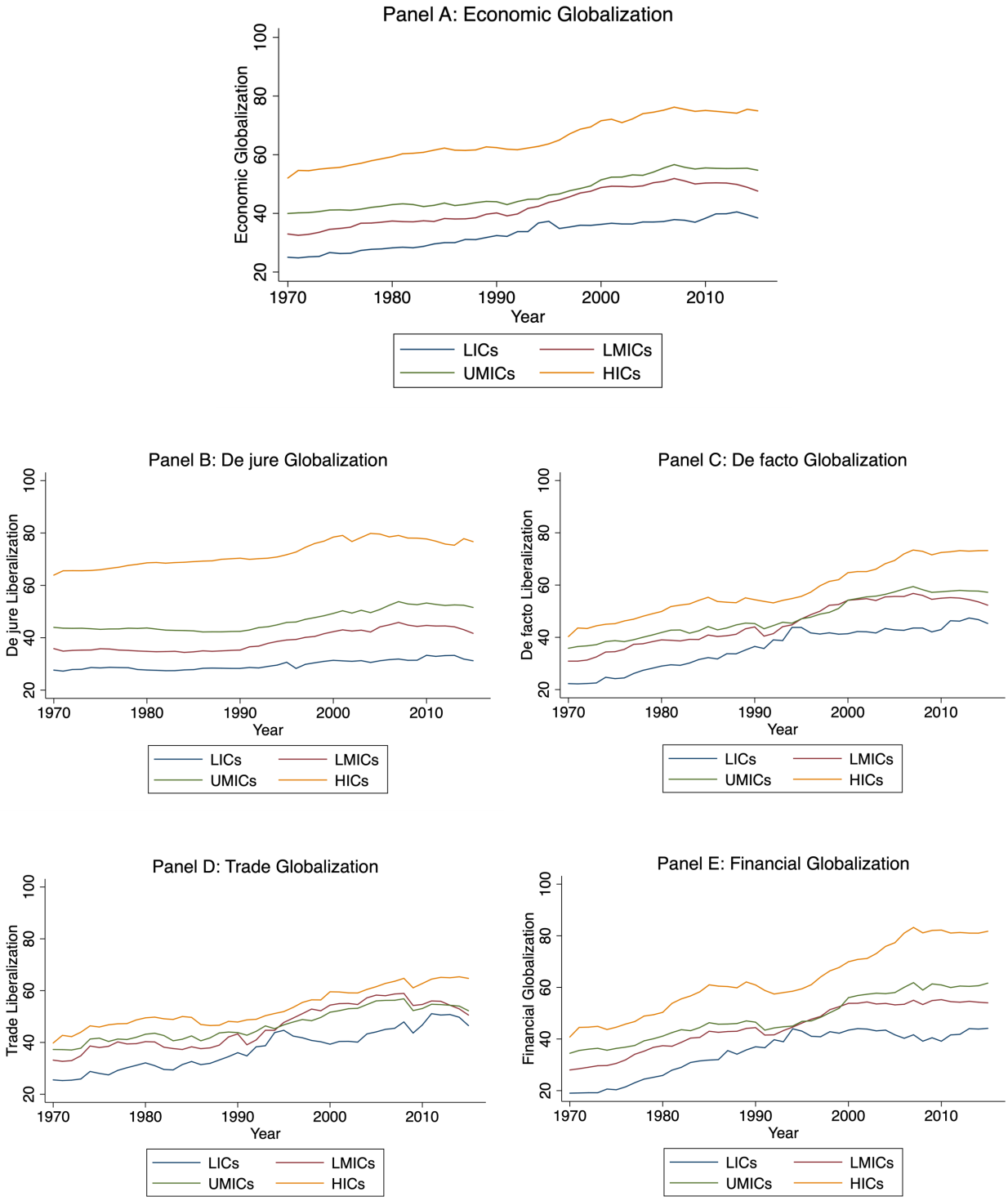
Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belarus, Belgium, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Congo, Dem. Rep., Congo, 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: Trends in Economic Globalization

Figure A1 depicts trends in the unweighted cross-country average of the KOF index of economic globalization and its two sub-indices for the four income groups of the World Bank's classification.

Several stylized facts emerge. First, at all times over the past half century richer countries were more globalized than poorer countries. There appears to be 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. 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 are similar.

Figure A1: Trends in Economic Globalization



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

Appendix 3: Descriptive Statistics and Data Sources

	Mean	S. D.	Min	Max	Source
Economic Globalization	50.65	17.19	12.63	93.15	KOF (2018)
Neighborhood Liberalization	40.81	8.04	23.11	62.93	Own calculations based on Mayer and Zignago (2011) and KOF (2018)
GDP/Capita Growth (WDI)	0.09	0.16	-1.41	1.08	World Bank (2017a)
GDP/Capita (ln, WDI)	8.17	1.57	5.02	11.52	World Bank (2017a)
GDP/Capita Growth (PWT)	0.09	0.16	-1.10	1.00	Feenstra et al. (2015)
GDP/Capita (ln, PWT)	8.83	1.25	5.71	12.10	Feenstra et al. (2015)
Gini (Net Income)	38.20	8.89	18.15	63.90	Solt (2016)
Gini (Market Income)	46.34	7.21	23.00	73.42	Solt (2016)
Gini (ATG & PovcalNet)	39.92	9.37	17.50	69.70	Milanovic (2014) and World Bank (2017b) (combined)
Population Growth	1.77	1.44	-3.77	15.53	World Bank (2017a)
Education	6.55	3.07	0.45	13.18	Barro and Lee (2013)
Democracy (Polity IV)	2.45	6.96	-10.00	10.00	Marshall et al. (2011)
Life Expectancy	65.32	10.82	29.27	83.54	World Bank (2017a)
Investment (% GDP)	23.10	7.35	3.58	58.97	World Bank (2017a)
Debt (% GDP)	78.99	107.06	1.38	1095.70	World Bank (2017a)
Government Expenditure (% GDP)	15.64	6.53	0.00	88.43	World Bank (2017a)
Education Expenditure (% GDP)	4.22	2.27	0.00	36.39	World Bank (2017a) and IMF (2017) (combined)
Mean Income of Decile 1 (ln)	5.78	1.61	2.09	8.98	Lahoti et al. (2016)
Mean Income of Decile 2 (ln)	6.36	1.49	3.26	9.34	Lahoti et al. (2016)
Mean Income of Decile 3 (ln)	6.69	1.43	3.90	9.54	Lahoti et al. (2016)
Mean Income of Decile 4 (ln)	6.95	1.38	4.25	9.68	Lahoti et al. (2016)
Mean Income of Decile 5 (ln)	7.18	1.34	4.55	9.80	Lahoti et al. (2016)
Mean Income of Decile 6 (ln)	7.39	1.30	4.84	9.91	Lahoti et al. (2016)
Mean Income of Decile 7 (ln)	7.61	1.26	5.11	10.09	Lahoti et al. (2016)
Mean Income of Decile 8 (ln)	7.86	1.21	5.41	10.28	Lahoti et al. (2016)

Mean Income of Decile 9 (ln)	8.19	1.15	5.81	10.54	Lahoti et al. (2016)
Mean Income of Decile 10 (ln)	9.10	0.96	6.42	11.50	Lahoti et al. (2016)
Mean Income at 95th Percentile (ln)	8.71	1.07	5.84	11.13	Lahoti et al. (2016)
Mean Income at 99th Percentile (ln)	11.20	1.07	8.32	13.61	Lahoti et al. (2016)
Income Share of Decile 1	1.65	1.01	0.06	4.84	Lahoti et al. (2016)
Income Share of Decile 2	2.73	1.27	0.28	6.19	Lahoti et al. (2016)
Income Share of Decile 3	3.69	1.43	0.65	7.21	Lahoti et al. (2016)
Income Share of Decile 4	4.67	1.52	1.18	8.10	Lahoti et al. (2016)
Income Share of Decile 5	5.76	1.54	1.96	8.95	Lahoti et al. (2016)
Income Share of Decile 6	7.04	1.50	2.95	9.92	Lahoti et al. (2016)
Income Share of Decile 7	8.68	1.39	4.27	11.99	Lahoti et al. (2016)
Income Share of Decile 8	11.03	1.15	6.53	14.71	Lahoti et al. (2016)
Income Share of Decile 9	15.24	0.96	11.35	18.15	Lahoti et al. (2016)
Income Share of Decile 10	39.51	10.65	18.48	69.55	Lahoti et al. (2016)
Income Share of Top 1 Percent	13.90	8.05	2.29	43.75	Lahoti et al. (2016)
Income Share of Top 5 Percent	28.64	10.37	10.21	60.62	Lahoti et al. (2016)

Appendix 4: Additional Results

Table A1 – First-Stage Estimates: Globalization and Growth

	(1)	(2)	(3)	(4)
First stage estimates of specification … , Table 3	**3**	**4**	**6**	**6**
Dependent variable	**Economic globalization $_{t-1}$**	**Economic globalization $_{t-1}$**	**Economic globalization $_{t-1}$**	**Economic globalization $_{t-1}{}^2$**
Neighborhood Liberalization $_{t-2}$	0.9269***	0.9536***	1.3386**	29.7125
	(0.1563)	(0.1556)	(0.5821)	(60.6076)
Neighborhood Liberalization $_{t-2}{}^2$			-0.0038	1.0756*
			(0.0054)	(0.5776)
GDP/capita (ln) $_{t-1}$	3.0319	3.3551*	3.3795	277.4731
	(2.0453)	(1.9703)	(2.1598)	(230.4244)
Population Growth (%) $_{t-1}$		0.0575	0.0976	43.2742
		(0.2392)	(0.2636)	(28.9518)
Education $_{t-1}$		-0.4038	-0.3741	-41.1119
		(0.6239)	(0.6891)	(78.5094)
Democracy $_{t-1}$		0.1597**	0.1575**	7.0521
		(0.0730)	(0.0801)	(7.8094)
Life Expectancy $_{t-1}$		0.1320	0.1255	-1.1092
		(0.1107)	(0.1227)	(13.4350)
Period FE and Country FE	Yes	Yes	Yes	Yes
Observations	786	786	787	787
K-P underidentification (p)	0.000	0.000	0.000	0.000
K-P weak identification (F)	35.166	37.554	7.132	7.132

Note: First-stage estimates corresponding to Table 3.

Table A2 – First-Stage Estimates: Globalization and Inequality

	(1)	(2)	(3)	(4)
First stage estimates of specification … of Table 4	**3**	**4**	**6**	**6**
Dependent variable	**Economic globalization $_{t-1}$**	**Economic globalization $_{t-1}$**	**Economic globalization $_{t-1}$**	**Economic globalization $_{t-1}{}^2$**
Neighborhood Liberalization $_{t-2}$	0.807***	0.827***	1.530**	77.274
	(0.173)	(0.176)	(0.597)	(59.310)
Neighborhood Liberalization $_{t-2}{}^2$			-0.007	0.326
			(0.005)	(0.553)
GDP/capita (ln) $_{t-1}$	7.131	5.047	2.735	-1682.025**
	(6.822)	(6.969)	(7.054)	(766.357)
	-0.070	0.078	0.229	144.060***
	(0.450)	(0.452)	(0.456)	(49.441)
Population Growth (%) $_{t-1}$		-0.248	-0.188	8.332
		(0.408)	(0.404)	(40.859)
Education $_{t-1}$		-0.451	-0.398	-71.193
		(0.632)	(0.633)	(67.964)
Democracy $_{t-1}$		0.086	0.085	5.244
		(0.084)	(0.086)	(7.904)
Life Expectancy $_{t-1}$		0.072	0.059	-1.590
		(0.125)	(0.127)	(12.510)
Period FE and Country FE	Yes	Yes	Yes	Yes
Observations	612	612	612	612
K-P underidentification (p)	0.000	0.000	0.000	0.000
K-P weak identification (F)	21.804	22.152	6.176	6.176

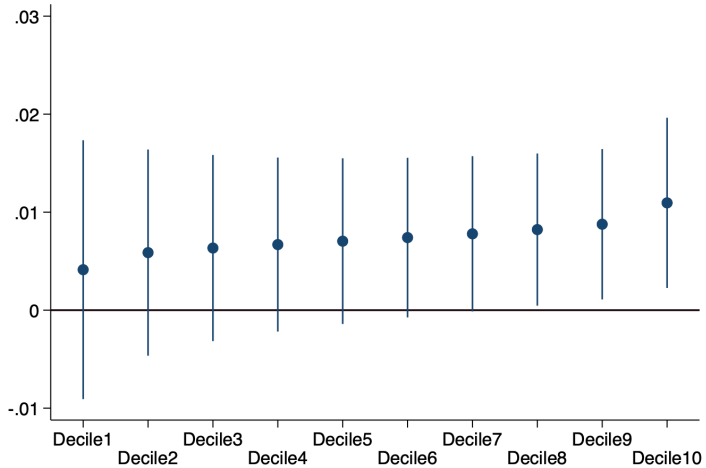
Note: First-stage estimates corresponding to Table 4.

Table A3 – Income Growth by Decile

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variable: Income Growth of Decile:	1	2	3	4	5	6	7	8	9	10	top 5%	top 1%
Economic Globalization	0.004	0.006	0.006	0.007	0.007	0.007	0.008	0.008*	0.009*	0.011**	0.007	0.007
	(0.008)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Observations	657	657	657	657	657	657	657	657	657	657	657	657
First-Stage Estimates												
Neighborhood Liberalization $_{t-2}$	0.823***	0.811***	0.809***	0.810***	0.814***	0.819***	0.824***	0.830***	0.837***	0.844***	0.836***	0.836***
	(0.169)	(0.170)	(0.171)	(0.171)	(0.171)	(0.171)	(0.171)	(0.170)	(0.170)	(0.170)	(0.171)	(0.171)
K-P weak id. test (F)	23.629	22.706	22.444	22.474	22.668	22.962	23.322	23.730	24.177	24.619	23.954	23.953

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.

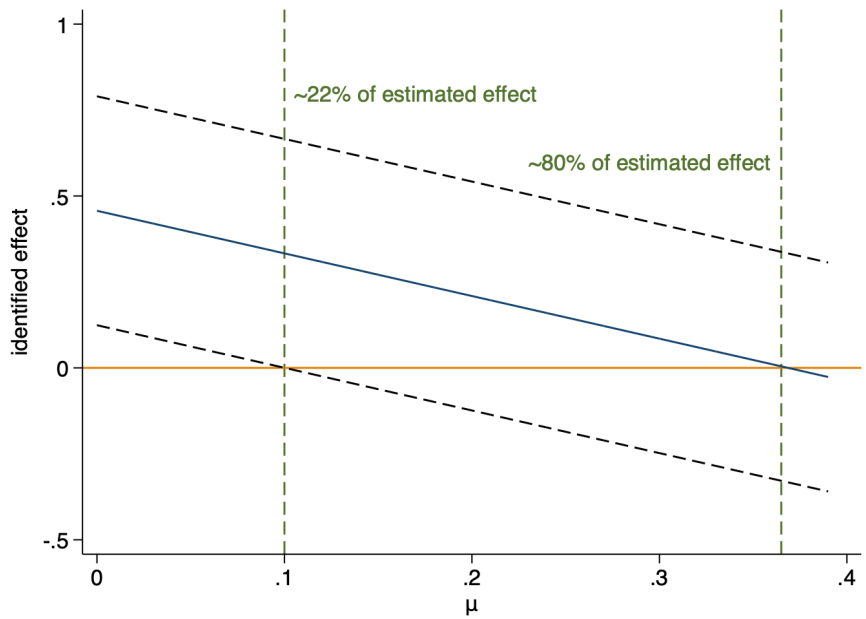
Figure A2 – Income Growth by Decile, Coefficient Plot



Note: point estimates and 90 percent confidence intervals of the coefficients on economic globalization in the regressions of decile-specific income growth, reported in Table A3, columns 1-10

Appendix 5: Robustness Tests

Figure A3: Plausibly Exogenous



Note: The graph is the result of applying the "plausibly exogenous" method proposed by Conley et al. (2012). It visualizes the estimated effect of globalization on the Gini index of market income for various parameter values of μ. The estimates show that the estimated effect remains positive for values of $\mu < 0.36$ and statistically significant at the ten percent level for values of $\mu < 0.10$. This suggests that the direct positive effect of the IV on the Gini index would have be equivalent to 80% of the estimated effect of globalization in order for the true effect to be 0. For details see section 4.5 and Conley et al. (2012).

Table A4: Robustness, GDP Figures from Penn World Tables

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation Method	**OLS**	**OLS**	**IV**	**IV**	**OLS**	**IV**
Economic Globalization	0.0040***	0.0034***	0.0050	0.0049	0.0129***	0.0512***
	(0.0013)	(0.0013)	(0.0038)	(0.0036)	(0.0037)	(0.0124)
Economic Globalization²					-0.0001***	-0.0003***
					(0.0000)	(0.0001)
GDP/capita (ln, PWT)	-0.2485***	-0.2432***	-0.3157***	-0.3171***	-0.2442***	-0.3855***
	(0.0334)	(0.0345)	(0.0458)	(0.0458)	(0.0334)	(0.0524)
Population Growth (%)		-0.0073		-0.0070	-0.0045	0.0058
		(0.0115)		(0.0117)	(0.0117)	(0.0128)
Education		-0.0147		-0.0117	-0.0123	-0.0020
		(0.0108)		(0.0124)	(0.0099)	(0.0148)
Democracy (Polity IV)		0.0008		0.0016	-0.0002	-0.0039
		(0.0014)		(0.0016)	(0.0014)	(0.0025)
Life Expectancy		0.0067***		0.0080***	0.0051**	0.0008
		(0.0022)		(0.0022)	(0.0023)	(0.0034)
Period FE and Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	924	924	817	817	924	817
K-P underid. (p)	0.268	0.286	0.307	0.331	0.301	0.287
K-P weak id. (F)			0.000	0.000		0.000

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 A5: Robustness, Gini Indices from PovcalNet and All the Ginis

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	**OLS**	**IV**	**IV**	**OLS**	**IV**
Economic Globalization	0.129**	0.083	0.342*	0.446**	0.128	-0.228
	(0.054)	(0.053)	(0.191)	(0.226)	(0.178)	(0.391)
Economic Globalization^2					-0.000	0.005
					(0.002)	(0.003)
GDP/capita (ln, WDI)	1.015	0.393	1.153	2.158	-0.668	12.606
	(6.320)	(6.808)	(7.123)	(7.832)	(8.126)	(10.229)
GDP/capita (ln, squared, WDI)	-0.012	0.106	-0.112	-0.195	0.176	-0.777
	(0.375)	(0.433)	(0.439)	(0.527)	(0.499)	(0.650)
Population Growth (%, WDI)		-0.711		-0.271	-0.688	-0.731
		(0.604)		(0.668)	(0.618)	(0.675)
Education		-0.468		-0.506	-0.457	-0.548
		(0.394)		(0.474)	(0.397)	(0.422)
Democracy (Polity IV)		-0.016		-0.043	-0.019	-0.011
		(0.106)		(0.105)	(0.107)	(0.108)
Life Expectancy		0.010		-0.002	0.008	0.025
		(0.156)		(0.148)	(0.158)	(0.152)
Period FE and Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	575	516	540	488	516	488
K-P underidentification test (p)			0.000	0.002		0.000
K-P weak identification test (F)			14.944	10.828		6.206

Note: Dependent variable: Gini indices from PovcalNet and All the Ginis. OLS and 2SLS regressions. Averages of five-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 A6: Robustness, Growth, Old KOF Index

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation Method	**OLS**	**OLS**	**IV**	**IV**	**OLS**	**IV**
Economic Globalization	0.0033***	0.0031***	0.0017	0.0016	0.0101***	0.0495***
	(0.0009)	(0.0009)	(0.0041)	(0.0038)	(0.0025)	(0.0133)
Economic Globalization²					-0.0001***	-0.0003***
					(0.0000)	(0.0001)
GDP/capita (ln)	-0.1958***	-0.1892***	-0.2417***	-0.2361***	-0.1839***	-0.3515***
	(0.0422)	(0.0413)	(0.0615)	(0.0595)	(0.0389)	(0.0666)
Population Growth (%)		-0.0199**		-0.0188**	-0.0151**	0.0005
		(0.0081)		(0.0075)	(0.0075)	(0.0090)
Education		-0.0133		-0.0123	-0.0121	-0.0006
		(0.0092)		(0.0105)	(0.0087)	(0.0150)
Democracy (Polity IV)		0.0010		0.0024*	0.0000	-0.0040
		(0.0013)		(0.0014)	(0.0013)	(0.0029)
Life Expectancy		0.0048***		0.0068***	0.0030*	-0.0040
		(0.0017)		(0.0020)	(0.0017)	(0.0045)
Period FE and Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full
Observations	852	852	767	767	852	767
R^2	0.225	0.249			0.269	
K-P underidentification test (p)			0.000	0.000		0.000
K-P weak identification test (F)			34.462	37.656		14.888

Note: Dependent variable: GDP/capita growth. Averages of five-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 A7: Robustness, Inequality, Old KOF index

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	**OLS**	**IV**	**IV**	**OLS**	**IV**
Economic Globalization	0.175***	0.169***	0.456**	0.440**	0.242	0.064
	(0.048)	(0.045)	(0.188)	(0.178)	(0.165)	(0.551)
Economic Globalization²					-0.001	0.002
					(0.001)	(0.004)
GDP/capita (ln, WDI)	-6.162	-1.899	-4.459	-0.545	-3.972	8.097
	(9.199)	(9.141)	(8.705)	(8.689)	(11.145)	(16.810)
GDP/capita (ln, squared)	0.620	0.365	0.465	0.218	0.499	-0.305
	(0.479)	(0.494)	(0.475)	(0.491)	(0.618)	(1.011)
Population Growth (%)		0.151		0.272	0.178	0.211
		(0.382)		(0.385)	(0.388)	(0.387)
Education		-1.034**		-0.379	-1.046**	-0.373
		(0.435)		(0.390)	(0.437)	(0.381)
Democracy (Polity IV)		-0.167*		-0.143	-0.171*	-0.137
		(0.094)		(0.097)	(0.096)	(0.096)
Life Expectancy		-0.079		-0.074	-0.093	-0.013
		(0.130)		(0.132)	(0.134)	(0.157)
Period FE and Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full
Observations	658	658	608	608	658	608
R^2	0.148	0.179	0.017	0.049	0.180	0.108
K-P underidentification test (p)			0.001	0.002		0.005
K-P weak identification test (F)			24.927	25.442		8.702

Note: Dependent variable: Gini index of net income. Averages of five-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 A8: Robustness, Relative Income Shares, Old KOF index

Dependent Variable: Income Share of Decile:	1	2	3	4	5	6	7	8	9	10	top 5%	top 1%
Economic Globalization	-0.023	-0.021	-0.024	-0.029*	-0.033**	-0.035**	-0.034**	-0.026*	0.001	0.248***	0.236***	0.134*
	(0.015)	(0.014)	(0.015)	(0.016)	(0.016)	(0.015)	(0.015)	(0.014)	(0.019)	(0.091)	(0.091)	(0.078)
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	645	645	645	645	645	645	645	645	645	645	645	645
K-P underid. test (p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K-P weak id. test (F)	32.232	30.118	28.924	28.369	28.303	28.636	29.328	30.392	31.951	34.500	31.676	31.676

Note: 2SLS regressions. Averages of five-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 A9: Robustness, Income Growth by Decile, Old KOF index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variable: Income Growth of Decile:	1	2	3	4	5	6	7	8	9	10	top 5%	top 1%
Economic Globalization	0.003	0.005	0.006	0.007	0.007	0.008	0.008	0.009*	0.009*	0.011**	0.008	0.008
	(0.008)	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	645	645	645	645	645	645	645	645	645	645	645	645
K-P underid. test (p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K-P weak id. test (F)	32.232	30.118	28.924	28.369	28.303	28.636	29.328	30.392	31.951	34.500	31.675	31.676

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 A10: Additional Robustness Tests of Growth Regressions

	no controls		more controls		no lag		winsorized variables		simple distance
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	IV
Economic Globalization (t-1)	0.016***	0.070***	0.012***	0.045***			0.013***	0.052***	0.061***
	(0.003)	(0.017)	(0.004)	(0.013)			(0.003)	(0.011)	(0.015)
Economic Globalization² (t-1)	-0.000***	-0.001***	-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)					0.012***	0.035**			
					(0.003)	(0.014)			
Economic Globalization² (t)					-0.000***	-0.000***			
					(0.000)	(0.000)			
GDP/capita (ln, t-1)			-0.231***	-0.335***	-0.182***	-0.216***	-0.165***	-0.278***	-0.330***
			(0.029)	(0.046)	(0.030)	(0.038)	(0.027)	(0.048)	(0.052)
Population Growth (%, t-1)			-0.009	0.003	-0.003	0.004	-0.007	0.005	0.014
			(0.007)	(0.009)	(0.014)	(0.014)	(0.009)	(0.008)	(0.014)
Education (t-1)			-0.003	-0.000	-0.012	-0.008	-0.012	-0.004	-0.001
			(0.008)	(0.011)	(0.009)	(0.010)	(0.009)	(0.011)	(0.014)
Democracy (Polity IV, t-1)			-0.001	-0.002	0.000	-0.003	-0.000	-0.003	-0.004
			(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)
Life Expectancy (t-1)			0.003	0.002	0.004**	-0.000	0.003*	-0.000	-0.002
			(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)
Investment (% GDP, t-1)			0.000	-0.003*					
			(0.001)	(0.002)					
Debt (% GDP, t-1)			-0.000*	-0.000					
			(0.000)	(0.000)					
Government Exp. (% GDP, t-1)			-0.002	-0.004*					
			(0.002)	(0.002)					
Observations	1015	915	813	737	875	874	873	787	787
K-P underid. (p)		0.000		0.000		0.003		0.000	0.000
K-P weak id. (F)		7.981		6.806		3.823		8.878	3.766

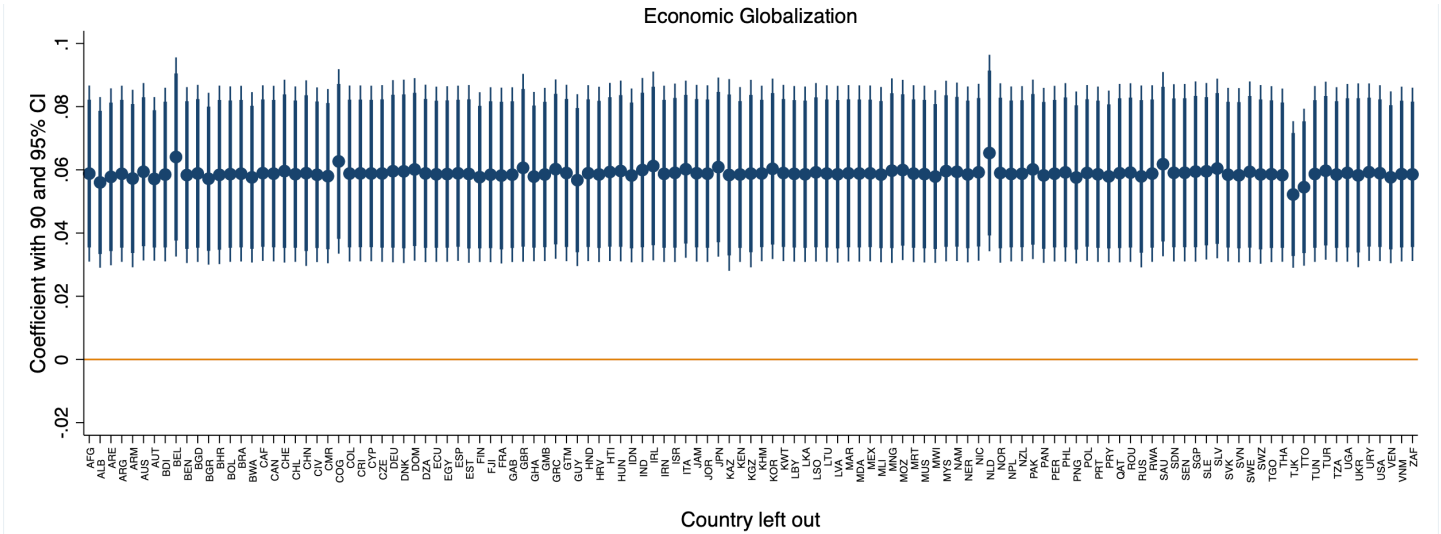
Note: Dependent variable: GDP/capita growth. Averages of five-year periods. OLS and 2SLS fixed effects regressions, standard errors clustered at the country-level in parentheses, significance levels: * p<.10, ** p<.05, *** p<.01.

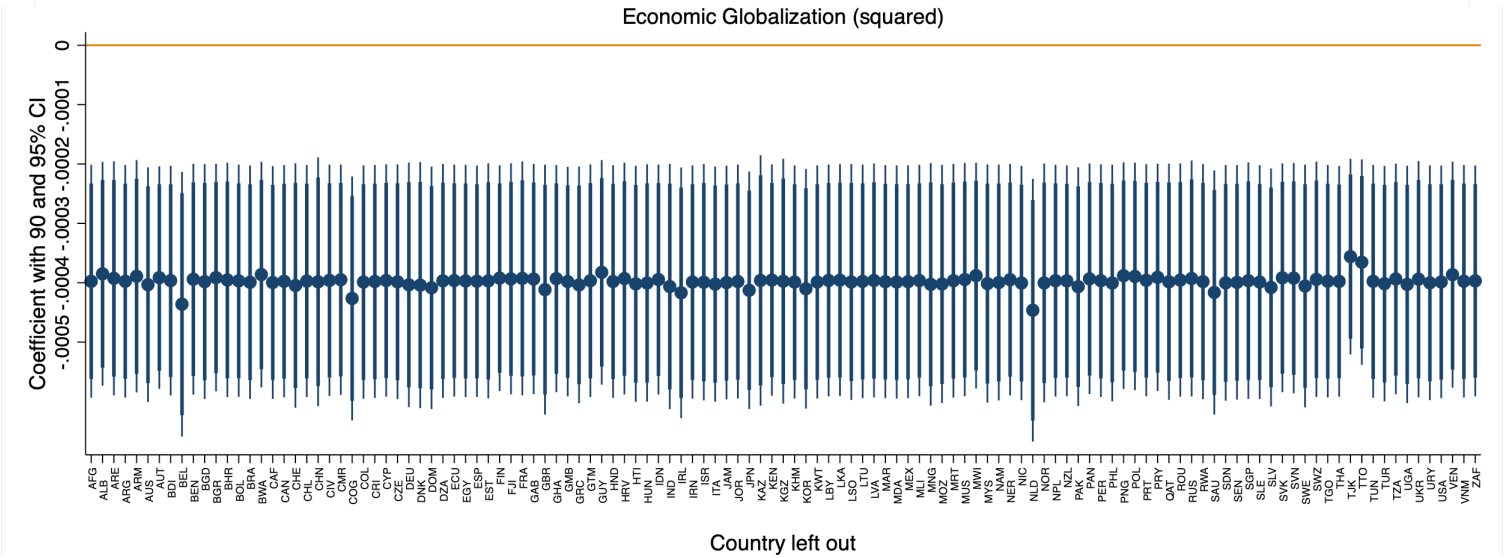
Table A11: Additional Robustness Tests of Inequality Regressions

	no controls		more controls		no lag		winsorized variables		simple distance
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	IV
Economic Globalization (t-1)	0.181***	0.255**	0.155***	0.367**			0.139***	0.398**	0.446**
	(0.053)	(0.102)	(0.049)	(0.157)			(0.048)	(0.173)	(0.204)
Economic Globalization (t)					0.184***	0.618***			
					(0.053)	(0.237)			
GDP/capita (ln, t-1)			-1.661	6.283	-0.898	1.474	-0.971	4.042	4.462
			(8.245)	(8.301)	(8.747)	(9.164)	(9.013)	(8.325)	(8.451)
GDP/capita (ln, squared, t-1)			0.297	-0.227	0.286	-0.043	0.303	-0.096	-0.137
			(0.462)	(0.485)	(0.484)	(0.558)	(0.492)	(0.491)	(0.505)
Population Growth (%, t-1)			0.273	0.482	0.221	0.441	0.149	0.372	0.406
			(0.375)	(0.378)	(0.406)	(0.429)	(0.375)	(0.376)	(0.386)
Education (t-1)			-1.124***	-0.558	-1.105**	-0.963**	-1.171***	-0.581	-0.536
			(0.419)	(0.375)	(0.438)	(0.430)	(0.444)	(0.390)	(0.393)
Democracy (Polity IV, t-1)			-0.194**	-0.203**	-0.183*	-0.208**	-0.181**	-0.171*	-0.168*
			(0.096)	(0.093)	(0.094)	(0.097)	(0.091)	(0.090)	(0.093)
Life Expectancy (t-1)			-0.001	-0.008	-0.108	-0.220	-0.077	-0.058	-0.064
			(0.128)	(0.122)	(0.130)	(0.144)	(0.128)	(0.126)	(0.129)
Investment (% GDP)			-0.044	-0.060					
			(0.069)	(0.070)					
Debt (% GDP)			0.418	0.487					
			(0.432)	(0.525)					
Government Exp. (% GDP)			0.122	0.080					
			(0.095)	(0.095)					
Observations	790	733	645	602	664	663	663	612	612
K-P underid. (p)		0.000		0.000		0.001		0.000	0.000
K-P weak id. (F)		32.516		17.356		11.714		22.723	14.475

Note: Dependent variable: Gini index of net income. Averages of five-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

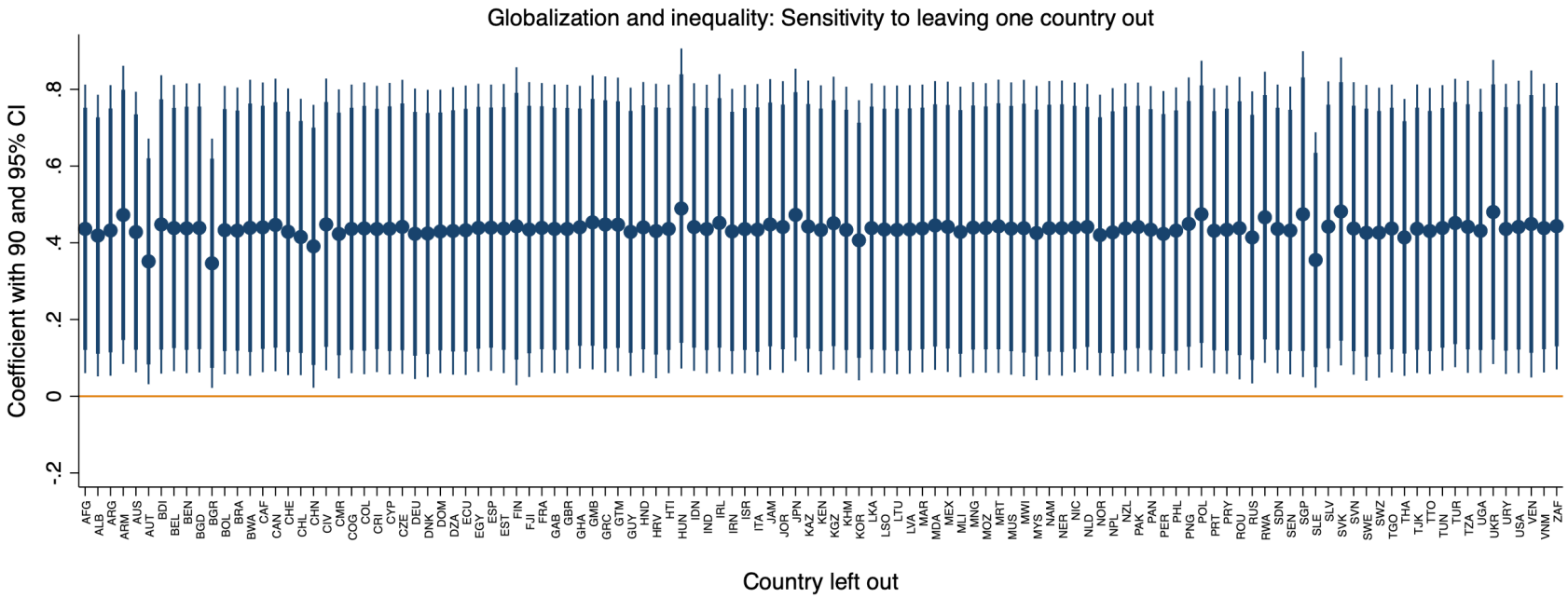
Figure A4: Globalization and Growth: Sensitivity of Coefficients (Jackknife Test)





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 A5: 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

Appendix 6: Suggestive Evidence on the Role of Redistribution

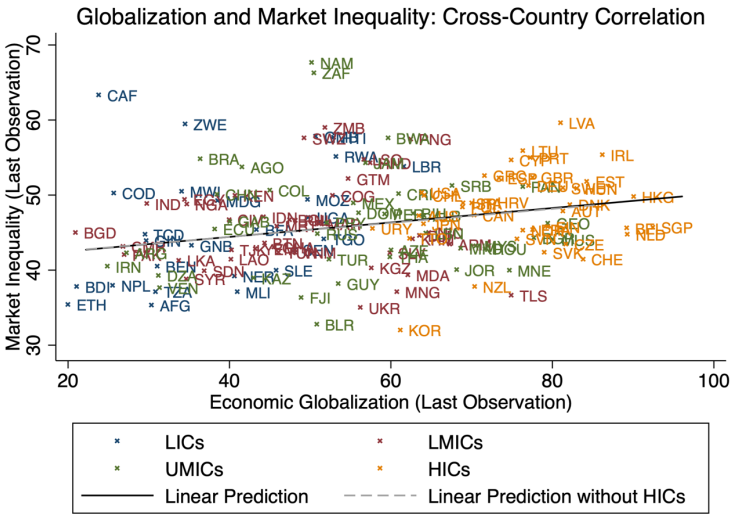
As our results suggests that economic globalization increases both average incomes and income inequality, it stands to reason that governments may want to combine the process of globalization with policies that spread the gains from globalization across society. In general, governments can affect the distribution of gains from globalization via two main channels: they can implement policies that alter the distribution of market income or they can redistribute market income by means of taxes and transfers. In this appendix we provide some suggestive evidence on the effectiveness of redistributive policies for mitigating the distributional effects of globalization.

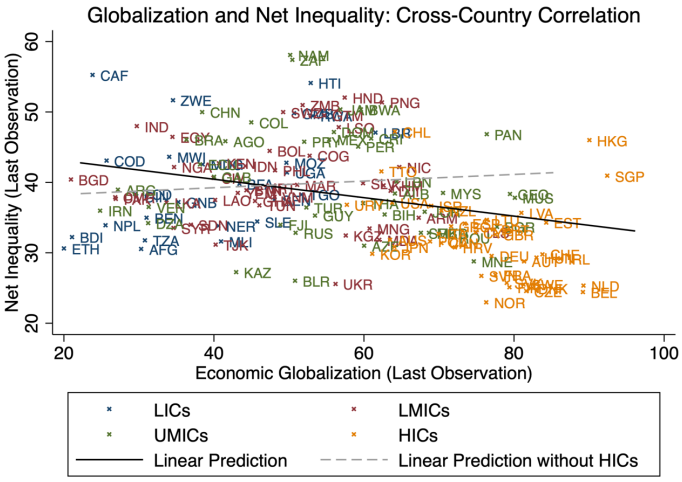
Initially, the top panel of Figure A6 again presents the graph presented above showing that today's more globalized countries are more unequal in terms of market income before taxes and transfers. This stands in an interesting contrast to the pattern that is visible in the middle panel: In countries with high levels of economic globalization *net* income is distributed more equally. Highly globalized countries appear to mitigate globalization's inequality-increasing effects. The bottom panel makes this more explicit. It visualizes the relationship between current levels of globalization and redistribution and shows that more globalized economies tend to redistribute more.[23] This is a prominent finding in 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).[24] What the figure illustrates very clearly, however, is that this association in the cross-section is almost exclusively driven by (European) high-income countries. The extent of redistribution in these countries, which have highly developed welfare states, is an order of magnitude larger than in all other countries. Once high-income countries are excluded, the association is substantially weaker (see the dashed lines).

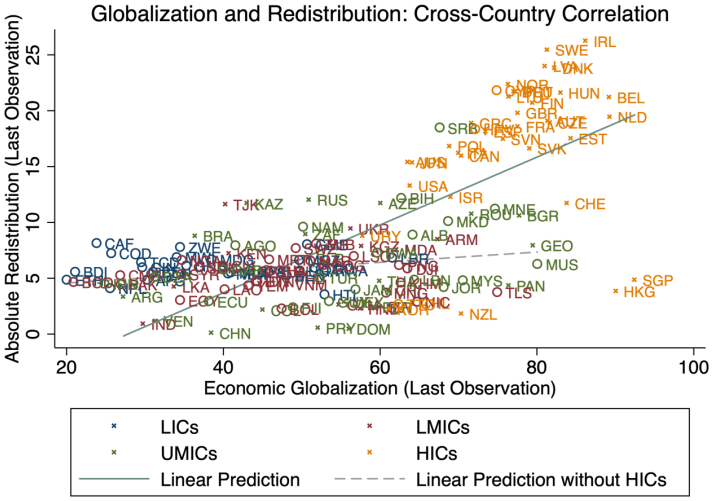
[23] Note that for the observations plotted as circles (rather than crosses) the data on the extent of redistribution is less reliable. Here the difference between market and net Ginis rather than the SWIID's measure of "absolute redistribution" is plotted. See Solt (2016: 1274-5) for details. While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

[24] 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.

Figure A6: Globalization and Redistribution







While these descriptive statistics suggest that redistribution is able to counteract some of the adverse distributional effects of globalization, our regression results show that the extent of redistribution is too small to offset the entire rise in inequality caused by globalization. In Table A10 we repeat the baseline inequality regressions but use the Gini index of *net income* – i.e., income after taxes and transfers – as the outcome variable (columns 1-2). Globalization's effect on the inequality of *net incomes* is slightly smaller than on inequality of *market incomes* (repeated in columns 3-4), but these differences are not statistically significant. Hence, while taxes and transfers counter some of the inequality-increasing effect of globalization (see Figure A6), such redistributive policies – at least in their current shape – do not offset the entire rise in inequality resulting from economic globalization.

Table A12: Net Inequality vs. Market Inequality

	(1)	(2)	(3)	(4)
Outcome Variable	Net inequality	Net inequality	Market inequality	Market inequality
	OLS	IV	OLS	IV
Economic Globalization	0.113***	0.327**	0.127**	0.436**
	(0.038)	(0.141)	(0.049)	(0.192)
Period and Country FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	618	618	618	618
K-P underidentification (p-value)		0.000		0.000
K-P weak identification (F-statistic)		22.152		22.152

Note: Dependent Variable: Gini index of market income. Averages of five-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