# Can Social Spending Cushion the Inequality Effect of Globalization?

## Andreas Bergh, Irina Mirkina and Therese Nilsson

# Can social spending cushion the inequality effect of globalization?

ANDREAS BERGH
*Department of Economics, Lund University, and Research Institute of Industrial Economics, Sweden*

IRINA MIRKINA
*Department of Economics, Lund University, Sweden*

THERESE NILSSON
*Department of Economics, Lund University, and Research Institute of Industrial Economics, Sweden*

**Abstract.** This paper examines whether social spending cushions the effect of globalization on within-country inequality. Using information on disposable and market income inequality and data on overall social spending, and health and education spending from the ILO and the World Bank/WHO, we analyze whether social spending moderates the association between economic globalization and inequality. The results confirm that economic globalization — especially economic flows — associates with higher income inequality, an effect driven by non-OECD countries. Health spending is strongly associated with lower inequality, but we find no robust evidence that any kind of social spending negatively moderates the association between economic globalization and inequality.

**Keywords.** Globalization; Social spending; Income inequality

## 1. Introduction

The idea that public social spending can help countries to enjoy the benefits of economic globalization without large increases in within-country income inequality is popular among policymakers (e.g., Urata and Narjoko 2017) and often alluded to also by social scientists (e.g. Dorn et al. 2017, Gozgor and Ranjan 2017). Yet, the empirical evidence that the welfare state acts as a cushion against globalization-induced inequality is both scant and somewhat dated. To increase our knowledge about what we shall call the cushioning hypothesis, we contribute by using new data that allow for a larger sample of countries to be studied compared to previous research (our sample contains 140 countries observed over up to 40 years) to study three different types of social spending (overall social spending, education, and public health spending). We also contribute to the literature by using comparable Gini coefficients for both market and disposable income inequality and by examining economic flows and economic trade rules separately. To minimize the influence of unobserved country level heterogeneity, our baseline model uses panel data with both country and time fixed effects. Simply put, we ask whether higher social spending implies a weaker association between economic globalization and income inequality. We rely on the social spending data from the International Labour Organization (ILO) and the World Bank, economic globalization data from the KOF globalization index (Dreher 2006) and comparable Gini coefficients from the Standardized World Income Database (Solt 2009, 2016) for both disposable income and market income.

While increasing globalization is a trend associated with several desirable consequences (see Potrafke 2015 for a survey), concerns have been voiced related in particular to the distributional aspects of economic globalization. Finding policy instruments that can mitigate the inequality effect of economic globalization is therefore of paramount importance. Many studies have examined the association between economic globalization and within-country income distribution (see Marsh 2016 for a survey), but the results are mixed. Recent findings in Dorn

et al. (2017) suggest that the positive association between economic globalization and inequality found in many studies is driven by China and a number of transition countries in Central and Eastern Europe. In line with the cushioning hypothesis, the authors speculate that welfare state institutions provide income insurance and education—a "cushion"—that may moderate the effects of globalization on income inequality in the developed countries.

In general, our results do not support the cushioning hypothesis. If anything, we find that the positive association between economic globalization and inequality is stronger in OECD countries that spend more on education. For education expenditure in non-OECD countries we do find some signs of a cushioning effect. For other types of spending, our results suggest that social spending does not moderate the association between (market or net) inequality and economic globalization. The results hold also when using a random effects model instead of a fixed effect model and when using GMM to account for potential endogeneity

The paper proceeds as follows. Section two presents and discusses related literature, section three presents our theoretical framework and derives testable hypotheses, and section four presents our empirical strategy, data and results. Finally, section five concludes the paper with a discussion of our results and their implications for the debates on fiscal policy and inequality in a globalized economy.

## 2. Related literature

The literature on the effect of economic globalization on country level inequality is large, and so is the literature on the distributional effect of social spending. Surveying the causes of country-level inequality, Marsh (2017) notes that the most common findings are that globalization increases inequality and also that inequality varies independently of globalization. There is also plenty of evidence on the equalizing effect of social spending (e.g., Moller et al. 2003; Huber et al. 2006; Bergh and Bjørnskov, 2014). It is likely, however, that some types of social spending affect economies in a way that increases the inequality on market income while at the same time lowering the inequality on disposable income, as discussed in Uusitalo (1985) and Bergh (2005a).

For developed countries, Roser and Cuaresma (2016) find that import from developing countries (as well as other indicators of trade openness) is a robust predictor of inequality, whereas taxes and public expenditure are associated negatively with inequality. They also note, however, that since the 1980s, within-country inequality has increased in almost all countries, most of all in the post-Soviet countries.

To our knowledge, however, the potentially moderating effect of social spending on the globalization-inequality association has been analyzed only once—in Rudra (2004) using a relatively small sample of 35 developing and 11 OECD countries. Rudra's empirical analysis suggests that only education spending may have a cushioning effect, and only in developing countries. In a somewhat similar paper, Lee et al. (2007) find that the total government size negatively moderates the relationship between foreign direct investment and inequality. Their empirical model uses random effects, and inequality is measured using 12 different types of Gini coefficients from the World Income Inequality Database V2.0a.

In both Rudra (2004) and Lee et al. (2007), the use of non-comparable Gini coefficients is a potential problem, well-known in the literature on inequality and redistribution. Many researchers consider the Luxembourg Income Study (LIS) to be the best source of inequality data (since it is based on micro-data from national household surveys), but even in 2019 the LIS sample covers only 50 countries, and for some of them the surveys are available only for one year. To maximize sample size, many scholars have used the data from Deininger and Squire (1996) and the later versions thereof. However, the broad country coverage in the Deininger and Squire data is deceiving: It contains Gini coefficients of several different types that are not directly comparable.

Lee et al. (2007) try to deal with the problem of incomparable Gini-coefficients by including dummy variables for each of the 12 types of Gini coefficients in the regressions. While that approach is sometimes used, such an adjustment procedure is too crude. For example, the difference between the pre- and post-tax income Gini coefficients will vary both between and within countries over time due to the differences in the structure of taxes and transfers (see further Solt 2015 and Bergh 2005a). Since different types of Gini coefficients react differently to changes in the economic structure, merely including dummy variables for different types of Gini coefficients is insufficient for full comparability.

This problem is even more severe in Rudra (2004), because different types of Gini-coefficients are treated in the paper as if they were comparable. Comparing the values reported in Rudra's Table 1 to the Deininger and Squire (1996) database reveals, for example, that the Gini data used refer to the net income at the household level in Sweden, the gross income at the household level in Brazil, and to the gross income at the individual level in China. According to the same table, inequality in Sweden was at its lowest level in 1975 (at 27.3), but at its highest level just a year later, in 1976 (at 33.1). In reality, the explanation for such a dramatic jump is not a suddenly worsening inequality, but the fact that the 1975 value comes from the LIS database

(which does not include capital income), whereas the 1976 value is taken from Statistics Sweden and includes capital income.[1]

Finally, Ha (2012) examined 59 developing countries from 1975 to 2005 and noted a positive association between trade and investment flows and inequality. The paper also argues that the association is negatively moderated by leftist government ideology. While the results are intriguing, the confidence intervals reported by Ha (2012) for the marginal effects of trade on income inequality are large and thus the moderating effect is estimated relatively imprecisely.[2]

In summary, a few previous studies present some evidence in line with the cushioning hypothesis (i.e., that social spending negatively moderates the association between economic globalization and within-country income inequality), but they generally suffer from small samples and data-related problems calling for more research on the topic.

## 3. Theoretical considerations and hypotheses

To derive hypotheses about the cushioning effect, we first clarify the different ways in which economic globalization can affect the income distribution, and how social spending can potentially moderate that association. In line with the discussion above, we must think carefully about the inequality measure used: Will the cushioning effect appear in the income distribution before taxes and transfers, the income distribution after taxes and transfers, or in both?

In short, our theoretical framework assumes that economic globalization can increase income inequality by creating winners and losers and by making incomes more volatile. Social spending

---

[1] Discrepancies like these are quite common when the Deininger and Squire (1996) data are used. Scully (2002), for example, directs the same critique towards Berggren (1999).

[2] See Hainmueller et al. (2019) on how the linear interaction models are often misinterpreted when there is insufficient common support in the data to reliably compute the conditional marginal effects.

can moderate the effect by facilitating income smoothing (also known as intra–individual redistribution), by generating vertical income redistribution from winners to losers (also known as inter–individual redistribution), and by affecting human capital so that workers become less vulnerable to the structural economic changes associated with economic globalization. We describe these mechanisms in more detail below.

A natural starting point for understanding how economic globalization can lead to inequality is to look at how openness changes the domestic economy in ways that create winners and losers (Schulze and Ursprung 1999; Kapstein 2000; Ursprung 2008; Teney et al. 2014). Standard trade theories, such as the Stolper-Samuelson theorem, suggest that an increase in the price of labor-intensive goods will lead to an increase in wages. Consequently, economic globalization may lead to lower income inequality in developing countries where production is typically labor-intensive (and thus capital scarce). In developed countries, on the other hand, economic globalization should work towards increasing the returns to capital and to high-skilled labour.

Wood (1997) and Kaplinski (2000), among others, argue that there are cases where the standard Stolper-Samuelson theory seems to fit well what has happened in developing countries, but there are also many cases where it does not. One explanation is that globalization gives rise to global value chains with vertical integration, making the competitive model less appropriate. As discussed in Wood (2001), involvement in global value chains can lead to the upgrading of firms in developing countries to higher productivity, but the gains achieved will not necessarily be concentrated on the poorest (see Timmer et al. 2014 for an analysis of how global value chains have changed over time). In short, there is ample evidence that economic globalization creates winners and losers, but the patterns generated in that process need not to follow a simple Stolper-Samuelson-based logic.

A different way in which economic globalization might affect the income distribution is by making incomes more uncertain and volatile. The idea that exposing domestic economies to the turbulences in the world economy increases their volatility is often attributed to Rodrik (1998), who has also suggested that such volatility can explain why open economies have larger public sectors. The general idea, however, predates Rodrik, since similar patterns have been previously discussed in the literature on embedded liberalism (cf. Ruggie 1982; Katzenstein 1985), and also by Cameron (1978) and Lindbeck (1975).

It bears noting, however, that the volatility link from economic globalization to income inequality has been questioned both theoretically and empirically. Kim (2007) and Down (2007) point out that the standard economic theory suggests that economic openness and international trade should generate risk diversification (promoting rather than reducing stability). Kim (2007) presents empirical results supporting that view. As an alternative hypothesis, Iversen and Cusack (2000) suggest that volatility and the resulting demands for social insurance are driven largely by de-industrialization and thus are unrelated to globalization.

Social spending can theoretically dampen both types of inequality effects, but the extent to which it does so depends on its design in three dimensions: The degree of vertical (or inter-individual) redistribution, the degree of income smoothing (intra–individual redistribution), and the ways in which social spending affects human capital.

If globalization creates winners and losers, and winners tend to be high-income earners while losers tend to be low-income earners, social spending that produces inter-individual (vertical) redistribution would negatively moderate the association between globalization and inequality. The effect should be stronger for the net income distribution because it would partly operate via transfers to the losers of globalization.

Income smoothing, or intra-individual redistribution, assists individuals in smoothing their income over time to overcome both short-run fluctuations due to, for example, illness or unemployment, and the life time changes via, for example, public pensions.[3] If globalization causes inequality mainly by increasing income volatility, welfare states with extensive intra-individual redistribution schemes will do a good job dampening the effect on inequality, and the effect will again be stronger for disposable income because of transfers.

Finally, public education and health spending include elements of both income smoothing and vertical income redistribution. Additionally, they likely affect the distribution and also the quality of human capital of the population. Education spending is of particular interest, because the benefits of economic openness are often said to be skill biased (as suggested by, e.g., Stijepic 2017). The importance of education is highlighted also by Milanovic (2002), who argues that openness benefits those with basic and high education but reduces the income share of those with no education. Education spending may thus dampen the inequality effect of globalization, and this effect should be stronger for market income inequality than for disposable income inequality (because of taxes and transfers). It must be stressed that a cushioning effect of education spending requires the distributional profile of such spending being sufficiently pro-poor—otherwise education spending might help high-income earners to benefit from globalization as much or even more than it helps low-income earners to do so.

The theoretical framework outlined above is summarized in Table 1.

Table 1. When should we expect the welfare state to cushion the effect of economic globalization on domestic income inequality?

| | Potentially moderating mechanism of social spending: | | |
| --- | --- | --- | --- |
| | *Income smoothing* | *Vertical redistribution* | *Human capital* |

[3] An early discussion of the distinction between inter and intra-individual redistribution in welfare states appears in Uusitalo (1985). See also Barr (1998) and Bergh (2005b).

| Channel from economic globalization to domestic inequality | *Volatility* (Rodrik 1998) | Cushioning effect that is stronger for disposable income inequality than for market income inequality | Weak or no cushioning effect | Cushioning effect that is stronger for market income inequality than for disposable income inequality |
|---|---|---|---|---|
| | *Winners and losers* (Stolper-Samuelsson theorem) | Weak or no cushioning effect | Cushioning effect that is stronger for disposable income than for market income | |

Note: A cushioning effect exists if social spending negatively moderates the association between economic globalization and inequality

It is clear that the theoretical framework does not unambiguously suggest that a cushioning effect should exist. Several possibilities are summarized in Table 1. On the one hand, a cushioning effect should exist if globalization generates inequality mainly by creating winners and losers and the distributional profile of social spending dampens that inequality effect. On the other hand, social expenditure that mainly generates intra-individual redistribution should have a weaker cushioning effect if globalization generates inequality by creating winners and losers with low to no increases in volatility. Similarly, if volatility is the main channel by which globalization generate inequality, intra-individual redistribution should be the best way to cushion the inequality effect, but in that case, expenditures that mainly redistribute from high-income earners to low-income earners would generate a cushioning effect. Welfare states typically have social spending that generates both inter- and intra-individual redistribution, with a mix that varies across countries (Baldini 2001).

Moreover, while public spending on health and education might be relatively more important for those who could not afford such services otherwise, some authors have argued that social spending in democracies tends to be biased towards the middle class (Goodin and Le Grand 1987). If the losers from globalization are in the middle class of developed countries (as suggested by Milanovic 2016, but partly disputed by Ravallion 2018), that speaks in favour of a cushioning effect. The existence of a cushioning effect must thus be settled empirically.

Based on the described framework and previous research, we develop the following hypotheses to test:

*H1: Economic globalization is positively associated with (disposable and market) income inequality within countries.*

*H2: Social spending is negatively associated with disposable income inequality, and positively associated with market income inequality.*

*H3 (The cushioning effect): Social spending negatively moderates the association between economic globalization and (disposable or market) income inequality.*

*H3a (Cushioning health and education spending): Health and education spending is associated with a cushioning effect that is stronger for market income inequality than for disposable income inequality.*

Finally, it should be acknowledged that the cushioning effect of social spending could only be identified if there is sufficient exogenous variation in globalization and social spending within and between countries. If higher globalization reflects a relatively high political strength of winners from globalization, who have no incentive to compensate the losers, no cushioning effect would be detected even if there are measures that would have worked had they been implemented. Similarly, expected losers from globalization could prevent openness, reducing the need to redistribute. In these cases, failing to find support for the cushioning effect does not rule out the theoretical possibility that some policy measures if implemented would be associated with cushioning effects.

There are two distinguished theories that suggest that social spending depends on globalization, rather than moderates the effect of globalization. While finding exogenous instruments for both

social spending and globalization is beyond the scope of this paper, we will discuss the nature of potential endogeneity bias in light of these theories. The compensation hypothesis (Cameron 1978, Katzenstein 1985, Rodrik 1998) suggests that openness will tend to increase the size of the welfare state when globalization leads to voters demanding more insurance and redistribution. If globalization causes both income inequality and larger social spending, our results will be biased against finding a cushioning effect.

In contrast, the efficiency hypothesis (also known as the disciplining hypothesis or the race to the bottom hypothesis) suggests that economic globalization will force countries to lower taxes and benefits to attract capital and avoid attracting bas risks in the welfare system (Schulze and Ursprung 1999; Sinn 1997, 2004). In this situation, our results will be biased because globalization causes both income inequality and lower social spending.

Empirical evidence suggests that neither of these opposing effects is very strong, leaving a substantial variation in social spending that is not explained by globalization but rather chosen by native governments. Studies by Dreher, Sturm and Ursprung (2008), Meinhard and Potrafke (2012), and Potrafke (2015) all suggest that globalization is not associated with a lower tax revenue and possibly correlates positively with government expenditure as a share of GDP. The positive association between globalization and government size is however not robust and seems to depend on a version of the Penn World Tables used in the analysis, as shown by Jetter and Parmeter (2015). The strength of the link from globalization to social spending also depends on the degree of democratic responsiveness, as discussed by Gozgor and Ranjan (2017). A detailed study of developed welfare states by Brady et al. (2005) concludes that the globalization effects are far smaller than the effects of domestic political and economic factors and that globalization does not clearly cause welfare state expansion, reduction, or convergence. Similarly, the cross-country study by Mahler (2004) finds no or only weak relationships

between globalization and redistribution but reasonably strong positive relationships between domestic political variables and state redistribution.

In summary, the findings regarding the compensation hypothesis and the efficiency hypothesis described above suggest that the endogeneity bias is likely to be small. Still, we will verify that our results are robust to different estimation approaches, including both country and time fixed effects, as well as random effects and generalized method of moments (GMM), all described further below. Another thing to note is that the endogeneity as described above applies mainly to trade policies, whereas the problem should be less severe for trade flows. In that case, the coefficient on the interaction between social spending and economic flows will be less biased by endogeneity than the coefficient on the interaction between social spending and economic policies.

## 4. Data and empirical strategy

### *Income inequality*

To avoid problems due to incomparable Gini coefficients, we rely on the Standardized World Income Inequality Database (SWIID), created by Solt (2009) to improve data availability and comparability by converting available Gini coefficients of different types into the LIS standard, i.e. household adult equivalent income based on the square root equivalence scale (for further details, see Solt 2016). The conversion in the SWIID exploits the fact that different types of Gini coefficients exhibit systematic relationships, and rely on information from the same country and proximate years to increase the number of comparable observations. Importantly, the SWIID provides both market income and disposable income Gini coefficients. Although the SWIID is not without its flaws (for a discussion, see Jenkins 2015; Solt 2015), but for our purposes, it represents a reasonable compromise between accuracy and country coverage.

Figure 1 illustrates the distribution of market income and disposable income Gini coefficients. The difference between the two is relatively small in non-OECD countries, but much larger in OECD countries, which often have extensive redistribution systems.

Figure 1. Distribution of disposable and market income inequality (Gini coefficients) in OECD and non-OECD countries
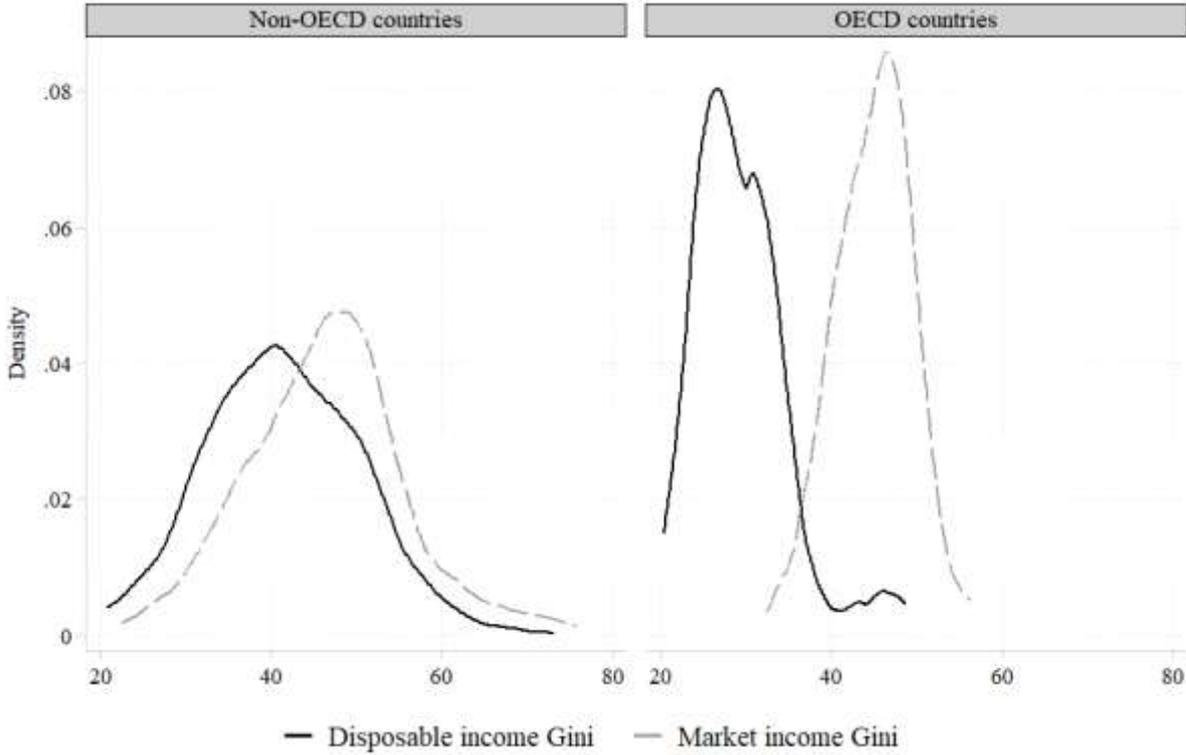


*Social spending*

Our baseline specification relies on the ILO Social Expenditure Database (International Labour Organization 2014), which includes aggregate and disaggregated data on *public social spending*. We follow the standard approach of including social expenditure as a share of GDP. The ILO classifies social spending as public when central government controls the financial flows, noting that the expenses of the lower levels of government (particularly, in federal states)

for this reason may be underestimated. Total annual public social spending is the sum of expenditure (including benefit expenditure and administration costs) of all existing public social security schemes in the country.[4] If this type of spending has a cushioning effect, it should show up mainly in the disposable income Gini coefficient.

We also use the World Bank World Development Indicators Database (WDI), which includes information on total public expenditure on education and health. *Education spending* includes all levels of government (central, regional, and local) spending on all levels of education. Public spending on education can result in a cushioning effect by generating inter-individual redistribution that benefits the losers from globalization, for example if it leads to shorter durations of unemployment.

Finally, we use *public health spending* collected from the WDI database (based on the information from the World Health Organization Global Health Expenditure database), which consists of total spending from central and local government budgets, as well as social health insurance funds (also calculated as a share of GDP). Public health spending will have a cushioning effect if the downsides of economic globalization include deteriorating health among at least some parts of the population which are mitigated by public health spending.

Theoretical expectations outlined above predict that the cushioning effect of social spending should affect disposable income inequality, whereas the effect of education and health spending, if any, should appear in the market income distribution.

---

[4] The scope of the indicators corresponds to the scope of the Social Security Minimum Standards Convention 1952 No.102 which established nine classes of benefits: medical care, sickness benefit, unemployment benefit, old-age benefit, employment injury benefit, family benefit, maternity benefit, invalidity benefit and survivors' benefit, plus other income support and assistance programmes, including conditional cash transfers, available to the poor and not included under the above classes (International Labour Organization 2014).

*Economic globalization*

The term globalization refers to the process by which different economies and societies become more closely integrated. We focus on economic globalization and rely on the KOF index (Dreher 2006, Dreher, Gaston and Martens 2008) for comparable country-level data that separate economic globalization into *economic policies* (trade barriers, tariffs, quotas, and investment regulations) and *economic flows* (reflecting imports, exports, foreign portfolio investment, and foreign direct investment). Empirically we test the relationship of interest using the economic globalization index and its two components—economic policies and economic flows—separately. To achieve meaningful comparisons with the coefficients of other variables, we rescale all three economic globalization indices to a scale ranging from 0 to 1 (from the original 0–100 scale).

The distinction between economic flows and economic policies is important in this line of research. Rodriguez and Rodrik (1999) noted that the link between openness measured using flow variables and growth (established in earlier papers, such as Sachs and Warner 1995) was not robust when flow variables were replaced by indicators of trade policies, such as the mean tariff rates. If growth is affected by economic flows rather than by economic policies, it should be reasonable to expect the same to apply to the income distribution. The KOF index allows us to distinguish flows and policies for testing this hypothesis.

*Control variables*

Our baseline specification controls for development and demography by including the log of *GDP per capita* (PPP adjusted, in constant USD) and the *age dependency ratio*, measured as a ratio of people younger than 15 or older than 64 to the population in working age*,* both taken from the WDI database (World Bank 2016). We also include the percentage of adult population

(age > 25) with completed *secondary education* (Barro and Lee 2013). A higher share of educated adults is expected to correlate with higher inequality in poor countries and with lower inequality in rich countries (Bergh and Fink 2008).

Table A1 in the appendix shows descriptive statistics for all variables.

### 4.1 Econometric specification

We study the period 1970-2010 with data divided into eight five-year intervals. The baseline specification uses the ordinary least squares estimator to fit the following model that includes country and time fixed effects:

$$Gini_{it} = \alpha + \beta Glob_{it} + \delta SPE_{it} + \theta Glob_{it} \times SPE_{it} + \mu X_{it} + \vartheta_i + \tau_t + \varepsilon_{it}$$

where *Gini* is the Gini income inequality (for disposable or market income, depending on the specification), *Glob* is a globalization indicator (economic globalization, economic flows, or economic restrictions), and *X* is a vector of conventional economic factors affecting income inequality, including log of GDP per capita, age dependency ratio, and the share of population with completed secondary education. *SPE* stands for social spending (education, health, or total welfare, depending on the specification), $\beta$, $\delta$ and $\theta$ are the coefficients of interest, where the coefficient on the interaction term $Glob_{it} \times SPE_{it}$ would channel the cushioning effect, $\vartheta_i$ and $\tau_t$ are respectively country and time fixed effects, and $\varepsilon_{it}$ is i.i.d. error term. Data are averaged over five-year intervals to minimize the influence of short-term fluctuations and measurement errors. As a second approach, we also model the relationship of interest without the country fixed effects, thus focusing on the differences across countries.

As noted above, there are reasons to expect endogeneity between social spending and inequality, as well as between globalization and inequality. Despite the inclusion of several

control variables and fixed effects, there may be omitted variables. Endogeneity may also follow from reverse causality, since changes in income inequality may also affect globalization and/or welfare policies. Therefore, to complement our fixed effect panel estimations, we also estimate our baseline model using a system GMM estimator (Arellano and Bover 1995, Blundell and Bond 1998) that combines the equations of both differences and in levels, each having a particular set of instrumental variables.[5] This approach will also test the sensitivity of our findings to the inclusion of a lagged dependent variable. System GMM estimations is one attempt to get closer to a causal interpretation of the test of the cushioning hypothesis. Still, we remain cautious in reading our results as causal and suggest interpreting the empirical relationships as associations rather than causal effects.

### 4.2 Results

Table 2 presents a summary of our findings when regressing income inequality (for market and disposable income) on economic globalization and one of three types of social spending (overall spending, education and health). Included in the regressions (but not shown) are a full set of control variables, described in Section 2, as well as country and time fixed effects. The table also shows the coefficients on the interaction term between economic globalization and social spending. Significant coefficients in column (1) and (2) indicate significant associations between globalization and inequality. Significant coefficients in column (3) and (4) indicate

---

[5] Specifically, the system is jointly estimated using first-difference equations instrumented by lagged levels and using level equations instrumented by the first differences of the regressors. If these variables are appropriate instruments, the estimator should be consistent in the presence of endogenous variables. The GMM difference estimator could also be used in this context, but the difference estimator often performs poorly when the number of periods (as in our case) is limited (Bond et al., 2001).

associations between social spending and inequality. Finally, in columns (5) and (6), significant negative coefficients would have indicated the presence of potential cushioning effects.

Economic globalization is positively associated with (both market and disposable) income inequality, and this relationship is driven by non-OECD countries. Social spending, on the other hand, is negatively associated with disposable income inequality, but rarely significantly so (health spending is the exception, being strongly and significantly associated with lower inequality, especially in non-OECD countries). Most interestingly, the interaction term is always close to zero and never significant, providing evidence against a cushioning effect. If anything, education spending in OECD countries seems to aggravate the association between globalization and market income inequality.

We will return to the interpretation of our findings after presenting the empirical results in more detail below.

Table 2. Effect of globalization and social spending on inequality: Summary of findings from FE regressions with income inequality as the dependent variable

| Sample | Social spending type | Association between economic globalization and inequality | | Association between social spending and inequality | | Interaction term (Cushioning hypothesis implies negative sign) | |
|---|---|---|---|---|---|---|---|
| | | Market income Gini (1) | Disposable income Gini (2) | Market income Gini (3) | Disposable income Gini (4) | Market income Gini (5) | Disposable income Gini (6) |
| Full sample (122 countries, 512 obs.) | Social spending | +++ | +++ | ++ | 0 | 0 | 0 |
| | Education | +++ | +++ | 0 | 0 | 0 | 0 |
| | Health | +++ | +++ | 0 | 0 | 0 | 0 |
| OECD countries (34 countries, 143 obs.) | Social spending | 0 | 0 | + | 0 | + | 0 |
| | Education | + | 0 | 0 | 0 | ++ | 0 |
| | Health | 0 | 0 | – | 0 | 0 | 0 |
| Non-OECD countries (98 countries, 369 obs.) | Social spending | +++ | +++ | 0 | 0 | 0 | 0 |
| | Education | +++ | ++ | 0 | 0 | 0 | 0 |
| | Health | +++ | +++ | – | – – | 0 | 0 |

Note: +++, ++, + denote positive coefficients with significance levels p<0.01, p<0.05 and p<0.1 respectively. 0 indicates a non-significant coefficient. Control variables, as well as time and country fixed effects are always included. The table summarizes our regression results, including those not shown in the paper due to space limitations, and should be read as follows. The columns labelled "Economic globalization" (columns 1 and 2) and "Social spending" (columns 3 and 4) are based on the baseline without interaction terms, while columns (5) and (6) show the results for the baseline with the corresponding interaction terms included (see the following tables for detailed results). For instance, the first row summarizes the results from columns (1) and (4) from Tables 3a and 3b.

Tables 3a presents the results for the full sample, using Gini coefficients for disposable income. Economic globalization is significantly associated with higher inequality in the full sample (column 1). Analyzing the effect of trade flows and restrictions separately suggests that the effect is driven by trade flows (columns 2 and 3). Interacting social spending with economic globalization, trade flows and restrictions, respectively, produces insignificant interaction coefficients close to zero.

Table 3a. Globalization and income inequality, conditional on social spending — Full sample, disposable income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Dependent variable: Disposable income Gini* | | | | | |
| | Baseline | | | Interaction effects | | |
| Social spending | -0.027 | 0.013 | -0.041 | 0.131 | 0.184 | -0.018 |
| | [0.089] | [0.092] | [0.096] | [0.210] | [0.160] | [0.198] |
| Economic globalization | 13.159*** | | | 16.120*** | | |
| | [3.976] | | | [5.400] | | |
| Economic flows | | 9.797*** | | | 13.338*** | |
| | | [2.648] | | | [3.791] | |
| Economic restrictions | | | 2.830 | | | 3.172 |
| | | | [2.348] | | | [3.960] |
| Globalization#Social spending | | | | -0.253 | | |
| | | | | [0.279] | | |
| Flows#Social spending | | | | | -0.297 | |
| | | | | | [0.210] | |
| Restrictions#Social spending | | | | | | -0.034 |
| | | | | | | [0.246] |
| ln GDPpc | -1.644 | -1.012 | -1.195 | -1.639 | -1.061 | -1.180 |
| | [2.616] | [2.418] | [2.702] | [2.628] | [2.415] | [2.709] |
| Dependency ratio | 0.087** | 0.075** | 0.083** | 0.105*** | 0.097*** | 0.085** |
| | [0.034] | [0.035] | [0.036] | [0.038] | [0.037] | [0.038] |
| Population with secondary education | 0.012 | -0.004 | 0.022 | 0.015 | -0.002 | 0.023 |
| | [0.039] | [0.038] | [0.041] | [0.039] | [0.038] | [0.040] |
| Constant | 37.733* | 34.755* | 39.204* | 34.862 | 31.714 | 38.750* |
| | [21.755] | [20.512] | [22.835] | [22.423] | [21.048] | [23.136] |
| Observations | 513 | 513 | 512 | 513 | 513 | 512 |
| R-squared | 0.128 | 0.135 | 0.086 | 0.131 | 0.140 | 0.086 |
| Number of countries | 123 | 123 | 122 | 123 | 123 | 122 |
| R-squared adj. | 0.112 | 0.120 | 0.070 | 0.113 | 0.123 | 0.068 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

Table 3b presents the same analysis using the Gini coefficient for market income rather than for disposable income. Results are almost identical, with one exception: Social spending is positively associated with market income inequality. This finding is likely driven partially by the fact that social spending is higher when market inequality is high, e.g., due to unemployment, and partially because social spending induces labor supply responses that increase market income inequality (Bergh 2005b). Most importantly, there are still no signs of a cushioning effect: the interaction terms are all insignificant and close to zero.

Table 3b. Globalization and income inequality, conditional on social spending — Full sample, market income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Dependent variable: Market income Gini* | | | | | |
| | Baseline | | | Interaction effects | | |
| Social spending | 0.218** | 0.269** | 0.212* | 0.079 | 0.273 | 0.005 |
| | [0.108] | [0.106] | [0.111] | [0.232] | [0.180] | [0.221] |
| Economic globalization | 13.624*** | | | 11.007* | | |
| | [4.919] | | | [6.373] | | |
| Economic flows | | 12.232*** | | | 12.307** | |
| | | [3.747] | | | [5.200] | |
| Economic restrictions | | | 0.783 | | | -2.220 |
| | | | [2.452] | | | [4.174] |
| Globalization#Social spending | | | | 0.224 | | |
| | | | | [0.316] | | |
| Flows#Social spending | | | | | -0.006 | |
| | | | | | [0.245] | |
| Restrictions#Social spending | | | | | | 0.303 |
| | | | | | | [0.277] |
| ln GDPpc | -0.301 | 0.331 | 0.385 | -0.306 | 0.330 | 0.257 |
| | [2.688] | [2.477] | [2.727] | [2.679] | [2.478] | [2.712] |
| Dependency ratio | 0.139*** | 0.125*** | 0.130*** | 0.123*** | 0.126*** | 0.112*** |
| | [0.037] | [0.037] | [0.039] | [0.040] | [0.039] | [0.041] |
| Population with secondary education | -0.016 | -0.037 | -0.008 | -0.018 | -0.037 | -0.012 |
| | [0.045] | [0.045] | [0.045] | [0.045] | [0.046] | [0.045] |
| Constant | 28.942 | 25.070 | 29.913 | 31.478 | 25.005 | 33.914 |
| | [22.149] | [21.009] | [22.978] | [22.324] | [21.319] | [22.965] |
| Observations | 513 | 513 | 512 | 513 | 513 | 512 |
| R-squared | 0.132 | 0.158 | 0.095 | 0.134 | 0.158 | 0.099 |
| Number of countries | 123 | 123 | 122 | 123 | 123 | 122 |
| R-squared adj. | 0.117 | 0.143 | 0.0791 | 0.117 | 0.141 | 0.0815 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

Table 4a and 4b repeats the analysis for OECD and non-OECD countries respectively, showing only models where interaction effects are included.[6] The results tell us that the positive association between globalization and inequality is driven by economic flows in non-OECD countries, a result that appears for both market and disposable income inequality. The

---

[6] The tables henceforth only show the results for specifications including interaction effects. Our statements on the direct globalization impact on inequality in the text are based on the results without interaction effects included. However, with the interaction effects being close to zero and insignificant, the results presented in specifications including the interactions give a strong indication about the direct globalization-inequality relationship.

interaction effects of interest remain very close to zero for disposable income inequality. For market income inequality, there is actually a weakly significant small positive interaction effect driven by economic flows in OECD countries (columns 1 and 2 in table 4b). The general pattern is still that social spending does not moderate the association between globalization and inequality.[7]

Among the control variables, the dependency ratio is positive and significant in all specifications, whereas other control variables have expected signs but are not significant. All specifications include country and time fixed effects with the latter being jointly significant.

---

[7] Splitting non-OECD countries into high-income and low-income countries respectively does not change our conclusion (see Table A2). A positive and significant relationship between economic globalization and inequality appears in both samples, while the interaction effect between types of globalization and social expenditure is never significant.

Table 4a. Globalization and income inequality, conditional on social spending — OECD and non-OECD countries, disposable income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Dependent variable: Disposable income Gini* | | | | | |
| | OECD | | | Non-OECD | | |
| Social spending | -0.097 | -0.059 | -0.157 | 0.014 | 0.249 | -0.197 |
| | [0.260] | [0.157] | [0.332] | [0.339] | [0.311] | [0.263] |
| Economic globalization | 3.909 | | | 16.813** | | |
| | [6.691] | | | [7.327] | | |
| Economic flows | | 6.520 | | | 13.657*** | |
| | | [4.700] | | | [5.089] | |
| Economic restrictions | | | -1.504 | | | 0.854 |
| | | | [6.284] | | | [5.248] |
| Globalization#Social spending | -0.053 | | | -0.009 | | |
| | [0.346] | | | [0.461] | | |
| Flows#Social spending | | -0.124 | | | -0.210 | |
| | | [0.222] | | | [0.415] | |
| Restrictions#Social spending | | | 0.038 | | | 0.339 |
| | | | [0.347] | | | [0.363] |
| ln GDPpc | 0.130 | 0.024 | 0.678 | -1.200 | -0.597 | -0.945 |
| | [2.929] | [2.847] | [3.004] | [2.833] | [2.616] | [2.930] |
| Dependency ratio | 0.188** | 0.193** | 0.182** | 0.082 | 0.112** | 0.079 |
| | [0.082] | [0.083] | [0.080] | [0.050] | [0.051] | [0.051] |
| Population with secondary education | -0.014 | -0.019 | -0.014 | 0.031 | 0.006 | 0.036 |
| | [0.034] | [0.037] | [0.035] | [0.062] | [0.058] | [0.063] |
| Constant | 18.314 | 18.114 | 16.702 | 34.649 | 27.882 | 39.768* |
| | [30.817] | [31.133] | [32.504] | [21.957] | [20.732] | [22.187] |
| Observations | 143 | 143 | 143 | 370 | 370 | 369 |
| R-squared | 0.256 | 0.271 | 0.252 | 0.143 | 0.151 | 0.093 |
| Number of countries | 34 | 34 | 34 | 98 | 98 | 97 |
| R-squared adj. | 0.200 | 0.216 | 0.196 | 0.119 | 0.127 | 0.0678 |

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

Table 4b. Globalization and income inequality, conditional on social protection expenditure — OECD and non-OECD countries, market income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Dependent variable: Market income Gini* | | | | | |
| | OECD | | | Non-OECD | | |
| Social spending | -0.295 | -0.109 | -0.044 | -0.067 | 0.269 | -0.244 |
| | [0.274] | [0.167] | [0.398] | [0.383] | [0.359] | [0.303] |
| Economic globalization | -15.886 | | | 16.257** | | |
| | [9.949] | | | [7.569] | | |
| Economic flows | | -12.930 | | | 14.656** | |
| | | [9.001] | | | [6.095] | |
| Economic restrictions | | | -8.295 | | | -2.320 |
| | | | [8.455] | | | [5.262] |
| Globalization#Social spending | 0.791* | | | 0.324 | | |
| | [0.458] | | | [0.506] | | |
| Flows#Social spending | | 0.660* | | | -0.005 | |
| | | [0.348] | | | [0.463] | |
| Restrictions#Social spending | | | 0.352 | | | 0.632 |
| | | | [0.493] | | | [0.405] |
| ln GDPpc | 0.505 | 1.137 | 0.501 | 0.280 | 1.003 | 0.608 |
| | [3.342] | [3.259] | [3.383] | [2.818] | [2.642] | [2.913] |
| Dependency ratio | 0.157** | 0.167** | 0.176* | 0.078 | 0.115** | 0.083 |
| | [0.071] | [0.068] | [0.092] | [0.056] | [0.057] | [0.059] |
| Population with secondary education | -0.054 | -0.054 | -0.058 | -0.000 | -0.029 | 0.003 |
| | [0.041] | [0.040] | [0.042] | [0.069] | [0.069] | [0.070] |
| Constant | 38.378 | 27.670 | 33.585 | 29.189 | 20.094 | 34.027 |
| | [35.042] | [34.276] | [39.091] | [21.354] | [20.520] | [21.920] |
| Observations | 143 | 143 | 143 | 370 | 370 | 369 |
| R-squared | 0.420 | 0.429 | 0.400 | 0.124 | 0.141 | 0.071 |
| Number of countries | 34 | 34 | 34 | 98 | 98 | 97 |
| R-squared adj. | 0.376 | 0.385 | 0.355 | 0.0999 | 0.117 | 0.0453 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

To fully examine whether there is a cushioning effect, we follow Brambor et al. (2006) and plot the marginal effect of globalization (with the 95% confidence intervals) across levels of social spending in Figures 2 and 3. We also include histograms that illustrate the distribution of observations by the level of social spending.

In the full sample, the marginal effect of globalization on disposable income inequality is positive but decreases slightly at higher levels of social spending, as illustrated in Figure 2a. Dividing the sample into OECD and non-OECD countries (Figure 3a) reveals, however, that

the marginal effect of globalization does not vary with levels of social spending in any of the samples. In OECD countries, globalization is not significantly associated with disposable income inequality, regardless of their level of social spending. In non-OECD countries, economic globalization increases disposable income inequality regardless of the level of social spending.

Focusing instead on market income inequality, the corresponding globalization effect is once again positive but increases slightly at higher levels of social spending in the full sample. Dividing the sample reveals insignificant coefficients for OECD countries, while the association between globalization and both types of income inequality is positive and statistically significant at most levels of social spending in non-OECD countries.

Figure 2. Marginal effect of globalization on inequality at different levels of social spending – Full sample
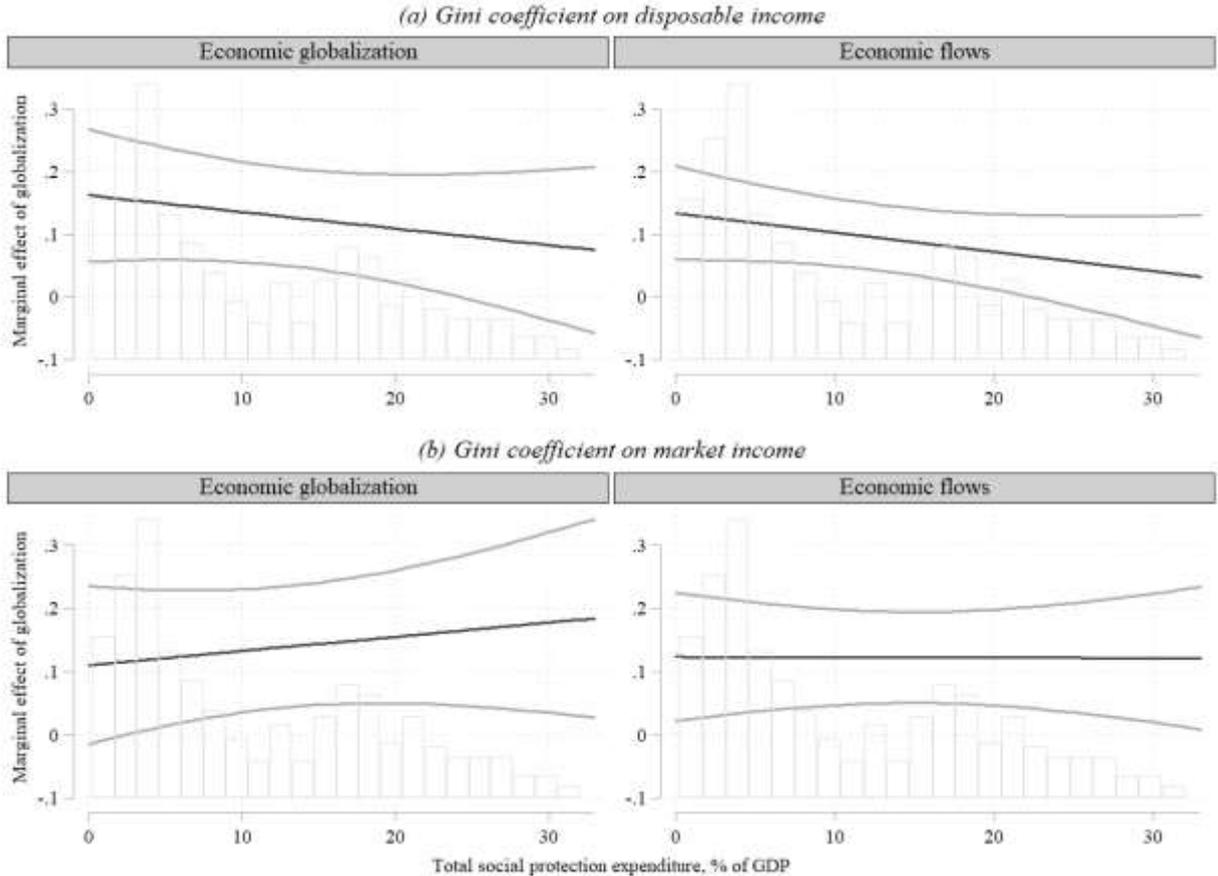
Figure 3. Marginal effect of economic globalization on inequality across levels of social spending – OECD and non-OECD countries



(a) Gini coefficient on disposable income

(b) Gini coefficient on market income
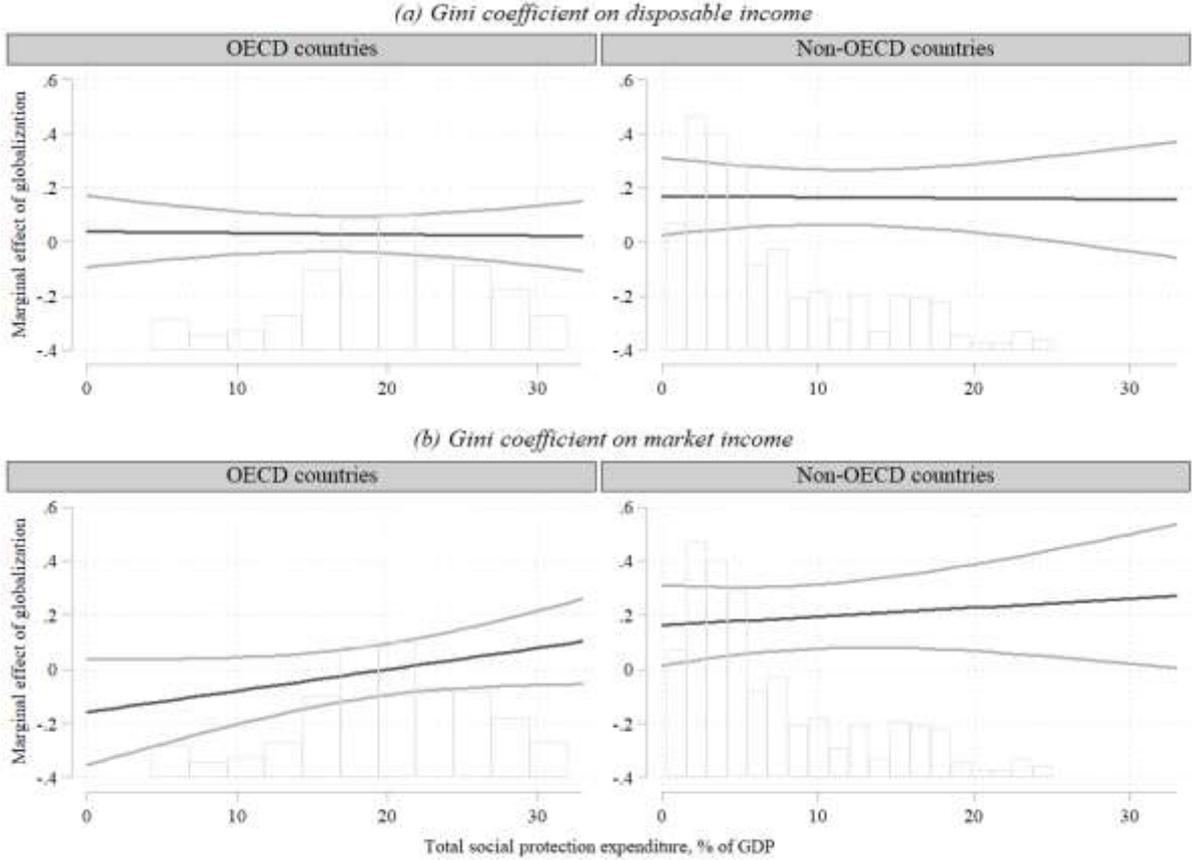
To sum up, we find that economic globalization is positively associated with income inequality for both disposable and market income, confirming H1. We also partly confirm H2, as social spending is positively associated with market income inequality but only weakly associated with lower inequality of disposable income inequality. Finally, and most important to the aim of this examination, we find no support for the cushioning hypothesis (H3).

### 4.3 Robustness tests

*Alternative empirical approaches to test the cushioning hypothesis*

The main aim of this paper is to examine whether social spending moderates the association between economic globalization and inequality. The results from fixed effects panel regressions give little evidence of such a cushioning effect. As a first robustness test, we consider two alternative empirical approaches to examine the relationship of interest. First, we re-estimate our baseline specification without fixed effects (see Table A5 and A6). As expected, this exercise gives more significant associations overall, but the main message regarding the cushioning hypothesis remains: the interaction effect between globalization and social spending is not significantly associated with income inequality. The only exception is for the specification using disposable income Gini and economic flows in the full sample, where the interaction effect is negative and significant, however the significant association disappears when splitting the sample into OECD and non-OECD countries.

Second, we run system GMM estimations in an attempt to handle endogenous variables for reasons outlined above. Since the GMM estimator easily becomes biased due to over-identification of instruments, we follow the recommendations in Roodman (2006) and reduce the number of instruments and test the sensitivity of our results with respect to lag lengths. Moreover, we use a two-step estimator, including Windmeijer's (2005) finite sample correction. In these estimations we treat the lagged information on income inequality, globalization, social spending and their interaction as endogenous.

Table A7, showing results for the full sample and overall social spending remains in line with the fixed effects estimation results. While the interaction coefficient is negative across all specifications, it is never significant even at the 10 percent level, regardless of which inequality or globalization measure we consider. The Hansen J-test further suggests that the instruments

are valid, and the Arellano–Bond test for second-order autocorrelation indicates that there is no significant serial correlation in our specifications.

### *Other data sources: World Bank data*

To test the hypothesis that a cushioning effect exists for health and education spending (H3a), we use an alternative data source on social spending: the WDI data on health and education spending (discussed in Section 2). Tables 5a and 5b show the results for the full sample with the disposable income and market income Gini, respectively.

Table 5a. Globalization, inequality, and education and health spending — Full sample, disposable income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Dependent variable: Disposable income Gini* | | | | | |
| | Social spending: Education, % of GDP | | | Social spending: Health, % of GDP | | |
| Social spending | 0.212 | 0.194 | 0.243 | -1.254 | -0.628 | -1.205 |
| | [0.369] | [0.300] | [0.351] | [1.059] | [1.010] | [0.888] |
| Economic globalization | 12.451** | | | 11.455** | | |
| | [4.992] | | | [5.531] | | |
| Economic flows | | 9.163** | | | 10.900** | |
| | | [3.800] | | | [5.194] | |
| Economic restrictions | | | 6.366 | | | 1.053 |
| | | | [4.048] | | | [4.188] |
| Globalization#Social spending | -0.624 | | | 0.965 | | |
| | [0.765] | | | [1.251] | | |
| Flows#Social spending | | -0.525 | | | 0.028 | |
| | | [0.597] | | | [1.053] | |
| Restrictions#Social spending | | | -0.745 | | | 0.693 |
| | | | [0.736] | | | [0.957] |
| ln GDPpc | 1.164 | 1.319 | 1.371 | -1.640 | -0.967 | -1.210 |
| | [1.316] | [1.270] | [1.333] | [2.193] | [2.013] | [2.313] |
| Dependency ratio | 0.114*** | 0.108** | 0.119*** | 0.056 | 0.057 | 0.060 |
| | [0.042] | [0.043] | [0.042] | [0.044] | [0.044] | [0.043] |
| Population with secondary education | 0.022 | 0.012 | 0.030 | 0.021 | 0.001 | 0.034 |
| | [0.047] | [0.047] | [0.048] | [0.041] | [0.038] | [0.042] |
| Constant | 15.406 | 16.079 | 15.684 | 42.913** | 37.351** | 44.011** |
| | [11.832] | [11.566] | [11.728] | [18.698] | [17.719] | [19.344] |
| Observations | 631 | 631 | 631 | 534 | 534 | 533 |
| R-squared | 0.098 | 0.097 | 0.085 | 0.140 | 0.144 | 0.093 |
| Number of countries | 122 | 122 | 122 | 125 | 125 | 124 |
| R-squared adj. | 0.078 | 0.077 | 0.064 | 0.124 | 0.127 | 0.076 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

Table 5b. Globalization, inequality, and education and health spending — Full sample, market income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Dependent variable: Market income Gini* | | | | | |
| | Social expenditure: Education, % of GDP | | | Social expenditure: Health, % of GDP | | |
| Social spending | -0.072 | 0.066 | 0.000 | -1.627 | -0.655 | -1.510 |
| | [0.346] | [0.309] | [0.329] | [1.170] | [1.110] | [1.036] |
| Economic globalization | 12.258** | | | 9.278 | | |
| | [5.476] | | | [6.221] | | |
| Economic flows | | 10.249** | | | 12.099* | |
| | | [4.378] | | | [6.334] | |
| Economic restrictions | | | 3.258 | | | -2.806 |
| | | | [4.308] | | | [4.621] |
| Globalization#Social spending | 0.221 | | | 1.710 | | |
| | [0.822] | | | [1.341] | | |
| Flows#Social spending | | -0.070 | | | 0.253 | |
| | | [0.694] | | | [1.143] | |
| Restrictions#Social spending | | | 0.036 | | | 1.333 |
| | | | [0.776] | | | [1.087] |
| ln GDPpc | 0.827 | 1.013 | 1.193 | -0.657 | -0.002 | -0.095 |
| | [1.447] | [1.380] | [1.517] | [2.228] | [2.038] | [2.345] |
| Dependency ratio | 0.170*** | 0.164*** | 0.175*** | 0.085* | 0.093** | 0.089* |
| | [0.043] | [0.044] | [0.044] | [0.047] | [0.047] | [0.047] |
| Population with secondary education | -0.025 | -0.042 | -0.015 | -0.011 | -0.034 | 0.001 |
| | [0.050] | [0.050] | [0.051] | [0.048] | [0.048] | [0.048] |
| Constant | 22.147* | 22.171* | 22.214 | 41.950** | 34.346* | 42.739** |
| | [13.042] | [12.574] | [13.451] | [18.762] | [17.828] | [19.548] |
| Observations | 631 | 631 | 631 | 534 | 534 | 533 |
| R-squared | 0.132 | 0.136 | 0.107 | 0.123 | 0.138 | 0.082 |
| Number of countries | 122 | 122 | 122 | 125 | 125 | 124 |
| R-squared adj. | 0.112 | 0.116 | 0.0863 | 0.107 | 0.121 | 0.0640 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

First, the results confirm the previously noted globalization-inequality association, while coefficients on education and health spending are never significant in the full sample without interaction terms, regardless of inequality measure. When including interaction terms, we once again conclude that there is no empirical support for a cushioning effect from health or education spending.

Moving to the results for the divided sub-samples, Figure 4 and Figure 5 illustrate the marginal effect of globalization (with the 95% confidence intervals) across levels of education and health

spending, respectively. Appendix tables A3 and A4 show the corresponding regression results. As expected, the effect of education spending varies with the level of development. In OECD countries, economic globalization, if anything, increases inequality more when education spending is high, but the effect is not significant and close to zero for the observed sample. In non-OECD countries, the downward slope of the globalization effect suggests that education spending could mitigate the effect of globalization on inequality (the same tendency is noted in Rudra 2004). As shown in Figure 4, there are signs of a cushioning effect in non-OECD countries for education spending on disposable income inequality, though the confidence intervals are very large. Interestingly, system GMM-estimations also suggest a weak cushioning effect from education spending in non-OECD countries, which we have verified is not driven by outliers (see Table A9).

Figure 4. Marginal effect of economic globalization on disposable income inequality across levels of education spending
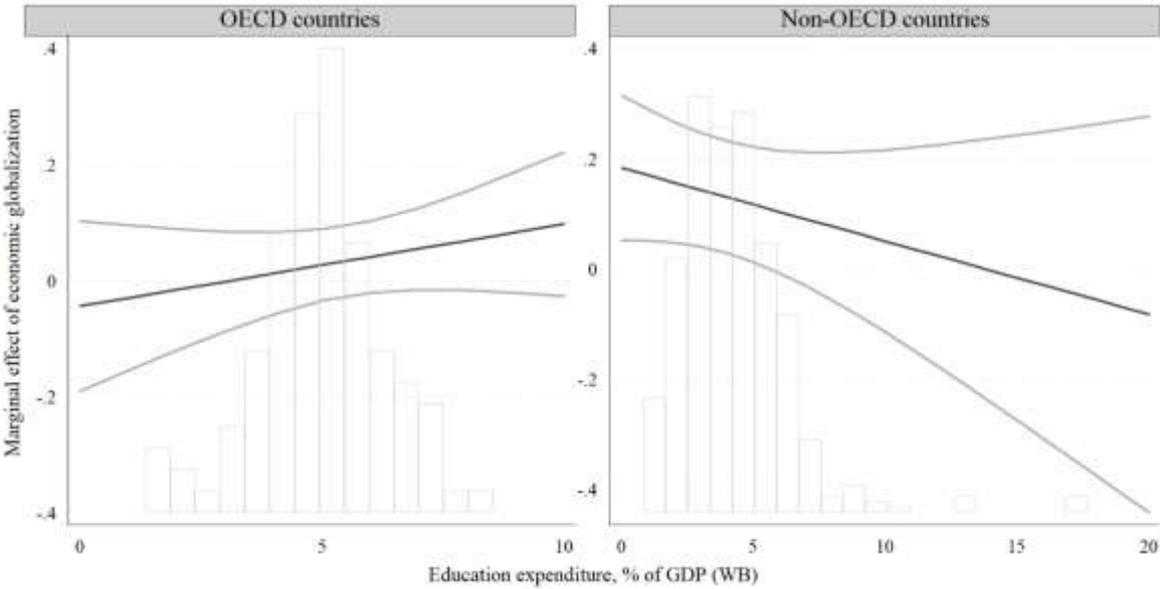
Figure 5. Marginal effect of economic globalization on disposable income inequality across levels of health spending
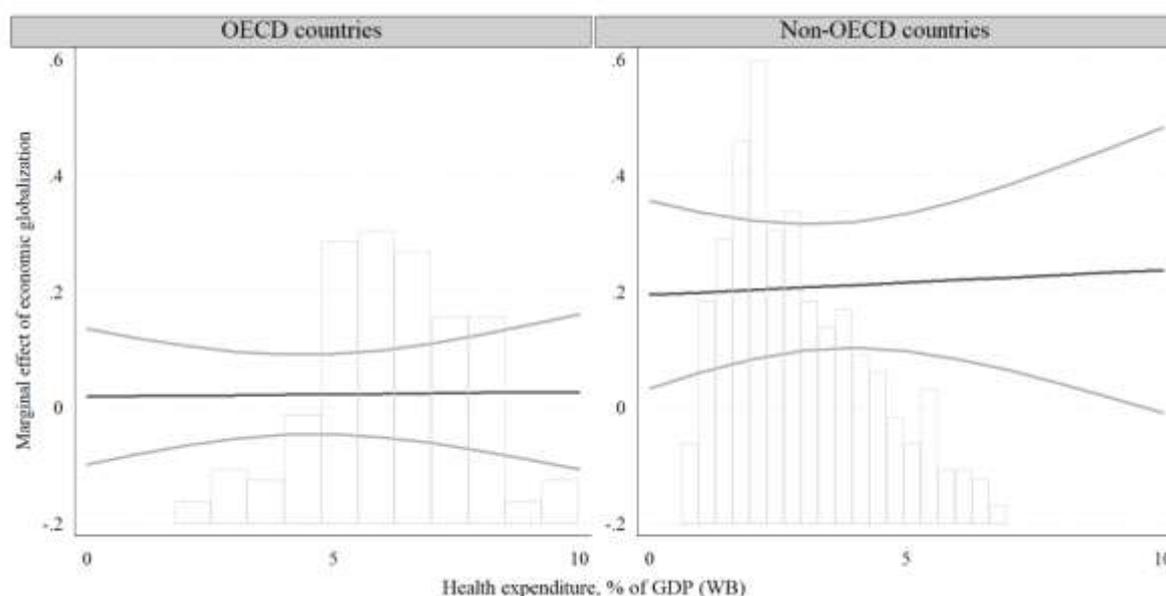


For health spending, the evidence is clear: the marginal effect of globalization in Figure 5 is almost exactly the same across all levels of health spending, both in OECD and non-OECD countries. System GMM estimations also support this conclusion (see Table A8 and A9). We thus find no support for the hypothesis H3a that health and education expenditure is associated with a cushioning effect that is stronger for market income inequality than for disposable income inequality. In fact, we find signs of an "aggravation effect" in OECD-countries, i.e., that the positive association between globalization and inequality is stronger when education spending is high. A possible explanation is that globalization induces skill-biased changes for example by increasing the returns to education in rich countries.

## 5. Concluding discussion

The global trend towards an increasing globalization since the 1990s seems to have had two different distributional consequences: On the one hand, income inequality between countries has declined, but on the other hand, income inequality within countries has increased

(Bourguignon 2016). Against this background, it is natural to wonder whether countries can enjoy the benefits of globalization without suffering any adverse effects on the within-country income distribution. There are cases where social policies seem to play an important role for mitigating inequality in the wake of economic globalization. One such case is the effect of rising Chinese import competition on US local labor markets, analyzed by Autor et al. (2013). They show that transfer payments for unemployment, disability, retirement, and healthcare rise in trade-exposed labor markets. The idea that social spending acts as a cushion against inequality induced by economic globalization is thus highly plausible. Nevertheless, the pattern is not confirmed in cross-country analysis: Using social spending data from the ILO and the World Development Indicators, economic globalization from the KOF globalization index, and Gini coefficients from the Standardized World Income Database, we have analyzed 140 countries over 40 years and found no evidence that social spending moderates the association between economic globalization and inequality, with the possible exception of education spending in non-OECD countries. How do we reconcile our results with anecdotal evidence and previous findings that have found some support for a moderating effect?

First, the effect of imports from China on the US labor markets is a possible explanation why we actually note some small positive interaction effect between economic globalization and market income inequality in OECD countries. Transfers should indeed compensate workers who lose their jobs because of trade with other countries. This finding, however, does not necessarily imply that the association between economic globalization and disposable income inequality is weakened by social spending. For example, generous unemployment benefits might worsen inequality if they lead to longer unemployment durations, such that it takes longer for laid off workers to find new jobs (Blanchard and Summers 1986; Keane and Wolpin 1997; Ball 2009). Our findings suggest that using a bigger sample than previous studies (allowing us to control for unobserved country heterogeneity using country fixed effects) and comparable

Gini coefficients tends to shift the results of previous research towards no evidence of a moderating ("cushioning") effect. It is also worth emphasizing that the positive association between economic globalization and inequality in our sample is almost entirely driven by non-OECD countries. In non-OECD countries, the association is significant but not very large: one standard deviation increase in economic globalization is associated with one third of a standard deviation higher Gini inequality for disposable income.

While we have not found any evidence for a moderating effect of social spending, other policy differences between countries might still matter for the association between globalization and inequality, including government ideology (Ha 2012), social justice (Kauder and Potrafke 2015), or transition towards market economy (Dorn et al. 2017). Our results also do not exclude the possibility that more fine-grained measures of economic globalization or analyses of different policy measures would reach other conclusions. A potentially fruitful area for future research would be to examine whether the origin of trade or investment flows matters, since anecdotal evidence suggests, for example, that the Chinese outward foreign direct investment is different from the FDI flows from other countries (Cheng and Ma 2010).

We also should note that health spending, in particular in non-OECD countries, is strongly associated with lower inequality. Our findings thus do not suggest that some policies are potent against rising inequality even when they don't moderate the effect of globalization. Finally, it is worth noting that the empirical pattern uncovered regarding economic globalization and income inequality is the opposite of what is suggested by the standard trade theory based on the Heckscher-Ohlin model. It turns out that economic globalization is significantly associated with inequality in developing countries, but typically not so in OECD countries. More research is apparently needed to fully understand how economic globalization shapes the income distribution.

# References

Arellano, M., and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, *68*(1), 29–51.

Autor, D. H., Dorn, D., and Hanson, G. H. (2013). The China syndrome: Local labor market effects of import competition in the United States. *American Economic Review*, 103(6), 2121–2168.

Baldini, M. (2001). Inequality and redistribution over the life-cycle in Italy: An analysis with a dynamic cohort microsimulation model. *Brazilian Electronic Journal of Economics,* 4(2).

Ball, L. M. (2009). *Hysteresis in Unemployment: Old and New Evidence*. NBER Working Paper 14818. National Bureau of Economic Research.

Barr, N. (1998). *The Economics of the Welfare State*. Stanford, California: Stanford University Press.

Barro, R., and Lee, J. (2013). A new data set of educational attainment in the world, 1950–2010. *Journal of Development Economics*, *104*, 184–198.

Berggren, N. (1999). Economic freedom and equality: Friends or foes? *Public Choice*, *100*, 203–223.

Bergh, A. (2005a). On the counterfactual problem of welfare state research: how can we measure redistribution? *European Sociological Review*, *21*(4), 345–357.

Bergh, A. (2005b). On inter- and intra-individual redistribution of the welfare state. *Social Science Quarterly,* 86(SPEC. ISS.): 984–995.

Bergh, A., and Bjørnskov, C. (2014). Trust, Welfare States and Income Equality: Sorting out the Causality. *European Journal of Political Economy*, 35, 183–199.

Bergh, A., and Fink, G. (2008). Higher education policy, enrollment, and income inequality. *Social Science Quarterly*, 89, 217–235.

Blanchard, O. J., and Summers, L. H. (1986). Hysteresis and the European unemployment problem. *NBER Macroeconomics Annual*, *1*, 15–78.

Blundell, R., and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, *87*(1), 115–143.

Bond, S. R., Hoeffler, A., and Temple, J. (2001). *GMM Estimation of Empirical Growth Models* (No. 3048). CEPR Discussion Papers.

Bourguignon, F. (2016). Inequality and globalization. How the rich get richer as the poor catch up. *Foreign Affairs*, *95*, 11–16.

Brady, D., Beckfield, J., and Seeleib-Kaiser, M. (2005). Economic globalization and the welfare state in affluent democracies, 1975–2001. *American Sociological Review*, *70*(6), 921–948.

Brambor, T., Clark, W. R., and Golder, M. (2006). Understanding interaction models: Improving empirical analyses. *Political Analysis*, *14*(1), 63–82.

Cameron, D. (1978). The expansion of the public economy: a comparative analysis. *American Political Science Review*, *72*, 1243–1261.

Cheng, L. K., and Ma, Z. (2010). China's outward foreign direct investment. In R. Feenstra and S.-J. Wei (eds.), *China's Growing Role in World Trade* (pp. 545–578). Chicago: University of Chicago Press.

Deininger, K., and Squire, L. (1996). A new data set measuring income inequality. *The World Bank Economic Review*, *10*(3), 565–591.

Dorn, F., Fuest, C., and Potrafke, N. (2017). *Globalisation and Income Inequality Revisited*. European Economy – Discussion Papers 2015-056. Brussels: Directorate General Economic and Financial Affairs (DG ECFIN), European Commission.

Down, I. (2007). Trade openness, country size and economic volatility: The compensation hypothesis revisited. *Business and Politics*, *9*, 1–22.

Dreher, A. (2006). Does globalization affect growth? Empirical evidence from a new index. *Applied Economics*, *38*, 1091–1110.

Dreher, A., Gaston, N., and Martens, P. (2008). *Measuring Globalisation: Gauging Its Consequences.* New York: Springer.

Dreher, A., Sturm, J.-E., and Ursprung, H. W. (2008). The impact of globalization on the composition of government expenditures: Evidence from panel data. *Public Choice*, 134(3), 263–292.

Goodin, R E, and Le Grand, J. (1987). *Not Only the Poor: The Middle Classes and the Welfare State.* London: Allen and Unwin.

Gozgor, G., and Ranjan, P. (2017). Globalisation, inequality and redistribution: Theory and evidence. *The World Economy*, 40(12), 2704–2751.

Ha, E. (2012). Globalization, government ideology, and income inequality in developing countries. *The Journal of Politics*, *74*(2), 541–557.

Hainmueller, J., Mummolo, J. and Xu, Y. (2019). How Much Should We Trust Estimates from Multiplicative Interaction Models? Simple Tools to Improve Empirical Practice. *Political Analysis*, 27(2), 163–192.

Huber, E., Nielsen, F., Pribble, J., and Stephens, J. D. (2006). Politics and inequality in Latin America and the Caribbean. *American Sociological Review,* 71(6), 943–963.

International Labour Organization. (2014). *World Social Protection Report 2014/15*. Geneva: International Labour Organization.

Iversen, T., and Cusack, T. (2000). The causes of welfare state expansion: Deindustrialization or globalization? *World Politics*, 52(3), 313–349.

Jenkins, S. (2015). World income inequality databases: An assessment of WIID and SWIID. *Journal of Economic Inequality*, *13*, 629–671.

Jetter, M., and Parmeter, C. F. (2015). Trade openness and bigger governments: The role of country size revisited. *European Journal of Political Economy*, *37*, 49–63.

Kaplinsky, R. (2000). Globalisation and unequalisation: What can be learned from value chain analysis? *Journal of Development Studies*, 37(2), 117–146.

Kapstein, E. B. (2000). Winners and losers in the global economy. *International Organization* 54(2), 359–384.

Katzenstein, P. (1985). *Small States in World Markets: Industrial Policy in Europe*. Ithaca, N.Y.: Cornell University Press.

Kauder, B., and Potrafke, N. (2015). Globalization and social justice in OECD countries. *Review of World Economics*, 151(2), 353–376.

Keane, M. P. and Wolpin, K. I. (1997). The career decisions of young men. *Journal of Political Economy*, 105(3), 473–522.

Kim, S. (2007). Openness, external risk, and volatility: Implications for the compensation hypothesis. *International Organization*, *61*, 181–216.

Lee, C. S., Nielsen, F., and Alderson, A. S. (2007). Income inequality, global economy and the state. *Social Forces*, 86(1), 77–111.

Lindbeck, A. (1975). Business cycles, politics, and international economic dependence. *Skandinaviska Enskilden Bank Quarterly Review*, 2, 53–68.

Mahler, V. A. (2004). Economic globalization, domestic politics, and income inequality in the developed countries. *Comparative Political Studies,* 37(9), 1025–1053.

Marsh, R. (2016). What have we learned from cross-national research on the causes of income inequality? *Comparative Sociology*, *15*, 7–36.

Meinhard, S., and Potrafke, N. (2012). The globalization–welfare state nexus reconsidered. *Review of International Economics*, 20(2), 271–287.

Milanovic, B. (2002). *Can We Discern the Effect of Globalization on Income Distribution? Evidence from Household Budget Surveys*. WB Policy Research Working Paper 2876. Washington, DC: World Bank.

Milanovic, B. (2016). *Global Inequality: A New Approach for the Age of Globalization*. Harvard: Harvard University Press.

Moller, S., Huber, E., Stephens, J. D., Bradley, D., and Nielsen, F. (2003). Determinants of relative poverty in advanced capitalist democracies. *American Sociological Review*, 68(1), 22–51.

Potrafke, N. (2015). The evidence on globalisation. *The World Economy,* 38(3), 509–552.

Ravallion, M. (2018). Inequality and globalization: A review essay. *Journal of Economic Literature,* 56(2): 620–642.

Rodriguez, F., and Rodrik, D. (1999). *Trade Policy and Economic Growth: A Skeptic's Guide to Cross-National Evidence.* NBER Working Paper No. W7081. National Bureau of Economic Research.

Rodrik, D. (1998). Why do more open economies have bigger governments? *The Journal of Political Economy*, *106*, 997–1032.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal*, *9*(1), 86–136.

Roser, M., and Cuaresma, J. C. (2016). Why is income inequality increasing in the developed world? *Review of Income and Wealth*, 62(1), 1–27.

Rudra, N. (2004). Openness, welfare spending, and inequality in the developing world. *International Studies Quarterly*, *48*, 683–709.

Ruggie, J. G. (1982). International regimes, transactions, and change: Embedded liberalism in the postwar economic order. *International Organization*, 36(2), 379–415.

Sachs, J. D., and Warner, A. (1995). Economic reform and the process of global integration. *Brookings Papers on Economic Activity*, 1, 1–119.

Schulze, G. G., and Ursprung, H. W. (1999). Globalisation of the economy and the nation state. *The World Economy*, 22(3), 295–352.

Scully, G., W. (2002). Economic freedom, government policy and the trade-off between equity and economic growth. *Public Choice*, *113*, 77–96.

Sinn, H. W. (1997). The selection principle and market failure in systems competition. *Journal of Public Economics*, *66*(2), 247–274.

Sinn, H. W. (2004). The New Systems Competition. *Perspectiven der Wirtschaftspolitik,* 5(1), 23–38.

Solt, F. (2009). Standardizing the world income inequality database. *Social Science Quarterly*, *90*(2), 231–242.

Solt, F. (2015). On the assessment and use of cross-national income inequality datasets. *Journal of Economic Inequality*, *13*(4), 683–691.

Solt, F. (2016). The Standardized World Income Inequality Database. *Social Science Quarterly*, 97(5), 1267–1281.

Stijepic, D. (2017). Globalization, Worker Mobility and Wage Inequality. *Review of International Economics*, 25(1), 108–131.

Teney, C., Lacewell, O. P., and De Wilde, P. (2014). Winners and losers of globalization in Europe: Attitudes and ideologies. *European Political Science Review*, 6(4), 575–595.

Timmer, M. P., Erumban, A. A., Los, B., Stehrer, R., and De Vries, G. J. (2014). Slicing up global value chains. *Journal of Economic Perspectives*, *28*(2), 99–118.

Urata, S., and Narjoko, D. (2017). *International Trade and Inequality*. ADBI Working Paper Series No. 675. Asian Development Bank Institute (ADBI).

Ursprung, H.W. (2008). Globalisation and the welfare state. In: S.N. Durlauf, and L.E. (eds.), *The New Palgrave Dictionary of Economics*, 2nd edition. Köln: Palgrave Macmillan.

Uusitalo, H. (1985). Redistribution and equality in the welfare state: An effort to interpret the major findings of research on the redistributive effects of the welfare state. *European Sociological Review*, 1, 163–176.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of econometrics*, *126*(1), 25–51.

Wood, A. (1997). Openness and wage inequality in developing countries: the Latin American challenge to East Asian conventional wisdom. *The World Bank Economic Review*, 11(1), 33–57.

Wood, A. (2001). Value chains: An economist's perspective. *IDS Bulletin*, 32(3), 41–45.

World Bank. (2016). *World Development Indicators Database*. Washington, DC: World Bank Group.

# Appendix

Table A1 Descriptive statistics

| Variable | OECD sample | | | | | Non-OECD sample | | | | | Source |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Obs. | Mean | SD | Min | Max | Obs. | Mean | SD | Min | Max | |
| Gini coefficient on market income | 143 | 46.10 | 4.10 | 32.44 | 56.30 | 370 | 45.96 | 8.82 | 22.52 | 75.75 | Solt 2009, 2016 |
| Gini coefficient on disposable income | 143 | 30.03 | 5.53 | 20.84 | 48.60 | 370 | 40.86 | 8.52 | 21.08 | 65.46 | Solt 2009, 2016 |
| Social spending (including health), % of GDP | 143 | 20.23 | 6.07 | 4.33 | 32.03 | 376 | 7.05 | 5.73 | 0.27 | 25.10 | ILO 2014 |
| Public education spending, % of GDP | 207 | 4.97 | 1.31 | 1.35 | 8.55 | 430 | 4.34 | 2.56 | 0.83 | 33.33 | World Bank 2016 |
| Public health spending, % of GDP | 143 | 6.21 | 1.57 | 1.76 | 9.99 | 398 | 2.93 | 1.41 | 0.62 | 6.96 | World Bank 2016 |
| KOF Index of Economic Globalization | 143 | 0.75 | 0.13 | 0.40 | 0.98 | 370 | 0.51 | 0.16 | 0.09 | 0.97 | Dreher 2006 |
| KOF Economic flows | 143 | 0.68 | 0.20 | 0.16 | 1.00 | 370 | 0.54 | 0.19 | 0.08 | 0.99 | Dreher 2006 |
| KOF Economic regulations | 143 | 0.83 | 0.10 | 0.49 | 0.98 | 369 | 0.48 | 0.18 | 0.10 | 0.96 | Dreher 2006 |
| Ln GDP per capita | 207 | 10.25 | 0.56 | 8.47 | 11.43 | 430 | 7.77 | 1.18 | 5.13 | 10.75 | World Bank 2016 |
| Age dependency ratio, % of working age population | 207 | 51.61 | 6.62 | 37.61 | 81.03 | 430 | 71.51 | 18.74 | 35.78 | 114.30 | World Bank 2016 |
| Secondary complete education, % of population aged 25+ | 207 | 27.23 | 15.40 | 1.59 | 73.00 | 430 | 17.39 | 15.57 | 0.00 | 70.82 | Barro and Lee 2013 |

Note: The summary statistics is calculated for the operative sample, conditional on a full set of control variables.

Table A2 Globalization, inequality, and social spending — High- and low-income non-OECD countries, disposable income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | High-income non-OECD countries | | | | | | Low-income non-OECD countries | | | | | |
| Social spending | 0.109 | 0.189 | 0.165 | 0.491 | 0.209 | 0.322 | -0.049 | 0.073 | -0.084 | 0.055 | 0.289 | -0.118 |
| | [0.156] | [0.122] | [0.175] | [0.360] | [0.352] | [0.394] | [0.168] | [0.185] | [0.155] | [0.474] | [0.430] | [0.350] |
| Economic globalization | 13.799** | | | 23.497 | | | 17.529** | | | 18.879** | | |
| | [6.007] | | | [14.164] | | | [7.100] | | | [8.582] | | |
| Economic flows | | 11.235** | | | 11.670* | | | 11.105*** | | | 14.263** | |
| | | [3.984] | | | [6.596] | | | [4.040] | | | [5.766] | |
| Economic restrictions | | | 6.148** | | | 10.291 | | | 3.472 | | | 3.123 |
| | | | [2.516] | | | [12.838] | | | [4.474] | | | [6.082] |
| Globalization#Social spending | | | | -0.597 | | | | | | -0.195 | | |
| | | | | [0.634] | | | | | | [0.741] | | |
| Flows#Social spending | | | | | -0.032 | | | | | | -0.408 | |
| | | | | | [0.472] | | | | | | [0.655] | |
| Restrictions#Social spending | | | | | | -0.245 | | | | | | 0.060 |
| | | | | | | [0.671] | | | | | | [0.546] |
| ln GDPpc | -8.653* | -7.955 | -8.914 | -8.896* | -7.955 | -9.156 | -0.363 | 0.311 | -0.111 | -0.386 | 0.167 | -0.123 |
| | [4.839] | [4.584] | [5.713] | [5.024] | [4.645] | [6.128] | [3.115] | [2.857] | [3.201] | [3.128] | [2.879] | [3.209] |
| Dependency ratio | 0.186 | 0.170 | 0.219 | 0.219 | 0.171 | 0.243 | 0.058 | 0.090 | 0.067 | 0.063 | 0.104* | 0.065 |
| | [0.122] | [0.135] | [0.137] | [0.149] | [0.140] | [0.189] | [0.056] | [0.056] | [0.061] | [0.058] | [0.058] | [0.060] |
| Population with secondary education | -0.017 | -0.018 | -0.045 | -0.009 | -0.018 | -0.040 | 0.038 | 0.016 | 0.078 | 0.042 | 0.023 | 0.077 |
| | [0.046] | [0.039] | [0.060] | [0.038] | [0.040] | [0.054] | [0.082] | [0.080] | [0.086] | [0.082] | [0.082] | [0.084] |
| Constant | 95.050** | 89.913** | 99.652* | 89.190* | 89.577* | 97.908* | 31.001 | 25.065 | 33.721 | 30.074 | 23.387 | 34.112 |
| | [43.813] | [39.747] | [54.397] | [43.004] | [43.407] | [53.985] | [22.680] | [21.004] | [23.377] | [23.805] | [22.263] | [23.646] |
| Observations | 58 | 58 | 58 | 58 | 58 | 58 | 312 | 312 | 311 | 312 | 312 | 311 |
| R-squared | 0.604 | 0.611 | 0.536 | 0.613 | 0.611 | 0.538 | 0.114 | 0.115 | 0.071 | 0.115 | 0.118 | 0.072 |
| Number of countries | 16 | 16 | 16 | 16 | 16 | 16 | 82 | 82 | 81 | 82 | 82 | 81 |
| R-squared adj. | 0.530 | 0.538 | 0.449 | 0.531 | 0.528 | 0.439 | 0.0878 | 0.0885 | 0.0437 | 0.0853 | 0.0892 | 0.0406 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

Table A3 Globalization and inequality, conditional on education and health spending (% of GDP), market income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Social spending: Education | | | | | | Social spending: Health | | | | | |
| | OECD countries | | | Non-OECD countries | | | OECD countries | | | Non-OECD countries | | |
| Education spending, % of GDP | -3.761*** | -2.117*** | -5.278*** | 0.524 | 0.549 | 0.617 | | | | | | |
| | [1.219] | [0.713] | [1.595] | [0.546] | [0.441] | [0.528] | | | | | | |
| Health spending, % of GDP | | | | | | | -0.335 | -0.432 | -0.690 | -1.958 | -1.092 | -2.079* |
| | | | | | | | [1.108] | [0.798] | [1.378] | [1.312] | [1.500] | [1.149] |
| Economic globalization | -15.271 | | | 19.512*** | | | 1.563 | | | 18.295** | | |
| | [10.352] | | | [6.925] | | | [7.345] | | | [8.692] | | |
| Economic flows | | -8.406 | | | 14.427** | | | 1.360 | | | 14.091* | |
| | | [7.299] | | | [5.529] | | | [7.082] | | | [8.316] | |
| Economic restrictions | | | -25.563** | | | 11.393** | | | -0.420 | | | 1.820 |
| | | | [9.822] | | | [5.567] | | | [7.230] | | | [6.262] |
| Globalization#Education spending | 4.570** | | | -1.201 | | | | | | | | |
| | [1.751] | | | [1.181] | | | | | | | | |
| Flows#Education spending | | 2.429** | | | -1.091 | | | | | | | |
| | | [1.094] | | | [0.842] | | | | | | | |
| Restrictions#Education spending | | | 6.043*** | | | -1.632 | | | | | | |
| | | | [1.912] | | | [1.270] | | | | | | |
| Globalization#Health spending | | | | | | | -0.407 | | | 1.598 | | |
| | | | | | | | [1.159] | | | [1.960] | | |
| Flows#Health spending | | | | | | | | -0.324 | | | 0.342 | |
| | | | | | | | | [0.772] | | | [1.959] | |
| Restrictions#Health spending | | | | | | | | | 0.052 | | | 1.777 |
| | | | | | | | | | [1.378] | | | [1.649] |
| ln GDPpc | -1.935 | -1.506 | -2.217 | 0.979 | 1.205 | 1.179 | -1.448 | -1.559 | -1.787 | 0.270 | 1.093 | 0.412 |
| | [2.284] | [2.674] | [2.263] | [1.587] | [1.522] | [1.609] | [3.797] | [3.498] | [3.571] | [2.357] | [2.173] | [2.585] |
| Dependency ratio | 0.134** | 0.164** | 0.127** | 0.081 | 0.085 | 0.075 | 0.220** | 0.217** | 0.211** | -0.002 | 0.024 | 0.008 |
| | [0.059] | [0.072] | [0.053] | [0.057] | [0.056] | [0.058] | [0.088] | [0.087] | [0.086] | [0.063] | [0.066] | [0.070] |
| Population with secondary education | -0.110** | -0.112** | -0.113** | 0.036 | 0.007 | 0.045 | -0.065 | -0.064 | -0.065 | 0.014 | -0.023 | 0.038 |
| | [0.047] | [0.047] | [0.044] | [0.077] | [0.079] | [0.079] | [0.044] | [0.043] | [0.044] | [0.068] | [0.068] | [0.072] |
| Constant | 70.280** | 58.667* | 82.168*** | 27.186** | 26.688** | 29.417** | 51.302 | 52.819 | 56.749 | 38.230** | 30.668* | 43.128** |
| | [26.568] | [29.815] | [27.534] | [13.473] | [13.378] | [13.517] | [42.419] | [38.404] | [41.781] | [17.910] | [17.334] | [19.479] |
| Observations | 207 | 207 | 207 | 424 | 424 | 424 | 143 | 143 | 143 | 391 | 391 | 390 |
| R-squared | 0.484 | 0.459 | 0.490 | 0.108 | 0.105 | 0.089 | 0.382 | 0.383 | 0.381 | 0.160 | 0.150 | 0.090 |
| Number of countries | 34 | 34 | 34 | 97 | 97 | 97 | 34 | 34 | 34 | 100 | 100 | 99 |
| R-squared adj. | 0.447 | 0.420 | 0.453 | 0.0780 | 0.0748 | 0.0580 | 0.335 | 0.336 | 0.335 | 0.137 | 0.128 | 0.0660 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

Table A4 Globalization and inequality, conditional on education and health spending (% of GDP), disposable income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Social spending: Education | | | | | | Social spending: Health | | | | | |
| | OECD countries | | | Non-OECD countries | | | OECD countries | | | Non-OECD countries | | |
| Education spending, % of GDP | -1.198 | -0.676 | -1.746 | 0.479 | 0.404 | 0.629 | | | | | | |
| | [0.899] | [0.556] | [1.232] | [0.503] | [0.400] | [0.495] | | | | | | |
| Health spending, % of GDP | | | | | | | -0.149 | 0.104 | -0.074 | -1.385 | -0.997 | -1.557 |
| | | | | | | | [0.966] | [0.663] | [1.021] | [1.191] | [1.414] | [0.949] |
| Economic globalization | -4.440 | | | 18.272*** | | | 1.855 | | | 19.414** | | |
| | [7.488] | | | [6.732] | | | [5.959] | | | [8.243] | | |
| Economic flows | | -1.022 | | | 11.721** | | | 4.748 | | | 12.311* | |
| | | [4.649] | | | [5.077] | | | [5.334] | | | [7.296] | |
| Economic restrictions | | | -9.683 | | | 13.189** | | | -1.191 | | | 5.795 |
| | | | [8.377] | | | [5.629] | | | [6.082] | | | [5.803] |
| Globalization#Education spending | 1.413 | | | -1.329 | | | | | | | | |
| | [1.238] | | | [1.095] | | | | | | | | |
| Flows#Education spending | | 0.692 | | | -0.991 | | | | | | | |
| | | [0.728] | | | [0.791] | | | | | | | |
| Restrictions#Education spending | | | 1.964 | | | -1.926 | | | | | | |
| | | | [1.567] | | | [1.197] | | | | | | |
| Globalization#Health spending | | | | | | | 0.085 | | | 0.427 | | |
| | | | | | | | [1.069] | | | [1.746] | | |
| Flows#Health spending | | | | | | | | -0.115 | | | 0.052 | |
| | | | | | | | | [0.664] | | | [1.771] | |
| Restrictions#Health spending | | | | | | | | | -0.014 | | | 0.581 |
| | | | | | | | | | [1.084] | | | [1.340] |
| ln GDPpc | 0.498 | 0.737 | 0.451 | 1.158 | 1.364 | 1.289 | 1.213 | 1.238 | 1.820 | -1.012 | -0.240 | -0.886 |
| | [2.136] | [2.197] | [2.256] | [1.531] | [1.479] | [1.519] | [3.059] | [2.875] | [3.182] | [2.340] | [2.143] | [2.552] |
| Dependency ratio | 0.094 | 0.106 | 0.089 | 0.089 | 0.092* | 0.084 | 0.182** | 0.186** | 0.182** | 0.004 | 0.025 | 0.011 |
| | [0.066] | [0.071] | [0.059] | [0.055] | [0.055] | [0.056] | [0.083] | [0.085] | [0.086] | [0.061] | [0.063] | [0.065] |
| Population with secondary education | -0.081* | -0.082* | -0.083* | 0.119 | 0.098 | 0.130* | -0.015 | -0.019 | -0.017 | 0.048 | 0.017 | 0.071 |
| | [0.041] | [0.042] | [0.041] | [0.074] | [0.076] | [0.074] | [0.036] | [0.038] | [0.037] | [0.060] | [0.056] | [0.064] |
| Constant | 24.543 | 19.374 | 29.384 | 19.894 | 20.209 | 21.540* | 7.142 | 4.581 | 3.094 | 41.241** | 35.894** | 45.564** |
| | [22.482] | [23.693] | [23.054] | [12.749] | [12.602] | [12.621] | [34.139] | [32.481] | [35.973] | [18.067] | [17.272] | [19.217] |
| Observations | 207 | 207 | 207 | 424 | 424 | 424 | 143 | 143 | 143 | 391 | 391 | 390 |
| R-squared | 0.292 | 0.289 | 0.293 | 0.121 | 0.112 | 0.112 | 0.235 | 0.249 | 0.234 | 0.183 | 0.166 | 0.121 |
| Number of countries | 34 | 34 | 34 | 97 | 97 | 97 | 34 | 34 | 34 | 100 | 100 | 99 |
| R-squared adj. | 0.241 | 0.237 | 0.241 | 0.0913 | 0.0816 | 0.0812 | 0.177 | 0.192 | 0.176 | 0.162 | 0.144 | 0.0976 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Time and country fixed effects are included but not shown. R-squared corresponds to within $R^2$ and R-squared adj. is the adjusted overall $R^2$.

Table A5 Globalization, inequality, and social spending — Full sample, and the subsamples of OECD and non-OECD countries, market income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | Full sample | | | OECD countries | | | Non-OECD countries | | |
| Social spending | 0.042 | 0.226 | -0.109 | 0.240 | 0.103 | 0.531 | -0.187 | 0.110 | -0.389 |
| | [0.201] | [0.147] | [0.203] | [0.371] | [0.188] | [0.501] | [0.314] | [0.277] | [0.272] |
| Economic globalization | 12.550** | | | 1.977 | | | 15.040** | | |
| | [5.146] | | | [10.658] | | | [5.872] | | |
| Economic flows | | 12.748*** | | | -5.110 | | | 13.443*** | |
| | | [3.834] | | | [6.885] | | | [4.373] | |
| Economic restrictions | | | -1.173 | | | 10.122 | | | -1.994 |
| | | | [3.787] | | | [11.473] | | | [4.645] |
| Globalization#Social spending | 0.051 | | | 0.040 | | | 0.336 | | |
| | [0.275] | | | [0.516] | | | [0.465] | | |
| Flows#Social spending | | -0.157 | | | 0.282 | | | 0.008 | |
| | | [0.203] | | | [0.314] | | | [0.403] | |
| Restrictions#Social spending | | | 0.260 | | | -0.340 | | | 0.656 |
| | | | [0.257] | | | [0.597] | | | [0.400] |
| ln GDPpc | 0.454 | 0.713 | 1.304** | -1.951** | -1.796** | -2.052** | 1.030 | 1.359 | 2.166*** |
| | [0.704] | [0.648] | [0.618] | [0.903] | [0.897] | [0.926] | [0.918] | [0.854] | [0.810] |
| Dependency ratio | 0.149*** | 0.149*** | 0.133*** | 0.175** | 0.160** | 0.190** | 0.126*** | 0.143*** | 0.125*** |
| | [0.037] | [0.036] | [0.037] | [0.077] | [0.064] | [0.078] | [0.044] | [0.046] | [0.044] |
| Population with secondary education | -0.068** | -0.074** | -0.063* | -0.051* | -0.051* | -0.047 | -0.095** | -0.094** | -0.089** |
| | [0.034] | [0.034] | [0.032] | [0.029] | [0.028] | [0.030] | [0.047] | [0.047] | [0.044] |
| Constant | 24.428*** | 21.475*** | 25.082*** | 50.001*** | 53.434*** | 43.815*** | 21.865*** | 17.176** | 20.453** |
| | [6.622] | [6.359] | [6.330] | [14.008] | [12.427] | [13.017] | [8.454] | [8.287] | [8.145] |
| Observations | 513 | 513 | 512 | 143 | 143 | 143 | 370 | 370 | 369 |
| Number of countries | 123 | 123 | 122 | 34 | 34 | 34 | 98 | 98 | 97 |
| R-squared | 0.157 | 0.158 | 0.141 | 0.270 | 0.242 | 0.335 | 0.217 | 0.205 | 0.216 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Pooled estimation, without country fixed effects. R-squared corresponds to overall $R^2$.

Table A6 Globalization, inequality, and social spending — Full sample, and the subsamples of OECD and non-OECD countries, disposable income Gini

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | Full sample | | | OECD countries | | | Non-OECD countries | | |
| Social spending | 0.075 | 0.070 | -0.122 | -0.093 | -0.126 | -0.341 | -0.128 | 0.012 | -0.328 |
| | [0.184] | [0.137] | [0.183] | [0.225] | [0.135] | [0.292] | [0.289] | [0.247] | [0.247] |
| Economic globalization | 17.157*** | | | 6.764 | | | 17.157*** | | |
| | [4.502] | | | [6.751] | | | [5.655] | | |
| Economic flows | | 14.351*** | | | 6.895 | | | 13.425*** | |
| | | [3.046] | | | [4.804] | | | [3.833] | |
| Economic restrictions | | | 4.242 | | | -0.185 | | | 2.414 |
| | | | [3.654] | | | [6.263] | | | [4.624] |
| Globalization#Social spending | -0.563** | | | -0.323 | | | -0.194 | | |
| | [0.256] | | | [0.315] | | | [0.451] | | |
| Flows#Social spending | | -0.507*** | | | -0.329 | | | -0.277 | |
| | | [0.187] | | | [0.203] | | | [0.380] | |
| Restrictions#Social spending | | | -0.256 | | | 0.043 | | | 0.118 |
| | | | [0.239] | | | [0.328] | | | [0.391] |
| ln GDPpc | -1.385* | -1.196* | -0.721 | -3.001*** | -2.940*** | -2.999*** | -0.369 | -0.023 | 0.580 |
| | [0.759] | [0.697] | [0.691] | [1.122] | [1.122] | [1.075] | [0.994] | [0.918] | [0.886] |
| Dependency ratio | 0.118*** | 0.105*** | 0.097*** | 0.222*** | 0.225*** | 0.203*** | 0.103** | 0.113*** | 0.099** |
| | [0.037] | [0.035] | [0.036] | [0.061] | [0.062] | [0.061] | [0.043] | [0.043] | [0.041] |
| Population with secondary education | -0.045 | -0.049* | -0.043 | -0.067*** | -0.068*** | -0.060** | -0.066 | -0.067* | -0.061 |
| | [0.029] | [0.029] | [0.029] | [0.025] | [0.026] | [0.026] | [0.041] | [0.040] | [0.040] |
| Constant | 34.174*** | 34.310*** | 36.651*** | 51.141*** | 51.070*** | 56.443*** | 28.626*** | 25.516*** | 28.116*** |
| | [6.975] | [6.674] | [6.648] | [12.276] | [11.986] | [12.315] | [8.730] | [8.490] | [8.182] |
| Observations | 513 | 513 | 512 | 143 | 143 | 143 | 370 | 370 | 369 |
| Number of countries | 123 | 123 | 122 | 34 | 34 | 34 | 98 | 98 | 97 |
| R-squared | 0.430 | 0.424 | 0.424 | 0.672 | 0.673 | 0.658 | 0.213 | 0.211 | 0.207 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Pooled estimation, without country fixed effects. R-squared corresponds to overall $R^2$.

Table A7 System GMM – Full sample – Social spending

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | | Disposable income Gini | | | Market income Gini | |
| Lagged Gini | 0.178 | 0.286 | 0.066 | -0.009 | 0.072 | 0.086 |
| | [0.207] | [0.194] | [0.156] | [0.151] | [0.187] | [0.139] |
| Social spending | 0.101 | -0.104 | -0.068 | 0.342 | 0.303 | 0.218 |
| | [0.364] | [0.275] | [0.327] | [0.531] | [0.419] | [0.342] |
| Economic globalization | 9.503 | | | 21.375 | | |
| | [11.367] | | | [16.375] | | |
| Economic flows | | 3.688 | | | 11.334 | |
| | | [8.332] | | | [14.455] | |
| Economic restrictions | | | 8.622 | | | 7.189 |
| | | | [8.220] | | | [8.603] |
| Globalization#Social spending | -0.789 | | | -0.609 | | |
| | [0.660] | | | [0.896] | | |
| Flows#Social spending | | -0.520 | | | -0.702 | |
| | | [0.515] | | | [0.797] | |
| Restrictions#Social spending | | | -0.396 | | | -0.055 |
| | | | [0.541] | | | [0.533] |
| ln GDPpc | -0.378 | 0.076 | -1.206 | 0.486 | 1.668 | -0.248 |
| | [0.723] | [0.868] | [0.825] | [1.177] | [1.235] | [1.088] |
| Dependency ratio | 0.133 | 0.146 | 0.137** | 0.280** | 0.284** | 0.232*** |
| | [0.086] | [0.095] | [0.070] | [0.124] | [0.137] | [0.079] |
| Population with secondary | 0.103 | 0.157 | 0.055 | 0.196 | 0.238 | 0.132 |
| | [0.108] | [0.129] | [0.080] | [0.136] | [0.166] | [0.118] |
| Observations | 470 | 473 | 470 | 469 | 472 | 469 |
| Number of countries | 118 | 120 | 118 | 118 | 120 | 118 |
| Number of instruments | 30 | 30 | 30 | 30 | 30 | 30 |
| Hansen J-test (p-value) | 0.239 | 0.172 | 0.384 | 0.402 | 0.249 | 0.235 |
| Serial correlation AR (2) (p-value) | 0.885 | 0.950 | 0.957 | 0.210 | 0.180 | 0.121 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets.Time fixed effects included in all regressions.

Table A8 System GMM – Market income Gini – OECD and non-OECD – Education and Health spending

| | (1) | (2) | (3) Education spending | (4) | (5) | (6) | (7) | (8) | (9) Health spending | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OECD countries | | | Non-OECD countries | | | OECD countries | | | Non-OECD countries | |
| Lagged market income Gini | 0.317 | 0.307* | 0.351* | 0.050 | 0.117 | 0.311** | 0.528*** | 0.475*** | 0.496** | 0.151 | 0.282 | 0.267* |
| | [0.216] | [0.173] | [0.199] | [0.149] | [0.211] | [0.152] | [0.135] | [0.134] | [0.222] | [0.173] | [0.200] | [0.162] |
| Education spending, % of GDP | -1.967 | -1.939 | -4.064 | 0.849 | 0.129 | 0.563 | | | | | | |
| | [1.936] | [1.515] | [3.998] | [1.802] | [1.742] | [1.502] | | | | | | |
| Health spending, % of GDP | | | | | | | 3.962** | 3.082*** | 1.544 | 2.061 | 1.108 | 2.013 |
| | | | | | | | [1.755] | [1.129] | [3.888] | [1.836] | [2.551] | [1.567] |
| Economic globalization | -9.258 | | | 25.457 | | | 13.426 | | | 16.839 | | |
| | [13.267] | | | [21.411] | | | [15.726] | | | [14.412] | | |
| Economic flows | | -14.110 | | | 2.953 | | | 8.131 | | | 3.232 | |
| | | [10.790] | | | [13.661] | | | [12.823] | | | [15.202] | |
| Economic restrictions | | | -19.557 | | | 24.717 | | | -6.046 | | | 19.918** |
| | | | [23.343] | | | [18.175] | | | [24.216] | | | [9.256] |
| Globalization#Education spending | 2.813 | | | -1.225 | | | | | | | | |
| | [2.502] | | | [2.886] | | | | | | | | |
| Flows#Education spending | | 2.755 | | | 0.089 | | | | | | | |
| | | [2.308] | | | [2.344] | | | | | | | |
| Restrictions#Education spending | | | 5.126 | | | -1.107 | | | | | | |
| | | | [4.817] | | | [2.892] | | | | | | |
| Globalization#Health spending | | | | | | | -3.029 | | | -2.282 | | |
| | | | | | | | [2.369] | | | [2.886] | | |
| Flows#Health spending | | | | | | | | -1.761 | | | -1.000 | |
| | | | | | | | | [1.604] | | | [3.915] | |
| Restrictions#Health spending | | | | | | | | | 0.698 | | | -2.354 |
| | | | | | | | | | [5.037] | | | [2.467] |
| ln GDPpc | -1.345 | -0.532 | -1.467 | 1.402 | 2.644*** | 0.723 | -3.133*** | -3.506*** | -3.235*** | 1.365 | 1.852 | 0.870 |
| | [1.326] | [0.921] | [2.051] | [1.349] | [0.960] | [1.283] | [0.887] | [1.109] | [1.123] | [1.546] | [1.358] | [1.217] |
| Dependency ratio | 0.077 | 0.106 | 0.054 | 0.231*** | 0.213*** | 0.183*** | 0.163*** | 0.131** | 0.120 | 0.165* | 0.145 | 0.178** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | [0.052] | [0.072] | [0.354] | [0.067] | [0.078] | [0.070] | [0.061] | [0.060] | [0.094] | [0.086] | [0.095] | [0.088] |
| Population with secondary | -0.010 | 0.020 | 0.012 | 0.011 | 0.012 | 0.008 | 0.010 | 0.016 | 0.063 | 0.016 | 0.025 | 0.031 |
|  | [0.054] | [0.059] | [0.088] | [0.096] | [0.098] | [0.081] | [0.063] | [0.071] | [0.152] | [0.122] | [0.138] | [0.103] |
| Observations | 188 | 188 | 188 | 357 | 357 | 357 | 142 | 142 | 142 | 345 | 345 | 345 |
| Number of countries | 34 | 34 | 34 | 93 | 93 | 93 | 34 | 34 | 34 | 95 | 95 | 95 |
| Number of instruments | 41 | 41 | 41 | 41 | 41 | 41 | 30 | 30 | 30 | 30 | 30 | 30 |
| Hansen J-test  (p-value) | 0.924 | 0.815 | 0.514 | 0.397 | 0.242 | 0.495 | 0.567 | 0.364 | 0.236 | 0.0410 | 0.0242 | 0.0189 |
| Serial correlation  AR 2 (p-value) | 0.350 | 0.297 | 0.298 | 0.883 | 0.803 | 0.998 | 0.716 | 0.598 | 0.654 | 0.332 | 0.326 | 0.378 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets.Time fixed effects included in all regressions.

Table A9 System GMM – Disposable income Gini – OECD and non-OECD – Education and Health spending

| | (1) | (2) | (3) Education spending | (4) | (5) | (6) | (7) | (8) | (9) Health spending | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OECD countries | | | Non-OECD countries | | | OECD countries | | | Non-OECD countries | | |
| Lagged disposable income Gini | 0.640*** | 0.662*** | 0.471** | -0.054 | -0.024 | 0.184 | 0.643*** | 0.742*** | 0.650*** | 0.109 | 0.212 | 0.109 |
| | [0.129] | [0.101] | [0.197] | [0.159] | [0.249] | [0.255] | [0.176] | [0.195] | [0.127] | [0.168] | [0.200] | [0.203] |
| Education spending, % of GDP | -0.289 | -0.446 | 0.134 | 1.674 | -0.064 | 1.238 | | | | | | |
| | [1.532] | [1.117] | [1.503] | [1.076] | [1.413] | [1.240] | | | | | | |
| Health spending, % of GDP | | | | | | | 0.124 | 0.428 | 0.178 | 1.018 | -0.598 | 1.001 |
| | | | | | | | [1.408] | [1.169] | [1.812] | [1.997] | [2.167] | [1.819] |
| Economic globalization | 4.744 | | | 27.197* | | | 2.565 | | | 0.107 | | |
| | [8.179] | | | [14.583] | | | [5.399] | | | [0.130] | | |
| Economic flows | | 0.093 | | | 5.471 | | | 4.756 | | | -0.001 | |
| | | [6.120] | | | [12.566] | | | [4.068] | | | [0.116] | |
| Economic restrictions | | | 9.207 | | | 24.412* | | | 2.400 | | | 0.125 |
| | | | [11.844] | | | [14.768] | | | [11.414] | | | [0.101] |
| Globalization#Education spending | -0.772 | | | -3.097* | | | | | | | | |
| | [1.988] | | | [1.756] | | | | | | | | |
| Flows#Education spending | | -0.464 | | | -0.235 | | | | | | | |
| | | [1.493] | | | [1.845] | | | | | | | |
| Restrictions#Education spending | | | -1.066 | | | -2.981 | | | | | | |
| | | | [1.949] | | | [2.098] | | | | | | |
| Globalization#Health spending | | | | | | | -0.534 | | | -0.021 | | |
| | | | | | | | [1.055] | | | [0.029] | | |
| Flows#Health spending | | | | | | | | -0.755 | | | 0.000 | |
| | | | | | | | | [0.709] | | | [0.032] | |
| Restrictions#Health spending | | | | | | | | | -0.285 | | | -0.019 |
| | | | | | | | | | [2.200] | | | [0.025] |
| ln GDPpc | -1.363 | -0.357 | -1.389 | -0.255 | 0.494 | -0.004 | -1.109 | -1.155 | -1.634** | -0.024 | 0.485 | -0.036 |
| | [0.885] | [0.718] | [0.991] | [1.004] | [0.831] | [1.351] | [0.748] | [0.810] | [0.764] | [1.156] | [1.032] | [1.050] |
| Dependency ratio | 0.084 | 0.125 | 0.186 | 0.135* | 0.102 | 0.125 | 0.082 | 0.075 | 0.074 | 0.077 | 0.054 | 0.136 |
| | [0.082] | [0.081] | [0.115] | [0.078] | [0.079] | [0.090] | [0.050] | [0.045] | [0.056] | [0.077] | [0.082] | [0.089] |
| Population with secondary | -0.035 | -0.016 | -0.012 | -0.091 | -0.134* | -0.070 | -0.054 | -0.035 | -0.060 | -0.075 | -0.088 | -0.029 |

| | [0.036] | [0.032] | [0.058] | [0.079] | [0.081] | [0.079] | [0.062] | [0.078] | [0.043] | [0.095] | [0.118] | [0.086] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Observations | 188 | 188 | 188 | 358 | 358 | 358 | 142 | 142 | 142 | 346 | 346 | 346 |
| Number of countries | 34 | 34 | 34 | 93 | 93 | 93 | 34 | 34 | 34 | 95 | 95 | 95 |
| Number of instruments | 41 | 41 | 41 | 41 | 41 | 41 | 30 | 30 | 30 | 30 | 30 | 30 |
| Hansen J-test (p-value) | 0.923 | 0.645 | 0.914 | 0.362 | 0.354 | 0.196 | 0.164 | 0.279 | 0.113 | 0.110 | 0.116 | 0.0846 |
| Serial correlation AR 2 (p-value) | 0.661 | 0.706 | 0.531 | 0.893 | 0.803 | 0.988 | 0.853 | 0.919 | 0.788 | 0.802 | 0.711 | 0.912 |

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in brackets.Time fixed effects included in all regressions.