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# Working Paper No. 341: Economic globalisation, inequality and the role of social protection

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# *Preface*

Economic globalisation – the integration of the world economy through the liberalisation of trade and finance – is arguably one of the most important trends shaping the world today, one that is impacting human well-being in different ways across the world and income groups.

The importance of looking at the role of social protection in the inequality-globalisation nexus follows directly from the consideration that when economic globalisation creates both winners and losers, the demand for social protection may increase, leading to a rise in public social spending that could mitigate the impact of economic globalisation on inequality. Testing such hypotheses requires research aimed at identifying how economic globalisation and social protection relates to inequality across countries.

This paper uses different measures of inequality to shed light on the empirical association between within-country income inequality, economic globalisation, and social protection. While examining the links between income inequality on the one hand, and economic globalisation and social protection spending on the other hand, the paper further assesses the sensitivity of the results to the use of different income inequality data.

Overall, the evidence produced in this analysis confirms previous findings that economic globalisation, especially economic flows, is associated with higher income inequality, and that social protection expenditure is negatively associated with inequality. While the sample is too small to appropriately capture an interaction between social protection and globalisation and thus to draw conclusions on the potential cushioning effect of social protection expenditure in the globalisation-inequality nexus, descriptive findings suggest that among countries with high social protection expenditure, the more globalised countries display lower levels of inequality.

This paper was produced as part of the research component of the EU Social Protection Systems Programme implemented by the OECD Development Centre and the government of Finland's National Institute for Health and Welfare (THL). We hope that it will enrich the evidence-based knowledge on the role of social protection in promoting inclusive growth.

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## *Résumé*

Cette analyse examine les liens entre la mondialisation économique, les dépenses en protection sociale, et les taux d'inégalités de revenus au sein des pays. Nous mesurons cette relation en utilisant les données de l'Étude sur les Revenus de Luxembourg (LIS) et la base de données des inégalités de revenus standardisée (SWIID). Les résultats basés sur la LIS confirment une relation positive entre la mondialisation économique, en particuliers les flux commerciaux, et le niveau d'inégalités économiques. La protection sociale est au contraire associée à un niveau plus faible des inégalités.


**Mots clés** : Globalisation, Inégalités de Revenus, Protection Sociale

**Classification JEL :** D63, F61, H53.


## *Abstract*

This paper examines the link between economic globalisation, social protection expenditure, and within-country income inequality. We examine the relationship using income inequality data from both the Luxembourg Income Study (LIS) and the Standardized World Income Inequality Database (SWIID). The results based on the LIS data confirm previous findings that economic globalisation, especially economic flows, associates with higher income inequality, and that social protection expenditure are negatively associated with inequality.


**Keywords:** D63, F61, H53.

**JEL classification:** Globalisation, Income Inequality, Social Protection

# 1. Introduction

Globalisation – the process by which different economies and societies become more closely integrated – is arguably one of the most important trends shaping the world today. As indicated in a recent survey by Potrafke (2015), globalisation has been linked to a number of desirable social and economic outcomes, such as spurring economic growth, promoting gender equality and improving human rights, without some of the sometimes feared downsides. Potrafke concludes that globalisation has not eroded welfare state activities or labour market institutions. A study of OECD countries found that neither rising trade integration nor financial openness had a significant impact on wage inequality, but rather that institutional and technological changes did (OECD, 2011).

Several papers, however, have found that economic globalisation – liberalisation of trade rules and increasing trade flows – associates with higher within-country income inequality (e.g. see Dreher and Gaston, 2008b; Bergh and Nilsson, 2010; Martinez-Vazquez et al., 2012). In OECD countries for instance, globalisation may widen inequality due to offshoring and labour income inequality, including a boosting of top incomes (OECD, 2012). The link between economic globalisation and income inequality is however not robust across studies (for a thorough review of evidence see Foerster and Toth, 2015). In a recent survey, Marsh (2016) concludes that "thus far, we cannot argue that the globalisation of trade and finance is a major cause of inequality because, though the most common finding is that globalisation increases inequality, it is almost as common for studies to find that it has no net effect". The pattern thus suggests an over-arching research question: Why is economic globalisation found to be associated with higher within-country income inequality in several studies, whereas no significant effect is found in other studies?

A possible explanation is variation between studies when it comes to time period, sample size and data sources. But there are also more fundamental reasons that could account for the variation in the empirical results, suggesting heterogeneity in the association between globalisation and income inequality. First, standard trade theory suggests that the effect of economic globalisation on the within-country income distribution is likely to depend on the level of development, i.e. to vary between developed and developing countries. Second, the so-called compensation hypothesis (Katzenstein, 1985) is often invoked to suggest that some countries develop social insurance institutions to mitigate the adverse distributional effects of globalisation, suggesting that the association between globalisation and inequality is weaker in countries with higher social protection expenditure. In other words, there may be a cushioning effect in the sense that social expenditure acts as a cushion that dampens the inequality increasing effect of globalisation.

The importance of the level of development follows the standard analysis of trade liberalisation and inequality in the Heckscher-Ohlin trade model, for which Kremer (2006) and Kremer and Maskin (2003) provide accessible descriptions and overviews. Simply put, the model suggests that developed countries with a high skilled to unskilled workers ratio will see the wages of the skilled workers fall when trade opens with developing countries with low skilled to unskilled workers ratios. Conversely, unskilled workers would see their wage rise in developing countries when opening trade with developed countries. This equalisation of factors will lead to a decrease in inequality in developing countries but rising inequality in developed countries.

The importance of social protection follows most directly from the definition of social protection expenditure: as globalisation creates both winners and losers, countries with higher social protection expenditure should see smaller income differences induced by globalisation. Joumard et al. (2012) for example find cash transfers to reduce inequality by about 19% in OECD countries in the late 2000s, although noting important variations in the level of redistributive impact reflecting difference in their size and progressivity.

The direct link between social protection expenditure and globalisation is analysed in the literature on the so-called compensation hypothesis, which asserts that globalisation raises (externally generated) economic instability, thereby increasing public demand for social protection. The compensation hypothesis has been used to explain the positive correlation between economic openness and social security institutions, and is often attributed to Rodrik (1998) or Katzenstein (1985). Cameron (1978) explained the positive association between trade exposure and the size of government by suggesting that small open economies faced incentives to shelter their economies from the competitive risks of the international economy. A similar reasoning appears also in Lindbeck (1975).

Several links in the compensation hypothesis have been questioned on both empirical and theoretical grounds. Garrett (2001) notes that the correlation between openness and social spending holds in levels, but not for changes. Down (2007) points to a more fundamental theoretical problem with the compensation hypothesis, in that economic theory suggests that expansion of international trade should give rise to risk diversification, and thus should promote (rather than reduce) stability. The openness-volatility link is questioned on similar theoretical grounds also by Kim (2007). Both Kim and Down present empirical evidence against the compensation hypothesis, suggesting that more open economies are in fact not more volatile. More recently, Dallinger (2014) shows that the more open the economy of a country is, the lower the demand for social security of its citizens – thus, according to the compensation hypothesis, the correlation should have the opposite sign.

This paper uses data on social expenditure to shed light on the empirical association between economic globalisation, income inequality and social protection.

In summary, we test the following two hypotheses:

- H1: Economic globalisation is associated with higher within-country inequality of net income.
- H2: Social protection expenditure is associated with lower within-country inequality of net income.

Similar work has been conducted by Rudra (2004), though using a sample of countries and using Gini coefficients that were not comparable across countries and time (as discussed further below). Moreover, Rudra (2004) focused on economic flows (i.e. trade and investment), while we examine separately the effects of economic regulations and of economic flows. The main differences between Rudra's study and this paper are summarised in Table 1.

**Table 1. Empirical differences between Rudra (2004) and the present study**

| Aspect | Rudra (2004) | This study |
|---|---|---|
| Measure of globalisation | Trade flows and portfolio flows | Economic globalisation disaggregated into economic flows and economic regulations, based on the KOF index (Dreher, 2006) |
| Data source for social security spending | IMF Governance Finance Statistics | ILO social protection expenditure data |
| Inequality measures | Different types of Gini coefficients (Deininger and Squire, 1996) | Gini coefficients and the 80/20 income ratio for household disposable income (LIS 2015) |
| Sample and time period | 35 developing countries, 11 OECD countries, 1972-1996 | 20 non-OECD countries, 30 OECD countries, 1980-2010 |
| Main findings | Social spending has a redistributive effect in OECD countries, while globalisation seems to not be significant – partly because OECD economies have been mostly open and globally integrated for quite some time. In general, social spending exacerbates inequality in developing countries, when the flows increase. | Social spending is associated with lower income inequality, while economic globalisation is associated with higher inequality. The effect comes mainly from flows rather than policies. |

In short, our findings are that economic globalisation, in particularly trade flows, increases income inequality. We also find that social protection expenditure is associated with lower income inequality, though this finding cannot be interpreted as a causal effect.

The paper proceeds as follows: Section II discusses definitions and data challenges when exploring the globalisation-inequality-social protection nexus, and presents our data. Section III defines our empirical strategy and Section IV presents our empirical findings, including several robustness test and re-examinations using other data sources. Section V concludes.

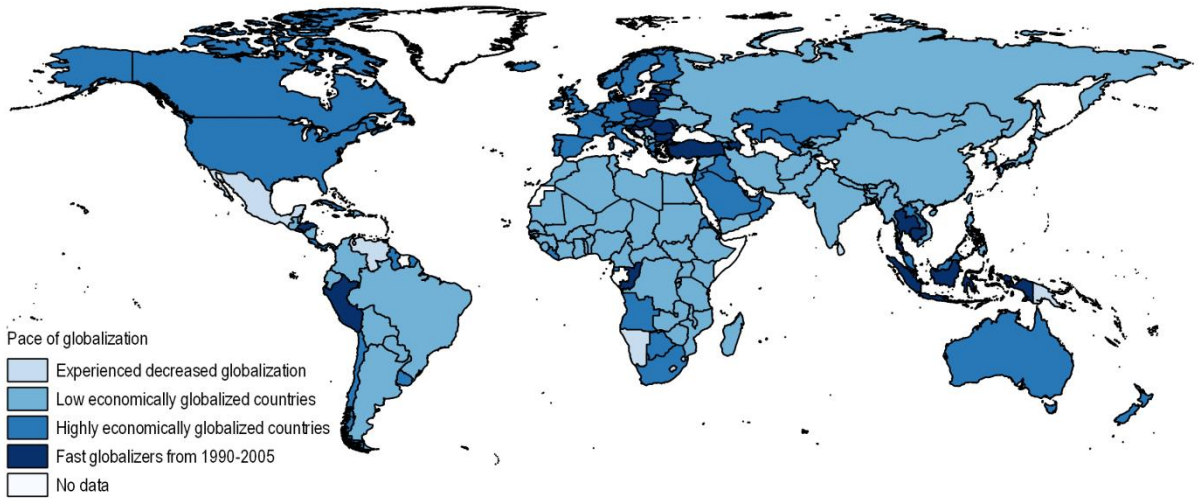
# 2. Income inequality and social protection: Definitions and data challenges

## 2.1. Economic globalisation

Globalisation is a multidimensional phenomenon that typically refers to the process by which different economies and societies become more closely integrated. Economic globalisation refers to flows of trade and investments, as well as to trade rules such as tariffs and non-tariff trade barriers. This paper uses what has become known as the KOF-index of globalisation introduced by Dreher (2006) that provides annually comparable country-level data on globalisation for most countries in the world from 1970 onwards, normalised to an index that ranges from 0 to 100. In addition to the broad country coverage, the index allows economic globalisation to be separated into economic policies (such as trade barriers, tariffs, quotas, and investment regulations) and economic flows (reflecting imports, exports, foreign portfolio investment, and foreign direct investment).

Globalisation in general has been increasing over the most recent decades, but some countries have been affected more than others. Based on calculations of the median for economic globalisation as measured by the KOF-index in 1990 and 2005, Figure 1 illustrates highly globalised countries that were above the median value both in 1990 and 2005, low globalised countries that were below the median both years, fast globalisers that were below the 1990 median and above the 2005 median, and finally countries that were above the 1990 median but below the 2005 median. Most developed countries belong to the group of highly globalised countries, while there is substantial variation among other countries.

**Figure 1. The dynamics of economic globalisation 1990-2005**

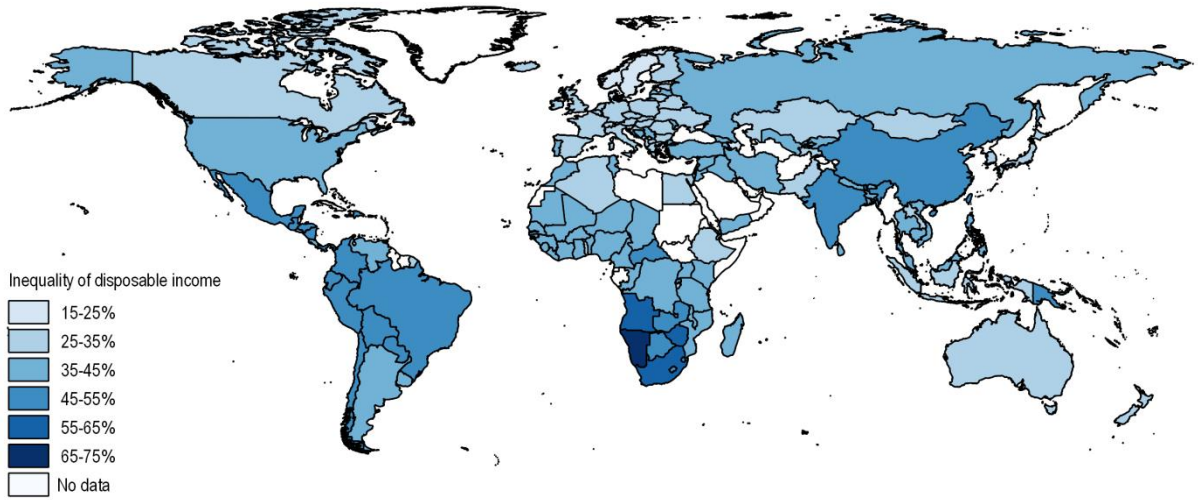



*Source*: Dreher (2006), "Does Globalization Affect Growth? Empirical Evidence from a new Index".

## 2.2. Income inequality

The most commonly used measure of inequality is the Gini coefficient, which has a straightforward interpretation: for completely egalitarian income distributions in which the whole population has the same income, the Gini coefficient would take a value of zero; conversely, a value of one would indicate that all income within country is concentrated by one person. Figure 2 illustrates variation in the Gini coefficient of net income inequality (income after accounting for direct taxes and public cash transfers) across countries. We focus on net income (after direct taxes and transfers), because it includes the effect of public redistribution, and because it is the distribution that actually matters for peoples' consumption possibilities (for a further discussion, see Brady and Sosnaud 2009).

**Figure 2. Inequality of disposable income worldwide in 2005, percentage**




*Source*: *Standardized World Income Inequality Database 4.0*.

Gini coefficients can be calculated for gross income (before taxes and transfers), for net income (after taxes and transfers), for consumption expenditure, for individuals or for households, and they may or may not include capital gains. The large variety of definitions means that coefficients from different sources cannot directly be compared.

The lack of comparable Gini coefficients both between countries and over time has long been a problem in inequality research. While Figure 2 uses data from the SWIID (the Standardized World Income Inequality Database, created by Solt, 2009), our baseline findings rely on data from the Luxembourg Income Study (LIS). The LIS data are based on reliable micro-data from national household income surveys. The downside of this source is that the LIS focuses mainly on high and middle income countries, and the sample covers 45 countries at the time of writing. Many scholars therefore turn to the data from Deininger and Squire (1996) and later versions thereof. It must be noted that this database combines Gini coefficients of many different types and from many different sources, which means that they cannot be used "out of the box", directly from the database. For instance, Deininger and Squire (1996) recommend adding three points to net-income-based inequality observations to make them comparable with the gross-income-based observations. Such a constant adjustment procedure is a bit crude, because

the difference between the gross and net income Gini coefficients depends both on the degree to which taxes and transfers are progressive and on how people's behaviour adapts to such redistribution. A bigger problem, however, is that such advice has been customary ignored, with many studies using the data available in the Deininger and Squire (1996) database "as is". Rudra (2004) is one such case, which emphasises the need to re-examine the theoretical question in point.

The goal of the SWIID is to convert available Gini coefficients of different types for all countries into the LIS standard, relying on the fact that different types of Gini coefficients display systematic relationships. Whether such adjusted inequality data can be trusted or not has been debated (see Jenkins, 2015; Ferreira, et al. 2015; Solt, 2015). For this reason, we run an additional robustness check of our findings where the LIS data are replaced by data from the SWIID, while keeping the sample fixed to the countries covered by the Luxembourg Income Study. As discussed further in Section IV, the SWIID data produce somewhat different results. We conclude that the wisest strategy for the purposes of this study is to rely on the data from the LIS, despite the small number of countries included.

Another advantage of using LIS-data is that we can also study the income quintile ratio (the 80s/20s ratio). The income quintile ratio is calculated as the ratio of income received by the top quintile of the population (20% with the highest income) to that received by the bottom quintile (20% with the lowest income). Using this measure reduces the effect on the statistics of outliers at the very top and bottom of the distribution; obviously, it also does not reflect inequality changes in the middle 60% of the income distribution. In summary, by using LIS-data we accept a smaller sample but we can say with great certainty what happens to the income distribution.

Table 2 presents summary statistics on income inequality illustrating differences between OECD and non-OECD sub-samples.

**Table 2. Summary statistics of inequality data**

| Variables / Source | Obs. | Countries | Mean | SD | Min | Max |
|---|---|---|---|---|---|---|
| *OECD countries* | | | | | | |
| LIS Gini coefficient (LIS 2016) | 110 | 30 | 29.20 | 5.33 | 20.50 | 48.07 |
| LIS Income quintile ratio 80/20 (LIS 2016) | 110 | 30 | 2.39 | 0.48 | 1.73 | 4.30 |
| SWIID Gini coefficient (Solt, 2009) | 110 | 30 | 29.41 | 5.24 | 20.84 | 48.60 |
| *Non-OECD countries* | | | | | | |
| LIS Gini coefficient (LIS 2016) | 32 | 20 | 38.64 | 10.25 | 18.90 | 59.05 |
| LIS Income quintile ratio 80/20 (LIS 2016) | 32 | 20 | 3.57 | 1.45 | 1.68 | 7.26 |
| SWIID Gini coefficient (Solt, 2009) | 32 | 20 | 39.05 | 9.95 | 22.53 | 59.40 |

*Note*: The summary statistics are calculated for the operative sample, conditional on a full set of control variables. The SWIID Gini is used only as a robustness test. Number of observations reflect countries x year.
*Source*: Authors' calculations.

## 2.3. Social protection expenditure

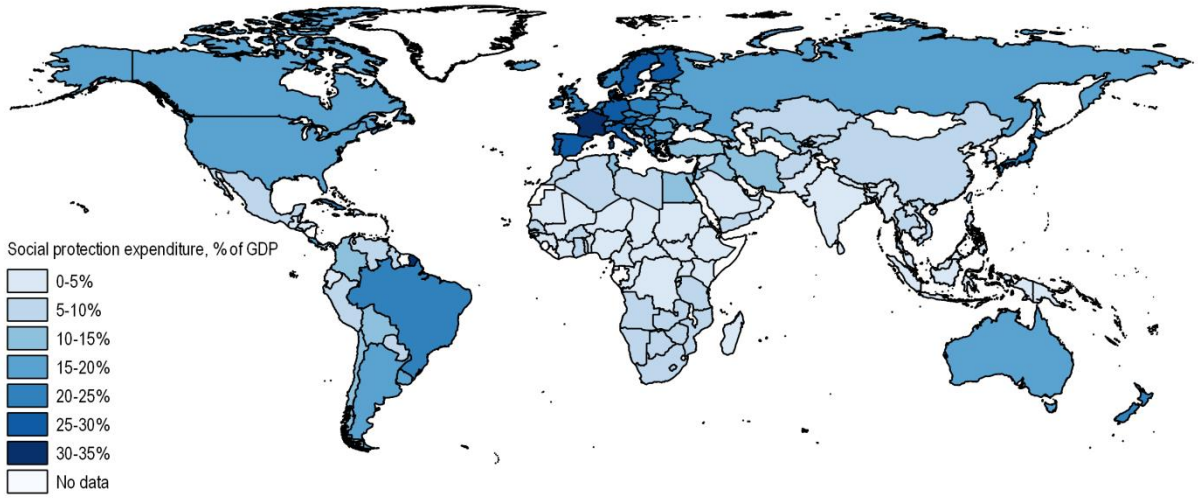
Several sources provide information on country-level social protection expenditure. Our baseline specification relies on the ILO Social Expenditure Database (International Labour Organization, 2014), which includes aggregate and disaggregated data on public social spending. Estimates in the ILO database are based on various sources, including National statistics, the OECD Social Expenditure Database (SOCX[2]), the IMF

[2] For more information see Adema, Fron and Ladaique, 2011.

Government Finance Statistics,[3] the European Commission Social Protection Database (ESSPROS), Asian Development Bank indicators for Asia and the Pacific. Total annual public social protection expenditure is defined by the ILO as the sum of expenditure (including benefit expenditure and administration costs) of all existing public social security/social protection schemes or programmes in a country. The scope of the indicators corresponds to 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, survivors' benefit, plus other income support and assistance programmes, including conditional cash transfers, available to the poor and not included under the above classes.

To account for country size and level of development, social expenditure is measured relative to GDP. Our baseline thus uses one of the most common ways to compare social protection efforts across countries. Figure 3 illustrates the cross-country variation in social protection expenditure. Social spending is highest in Europe (where it typically amounts to 25-30% of GDP), and lowest in Africa and South-East Asia (where it is typically less than 10% of GDP).

**Figure 3. Public social protection expenditure worldwide in 2010, percentage of GDP**




*Source*: ILO (2014), *World Social Protection Report 2014/15*.

Table 3 summarises the sources, time period, and some basic descriptive statistics for social protection spending in OECD and non-OECD countries.

[3] For more information see IMF, 2014.

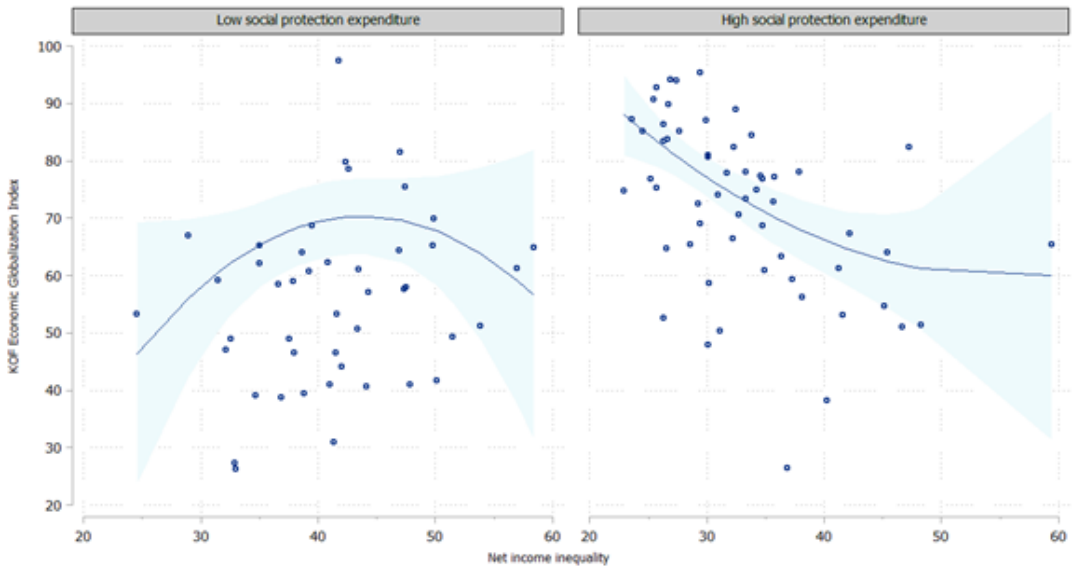
**Table 3. Summary statistics of social protection spending data for OECD and non-OECD countries**

| Variables / Source | Obs. | Countries | Period | Mean | SD | Min | Max |
|---|---|---|---|---|---|---|---|
| *OECD countries* | | | | | | | |
| Social protection expenditure (including health), % of GDP | 110 | 30 | 1990-2010 | 21.31 | 5.47 | 4.33 | 32.03 |
| *Non-OECD countries* | | | | | | | |
| Social protection expenditure (including health), % of GDP | 32 | 20 | 1990-2010 | 13.38 | 6.55 | 1.54 | 25.10 |

*Source*: ILO (2014), *World Social Protection Report 2014/15*.

Figures 2 and 3 together highlight the fact that countries with higher social protection expenditure tend to be countries with lower income inequality. This relationship is also found in more detailed studies, such as Bradley et al. (2003) and Bergh and Bjørnskov (2014). In terms of whether social protection expenditure could moderate the relationship between globalisation and income inequality, Figure 4 shows that the cross-country relationship between globalisation and income inequality differs a lot between countries with high and low social protection expenditure. Among high-protection countries, more globalised countries have lower income inequality. Among low-protection countries, there is no clear linear pattern (although the data might suggest an inverse-U relationship).

**Figure 4. Globalisation and inequality among countries with high and low social protection expenditure in 2010**




*Source*: Authors' calculations.

## 2.4. Control variables

The baseline specification includes several control variables; all suggested by previous empirical research on the determinants of income inequality (see Bergh and Nilsson 2010). The log of GDP per capita (PPP adjusted, in constant USD) and age dependency ratio are taken from the WDI database (World Bank, 2016). While more developed countries typically have higher levels of welfare state, numerous studies suggest that the

ratio of the non-working age population (ages 0-14 and 65 and above) to the total labour force could drive inequality levels up due to lower productivity levels, shrinking domestic savings and tax payments, and changing consumption structure. We also include the percentage of adult population (age > 15) who completed secondary education (Barro and Lee, 201 3. Based on the idea of a Kuznets-curve, we would expect that a higher share of educated people will be correlated with higher inequality in poor countries, and with lower inequality in rich countries (as discussed by Bergh and Fink, 2008).

Additional controls are used as robustness checks, including an index of overall economic freedom and freedom to trade internationally from the Economic Freedom of the World Index (Gwartney, et al. 2015), employment in industry and employment in services as a share of total employment (World Bank, 2016), political rights and civil liberties rating (Freedom House, 2015), as well as technological change (measured through investments in innovation and communication technologies or research and development, World Bank, 2016).

Descriptive statistics for all control variables are shown in the Annex (Table A.1).

# 3. Econometric specification

Our baseline model uses ordinary least squares (OLS) in a model that includes country and time fixed effects:

$$Inequality_{it} = Glob_{it} + Economy_{it} + SPE_{it} + \vartheta_i + \tau_t + \varepsilon_{it} \quad (1)$$

In equation (1) $Inequality$ is the Gini index of net income inequality or the 80s/20s quintile ratio, depending on the model specification, $Glob$ is an index of globalisation (economic globalisation, economic flows, or economic restrictions, depending on specification), and $Economy$ is a set of conventional economic factors affecting income inequality, including log of GDP per capita, age dependency ratio, and the share of population who completed secondary education. $SPE$ stands for social protection expenditure, $\vartheta_i$ and $\tau_t$ are country and time fixed effects, and $\varepsilon_{it}$ is an error term. Data are grouped in five year intervals, starting in 1970 or 1990 (as indicated in Table 3) and ending in 2010.

Since Figure 4 gives us reason to expect that the effect of globalisation on inequality may be non-linear, we also estimate a curvilinear regression as a robustness check:

$$Inequality_{it} = Glob_{it} + Glob_{it}^2 + Economy_{it} + SPE_{it} + \vartheta_i + \tau_t + \upsilon_{it} \quad (2)$$

where $Glob^2$ is the quadratic expression for the globalisation index and $\upsilon_{it}$ is the non-linear error term.

Further robustness checks include various economic and institutional measures that can intervene in the globalisation-inequality interplay, resulting in the following equation:

$$Inequality_{it} = Glob_{it} + Economy_{it} + CountryChar_{it} + SPE_{it} + \vartheta_i + \tau_t + \varepsilon_{it} \quad (3)$$

where $CountryChar$ stands for economic freedom, political rights and civil liberties, share of employment in industry and services, or infant mortality, depending on the model.

# 4. Results

## 4.1. The effect on economic globalisation and social expenditure on inequality

We first examine the effect of globalisation on income inequality. This allows examining whether results for 78 countries in Bergh and Nilsson (2010) also hold in our sample with higher quality data from the LIS. Baseline results for the full sample are presented in Table 4.

In the full sample of countries, economic globalisation is significantly associated with higher inequality, as measured by the Gini coefficient. The effect on the 80/20 ratio is lower but more significant. Analysing the effect of trade flows and economic restrictions separately suggests that the positive effect on income inequality is mainly driven by flows. The coefficient on social protection expenditure is negative and significant, indicating that social protection expenditure is associated with lower income inequality in the full sample of countries. Among the control variables, the effect of economic development is negative and significant, suggesting that developed countries have lower income inequality. The dependency ratio and secondary education variables are both generally insignificant, as expected in a sample that pools developed and developing countries. All specifications include country- and time-fixed effects with year dummies being jointly significant.

**Table 4. Globalisation, social protection spending and inequality (LIS Gini coefficient and LIS 80/20 quintile ratio)**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | LIS Gini | | LIS 80/20 Ratio | |
| Social protection expenditure | -0.260** | -0.241* | -0.024** | -0.022** |
| | [0.122] | [0.121] | [0.010] | [0.010] |
| Economic globalisation | 0.094** | | 0.006 | |
| | [0.045] | | [0.005] | |
| Economic flows | | 0.076* | | 0.007** |
| | | [0.041] | | [0.003] |
| ln GDPpc | -7.356** | -6.432** | -0.832*** | -0.813** |
| | [3.315] | [3.180] | [0.300] | [0.307] |
| Dependency ratio | -0.067 | -0.076 | -0.010* | -0.011* |
| | [0.090] | [0.091] | [0.006] | [0.006] |
| Population with secondary education | -0.002 | -0.008 | -0.004 | -0.005 |
| | [0.028] | [0.028] | [0.003] | [0.003] |
| Constant | 104.339*** | 97.254*** | 11.486*** | 11.311*** |
| | [35.551] | [34.874] | [3.192] | [3.212] |
| Observations | 142 | 142 | 142 | 142 |
| R-squared | 0.344 | 0.336 | 0.221 | 0.240 |
| Number of countries | 43 | 43 | 43 | 43 |
| R-squared adj. | 0.299 | 0.291 | 0.168 | 0.189 |

*Note*: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.
*Source*: Authors' calculations.

## 4.2. Robustness tests

The positive relationship between economic globalisation and income inequality in our baseline is robust to several changes in the econometric specification, including the introduction of additional controls that capture institutional differences between countries. The same holds for the relationship between expenditure on social protection and income inequality. Table 5 summarises various robustness tests that we implemented, while full results are shown in Tables A.2-A.5 in the Annex.

**Table 5. Robustness of the main results**

| Robustness test | Findings |
|---|---|
| Adding a quadratic globalisation term, allowing the globalisation-inequality relationship to be non-linear | Economic globalisation is related to higher inequality, but at a decreasing rate |
| Controlling for infant mortality | Main results remain. |
| Controlling for political rights and civil liberties | Main results remain. Coefficient on civil liberties is always positive. |
| Controlling for economic freedom (aggregate index and freedom to trade internationally) | Main results remain. |
| Controlling for employment shares in industry and service sector | Main results remain. Employment shares are always negative. |
| Lagging social expenditure | Main results remain |
| Replacing LIS data with SWIID data | Main results remain |
| Controlling for technological change (innovation and communication technologies investment or R&D costs | Main results remain |

In Table A.5 in the Annex, we replicate the results for the Gini coefficients presented in Table 4 using the data from the SWIID instead of the LIS. As expected, and as indicated by the descriptive statistics in Table 2, the two data sources are very highly correlated ($r = 0.98$). Results are qualitatively unchanged: social protection expenditure is still negatively associated with income inequality, while economic globalisation is positively associated with income inequality.

One limitation of our approach lies in the potential for social protection expenditure to be themselves a function of income inequality levels, corresponding to an issue of endogeneity. The likely bias resulting from such endogeneity would however be upwards, as countries are more likely to spend more on social protection when income inequality increases. The negative coefficient of social protection expenditure on income inequality in the presence of a potential upwards bias thus further strengthens our finding of a negative relationship between social protection and income inequality. More so, given that we use net income as the basis for income inequality, the effect of social protection expenditure on inequality captures dimensions beyond direct cash transfers, such as services, and as such may further be underestimated.

# 5. Concluding discussion

The global trend towards increasing globalisation since the 1990s seems to have two different distributional consequences: on the one hand, income inequality between countries has declined, while economic inequality within countries has increased (Bourguignon, 2016). Lakner and Milanovic (2015) show that the global growth incidence curve (showing which parts of the global distribution benefited the most and the least during globalisation) has a distinct supine S shape, with gains highest around the median and the top. For most inequality measures this implies that inequality within countries is not rising fast enough to offset the decline in inequality between countries.

Against this background, it is natural to wonder whether countries could enjoy the benefits of economic globalisation without suffering adverse effects on the within-country income distribution. We find that higher social protection expenditure is significantly related to lower income inequality, and that higher economic globalisation is linked to higher income inequality – in line with previous findings in the literature. While the sample is too small to capture an interaction between social protection and globalisation, and thus to draw conclusions on the cushioning effect of social protection expenditure in the globalisation-inequality nexus, descriptive findings suggest that more globalised countries display lower levels of income inequality in the sample of countries with high social protection expenditure.

An important limitation revealed by this work lies in the availability and quality of indicators for both social protection and inequality. While the direction of the relationship between inequality on the one hand, and economic globalisation and social protection on the other hand appears robust across databases, the association is no longer statistically significant with the SWIID data indicating that one should be careful about interpretation of the results based on the latter database. This issue may be resolved in the future when the LIS expands its coverage, but for now we should acknowledge the persisting uncertainty about the income inequality data.

The issue of data harmonisation is perhaps even more worrisome in the case of social protection expenditure indicators. Conceptually, social protection expenditure can be problematic in their interpretation, due to their imperfect correlation with coverage, their potential countercyclical nature, changes in the needs of the population – say lower demand for unemployment benefits with rising employment rates –, and unequal distribution of benefits across the population. Beyond this conceptual issue however, although social protection has been recognised as a goal in the Sustainable Development Goals agenda, measurement issues, and in particular the harmonisation of indicators across countries and regions, appear to remain important.

# Annex A.

**Table A.1. Descriptive statistics**

| Variable | OECD sample | | | | | Non-OECD sample | | | | | Source |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Obs. | Mean | SD | Min | Max | Obs. | Mean | SD | Min | Max | |
| KOF Economic Index of Globalisation | 110 | 76.53 | 11.65 | 47.88 | 98.03 | 32 | 60.89 | 13.34 | 39.40 | 90.34 | Dreher, 2006 |
| KOF economic flows | 110 | 69.56 | 18.52 | 24.21 | 100.00 | 32 | 58.91 | 13.94 | 32.17 | 91.84 | Dreher, 2006 |
| KOF economic regulations | 110 | 84.15 | 9.45 | 54.78 | 98.26 | 32 | 62.87 | 15.99 | 35.97 | 94.73 | Dreher, 2006 |
| Ln GDP per capita | 110 | 10.42 | 0.57 | 8.89 | 11.55 | 32 | 8.98 | 0.72 | 6.92 | 10.22 | World Bank, 2016 |
| Age dependency ratio (% of working-age population) | 110 | 49.41 | 5.01 | 37.61 | 68.96 | 32 | 53.34 | 9.66 | 38.09 | 77.20 | World Bank, 2016 |
| Secondary complete education (% of population aged 25+) | 110 | 34.01 | 14.48 | 6.63 | 73.00 | 32 | 31.69 | 12.99 | 9.09 | 56.33 | Barro and Lee, 2013 |
| EFW Economic Freedom of the World Index | 108 | 7.49 | 0.59 | 5.80 | 8.60 | 30 | 6.35 | 1.12 | 3.50 | 8.00 | Gwartney et al., 2015 |
| EFW freedom to trade internationally | 108 | 8.35 | 0.72 | 6.40 | 9.60 | 30 | 7.31 | 1.01 | 5.00 | 9.00 | Gwartney et al., 2015 |
| Employment in industry (% of total employment) | 110 | 26.72 | 5.77 | 12.70 | 41.80 | 32 | 27.31 | 7.09 | 14.90 | 43.40 | World Bank, 2016 |
| Employment in services (% of total employment) | 110 | 67.06 | 7.24 | 50.90 | 81.20 | 32 | 57.22 | 13.76 | 25.20 | 75.70 | World Bank, 2016 |
| Political rights rating | 110 | 1.06 | 0.37 | 1 | 4 | 32 | 2.38 | 1.68 | 1 | 7 | Freedom House, 2015 |
| Innovation and communication technologies investment (% of total investment) | 110 | 36.61 | 32.57 | 0 | 93.39 | 32 | 19.66 | 17.97 | 0 | 61.45 | World Bank, 2016 |
| Research & development cost (% of GDP) | 72 | 1.77 | 0.91 | .32 | 3.93 | 21 | 1.04 | 1.07 | .04 | 4.04 | World Bank, 2016 |

*Note*: The summary statistics are calculated for the operative sample, conditional on a full set of control variables.
*Source*: Authors' calculations.

**Table A.2. Globalisation, inequality, and social protection expenditure – robustness**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Social protection expenditure | | | | | -0.260** | | -0.330*** | -0.197 | -0.278** | -0.274** | -0.258* | -0.305** | -0.485*** | -0.295* |
| | | | | | [0.122] | | [0.121] | [0.122] | [0.126] | [0.124] | [0.134] | [0.138] | [0.104] | [0.155] |
| Economic globalisation | 0.061 | 0.091* | 0.091* | 0.092* | 0.094** | 0.116** | 0.425** | 0.108** | 0.099** | 0.073 | 0.095 | 0.109** | 0.034 | 0.050 |
| | [0.047] | [0.050] | [0.049] | [0.046] | [0.045] | [0.053] | [0.194] | [0.044] | [0.045] | [0.044] | [0.060] | [0.043] | [0.048] | [0.100] |
| ln GDPpc | | -4.517* | -5.879* | -5.888* | -7.356** | -6.831* | -6.425* | -8.355*** | -6.319** | -7.707** | -7.344** | -6.536** | -6.243* | -7.753 |
| | | [2.287] | [3.318] | [3.323] | [3.315] | [3.910] | [3.260] | [2.792] | [2.997] | [3.280] | [3.337] | [2.797] | [3.222] | [6.215] |
| Dependency ratio | | | -0.068 | -0.068 | -0.067 | -0.050 | -0.031 | -0.168* | -0.024 | -0.053 | -0.067 | -0.119 | 0.147 | -0.028 |
| | | | [0.090] | [0.091] | [0.090] | [0.115] | [0.086] | [0.099] | [0.087] | [0.091] | [0.095] | [0.081] | [0.110] | [0.147] |
| Population with secondary education | | | | -0.003 | -0.002 | 0.009 | -0.005 | -0.001 | 0.005 | -0.003 | -0.002 | -0.010 | -0.026 | -0.031 |
| | | | | [0.030] | [0.028] | [0.034] | [0.029] | [0.025] | [0.031] | [0.029] | [0.028] | [0.031] | [0.027] | [0.024] |
| Social protection expenditure (t-1) | | | | | | -0.195* | | | | | | | | |
| | | | | | | [0.111] | | | | | | | | |
| Economic globalisation^2 | | | | | | | -0.002* | | | | | | | |
| | | | | | | | [0.001] | | | | | | | |
| Infant mortality | | | | | | | | 0.253** | | | | | | |
| | | | | | | | | [0.115] | | | | | | |
| Political rights | | | | | | | | | -1.055 | | | | | |
| | | | | | | | | | [0.692] | | | | | |
| Civil liberties | | | | | | | | | 0.469 | | | | | |
| | | | | | | | | | [0.571] | | | | | |
| Economic freedom overall | | | | | | | | | | 0.402 | | | | |
| | | | | | | | | | | [0.411] | | | | |
| Freedom to trade internationally | | | | | | | | | | | -0.021 | | | |
| | | | | | | | | | | | [0.549] | | | |
| Employment in industry | | | | | | | | | | | | -0.314*** | | |
| | | | | | | | | | | | | [0.103] | | |
| Employment in service | | | | | | | | | | | | -0.028 | | |
| | | | | | | | | | | | | [0.081] | | |
| Research and development cost | | | | | | | | | | | | | -0.792 | |
| | | | | | | | | | | | | | [1.147] | |
| Innovations and communications investment | | | | | | | | | | | | | | -0.009 |
| | | | | | | | | | | | | | | [0.066] |
| Observations | 142 | 142 | 142 | 142 | 142 | 122 | 142 | 142 | 142 | 138 | 138 | 142 | 93 | 72 |
| R-squared | 0.245 | 0.282 | 0.291 | 0.291 | 0.344 | 0.217 | 0.367 | 0.382 | 0.360 | 0.349 | 0.344 | 0.409 | 0.350 | 0.251 |
| Number of countries | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 39 | 39 | 43 | 41 | 17 |

*Note*: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1, Column 5 reproduces baseline results to aid comparisons.
*Source*: Authors' calculations.

**Table A.3. Robustness tests – Economic flows**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | LIS Gini | | | | |
| Social protection expenditure | | -0.239* | -0.181 | -0.262** | -0.267** | -0.268* | -0.257* | -0.472*** | -0.282* |
| | | [0.120] | [0.121] | [0.125] | [0.129] | [0.135] | [0.141] | [0.109] | [0.153] |
| Economic flows | 0.098* | 0.053 | 0.085** | 0.083* | 0.057 | 0.066 | 0.088** | 0.042 | -0.001 |
| | [0.054] | [0.056] | [0.041] | [0.042] | [0.041] | [0.041] | [0.042] | [0.050] | [0.063] |
| ln GDPpc | -6.218 | -6.974** | -7.188** | -5.244* | -7.310** | -7.184** | -5.356* | -6.397** | -7.603 |
| | [3.726] | [3.452] | [2.707] | [2.873] | [3.220] | [3.201] | [2.690] | [3.075] | [6.818] |
| Dependency ratio | -0.072 | -0.077 | -0.170* | -0.026 | -0.054 | -0.063 | -0.138 | 0.134 | -0.012 |
| | [0.115] | [0.092] | [0.101] | [0.083] | [0.088] | [0.088] | [0.085] | [0.115] | [0.159] |
| Population with secondary education | 0.002 | -0.007 | -0.007 | -0.004 | -0.009 | -0.007 | -0.013 | -0.029 | -0.033 |
| | [0.030] | [0.028] | [0.024] | [0.031] | [0.029] | [0.028] | [0.028] | [0.027] | [0.025] |
| Social protection expenditure (t-1) | -0.210* | | | | | | | | |
| | [0.115] | | | | | | | | |
| Economic globalisation^2 | | 0.000 | | | | | | | |
| | | [0.000] | | | | | | | |
| Infant mortality | | | 0.233* | | | | | | |
| | | | [0.116] | | | | | | |
| Political rights | | | | -1.169* | | | | | |
| | | | | [0.686] | | | | | |
| Civil liberties | | | | 0.402 | | | | | |
| | | | | [0.579] | | | | | |
| Economic freedom overall | | | | | 0.568 | | | | |
| | | | | | [0.467] | | | | |
| Freedom to trade internationally | | | | | | 0.416 | | | |
| | | | | | | [0.429] | | | |
| Employment in industry | | | | | | | -0.321*** | | |
| | | | | | | | [0.110] | | |
| Employment in service | | | | | | | -0.073 | | |
| | | | | | | | [0.093] | | |
| Research and development cost | | | | | | | | -0.893 | |
| | | | | | | | | [1.213] | |
| Innovations and communications investment | | | | | | | | | -0.019 |
| | | | | | | | | | [0.068] |
| Observations | 122 | 142 | 142 | 142 | 138 | 138 | 142 | 93 | 72 |
| R-squared | 0.212 | 0.340 | 0.369 | 0.357 | 0.349 | 0.347 | 0.397 | 0.412 | 0.351 |
| Number of countries | 43 | 43 | 43 | 43 | 39 | 39 | 43 | 41 | 17 |
| R-squared | 0.156 | 0.290 | 0.321 | 0.302 | 0.298 | 0.295 | 0.346 | 0.356 | 0.244 |

*Note*: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.
*Source*: Authors' calculations.

**Table A.4. Economic restrictions**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | LIS Gini | | | | |
| Social protection expenditure | | -0.238* | -0.215 | -0.288** | -0.289** | -0.284** | -0.332** | -0.497*** | -0.312* |
| | | [0.134] | [0.130] | [0.132] | [0.126] | [0.131] | [0.151] | [0.112] | [0.160] |
| Economic restrictions | 0.053 | -0.007 | 0.054* | 0.045 | 0.024 | 0.026 | 0.057* | 0.009 | 0.045 |
| | [0.039] | [0.059] | [0.032] | [0.032] | [0.031] | [0.052] | [0.032] | [0.022] | [0.055] |
| ln GDPpc | -5.358 | -7.231** | -7.512** | -5.615* | -7.385** | -6.795* | -6.003* | -5.621* | -8.549 |
| | [3.936] | [3.491] | [2.837] | [3.148] | [3.284] | [3.364] | [3.077] | [2.970] | [5.887] |
| Dependency ratio | -0.055 | -0.078 | -0.150 | -0.018 | -0.040 | -0.054 | -0.099 | 0.139 | -0.026 |
| | [0.126] | [0.098] | [0.108] | [0.093] | [0.091] | [0.096] | [0.090] | [0.109] | [0.155] |
| Population with secondary education | 0.025 | 0.000 | 0.015 | 0.014 | 0.004 | 0.010 | 0.004 | -0.025 | -0.027 |
| | [0.045] | [0.029] | [0.034] | [0.036] | [0.034] | [0.036] | [0.040] | [0.028] | [0.025] |
| Social protection expenditure (t-1) | -0.159 | | | | | | | | |
| | [0.110] | | | | | | | | |
| Economic globalisation^2 | | 0.001 | | | | | | | |
| | | [0.001] | | | | | | | |
| Infant mortality | | | 0.227* | | | | | | |
| | | | [0.123] | | | | | | |
| Political rights | | | | -0.920 | | | | | |
| | | | | [0.667] | | | | | |
| Civil liberties | | | | 0.235 | | | | | |
| | | | | [0.555] | | | | | |
| Economic freedom overall | | | | | 0.688 | | | | |
| | | | | | [0.417] | | | | |
| Freedom to trade internationally | | | | | | 0.340 | | | |
| | | | | | | [0.653] | | | |
| Employment in industry | | | | | | | -0.279** | | |
| | | | | | | | [0.108] | | |
| Employment in service | | | | | | | 0.009 | | |
| | | | | | | | [0.089] | | |
| Research and development cost | | | | | | | | -0.721 | |
| | | | | | | | | [1.147] | |
| Innovations and communications investment | | | | | | | | | -0.007 |
| | | | | | | | | | [0.070] |
| Observations | 122 | 142 | 142 | 142 | 138 | 138 | 142 | 93 | 72 |
| R-squared | 0.212 | 0.340 | 0.369 | 0.357 | 0.349 | 0.347 | 0.397 | 0.412 | 0.351 |
| Number of countries | 43 | 43 | 43 | 43 | 39 | 39 | 43 | 41 | 17 |
| R-squared | 0.156 | 0.290 | 0.321 | 0.302 | 0.298 | 0.295 | 0.346 | 0.356 | 0.244 |

*Note*: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.
*Source*: Authors' calculations.

**Table A.5. Globalisation and inequality (SWIID Gini Coefficient)**

| | (1) | (2) SWIID Gini full sample | (3) |
|---|---|---|---|
| Social protection expenditure | -0.111 | -0.102 | -0.117 |
| | [0.146] | [0.145] | [0.149] |
| Economic globalisation | 0.049 | | |
| | [0.042] | | |
| Economic flows | | 0.037 | |
| | | [0.033] | |
| Economic restrictions | | | 0.025 |
| | | | [0.034] |
| ln GDPpc | -3.733 | -3.206 | -3.399 |
| | [3.931] | [3.675] | [4.130] |
| Dependency ratio | 0.035 | 0.030 | 0.038 |
| | [0.108] | [0.109] | [0.110] |
| Population with secondary education | -0.021 | -0.024 | -0.014 |
| | [0.036] | [0.037] | [0.036] |
| Constant | 64.524 | 60.524 | 62.244 |
| | [42.901] | [41.291] | [44.531] |
| Observations | 142 | 142 | 142 |
| R-squared | 0.219 | 0.215 | 0.211 |
| Number of countries | 43 | 43 | 43 |
| R-squared adj. | 0.166 | 0.161 | 0.157 |

*Note*: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.
*Source*: Authors' calculations.

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