Mitigating the Gap between the Rich & the Poor: An Empirical Assessment of Key Trends & Drivers of Redistribution

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Abstract

The growing inequality of market income has, in the recent past, attracted considerable attention; less so the redistribution of income. This paper analyses key trends and drivers determining the size of income redistribution across households. We show that in the EU increasing redistribution has largely stabilised the distribution of disposable income since the late 1990s. Only developing countries, where lagging income levels do not allow larger welfare programmes, and some advanced countries with a dominant free market ideology have recorded an increasing inequality of disposable income alongside a growing inequality of market outcomes. Our evidence from panel data shows that the degree of redistribution increases with per-capita income, the share of low-tech, low-income sectors in manufacturing and, in line with the median voter model, when more than half of the voters earn less than the average income in countries with a majoritarian electoral system.

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1. INTRODUCTION

Condemned to live in the shadows of mainstream economics for a long time, income inequality has taken center stage in recent years. Especially in the wake of the Great Recession in 2008, academics and policy makers alike have paid increased attention to the growing income gap between the rich and the poor. The post-2008 crisis was only the trigger not the cause of the change of heart. Since the 1980s, and alongside a trend of growing per capita income levels, the distribution of market income has become more unequal in almost all advanced countries. In some cases, income inequality has even returned to levels observed at the beginning of the 20th century, that is, before governments in advanced countries started developing a noteworthy welfare state (Piketty 2014). It took the 2007 crisis and a more general discontent with the prevailing economic and political system to turn income inequality into a focal research and policy question.

At the same time, the current discussion has paid less attention to the evolution of redistribution, which increased significantly over the past decades. Fiscal policy has an important direct effect on redistribution via the design of the tax and benefit system (European Commission, 2017). For instance, an increase in unemployment benefits has a direct inequality-mitigating and redistribution-increasing effect by giving cash to households with otherwise zero earnings. At the same time, fiscal policy can also cause indirect macroeconomic or behavioural effects. For instance, unemployment benefits, if inadequately designed, can weaken work incentives, increase unemployment and lower growth, which, in turn, can increase inequality and redistribution (Conesa and Krueger, 2006). Apart from fiscal policy, macroeconomic (such as GDP) and political-economic factors tend to drive redistribution of income across households (see for instance Gründler and Köllner, 2017).

The literature on redistribution also focuses on the impact of inequality on redistribution with inconclusive results in terms of the direction of the relationship (see Mohl and Pamp (2009) for an overview). Classical median voter models typically represent the conventional view according to which redistribution increases with a rising inequality gap between the mean and the median voter (Meltzer and Richard, 1981). By contrast, focusing on the insurance motives of public transfer spending, Moene and Wallerstein (2001, 2003) predict a negative relationship, implying that greater inequality in pretax earnings is associated with less, not more, spending on welfare policies targeted to people who have lost their market income because of layoffs, accidents, or ill health. Finally, some models conclude that redistribution has this ends- against-the-middle feature, i.e. redistribution runs from the ends of the income distribution towards the middle class (Stigler 1970, Dixit and Londregan 1998, Epple and Romano 1996).

Against this background, this paper analyses key trends and drivers determining the size of income redistribution across households. Using a large sample of both developing and advanced countries since the 1970s, we go beyond the existing literature by exploring a wider range of economic, political and institutional factors. In particular, we offer an empirical test of the median voter model according to which redistribution grows in importance as mean income exceeds the median.

Our analysis supports a number of important conclusions. First, the redistribution of income is, to a large extent, a matter of living standards. While market outcomes have definitively become more unequal since the 1970s, the long-term increase in per capita income across countries enabled governments to implement growing welfare programmes thus mitigating the impact on the distribution of disposable income. There are prominent examples of countries, where a dominant free-market ideology appears to have put a break on redistribution, but the role of ideology is not confirmed by

inferential statistical analysis.[1] Second, redistribution seems to weigh on the state of public finances: countries with a higher degree of redistribution record on average a lower budgetary surplus or a higher deficit. While the causality underpinning this result is not entirely clear, it can raise important questions of sustainability should the trend towards more unequal market outcomes continue. Third, our analysis finds support of the conventional view of median voter models: A growing gap between mean and median income translates into a higher degree of redistribution in countries with a majoritarian election system.

The reminder of the paper is organised as follows. Section 2 starts with looking at the evolution of disposable vis-à-vis market incomes. The key underlying question is whether the redistribution of income has grown in importance when and where market outcomes have become more unequal. Section 2 also provides an initial characterisation of factors that discriminate between a stronger and a less incisive redistribution. Section 3 presents a series of panel regressions, which allow us to simultaneously control for a number of economic, political and institutional factors. Finally, Section 4 concludes.

2. REDISTRIBUTION OF INCOME: MAIN TRENDS AND FACTS

Despite the booming interest in distributional issues, the availability and comparability of inequality data remain limited. The Gini index is the only aggregate measure of income dispersion, which covers both market and disposable income and is available for a large set of countries and years. The index ranges between 0 and 100 with 0 representing perfect equality and 100 representing perfect inequality of income distribution.[2]

In this paper, we mainly rely on the Gini index from the Standardized World Income Inequality Database (SWIID) compiled by Solt (2016), which is widely used in the growing literature (e.g. Ostry et al., 2014). The database covers 66 advanced and developing countries from the early 1970s to 2015. In the 1970s, the availability of Gini coefficients remains uneven across countries, but it is fairly complete for advanced countries in the later years.

We measure the degree of redistribution as the difference between the Gini index of market income and the Gini index of disposable income. The measure for redistribution used here focuses on the governments' tax and benefit system (i.e. social transfers in cash, social security contributions and direct taxes) and it does not take into account in-kind elements such as the provision of education. The

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[1] The degree of free-market ideology can be measured by the Fraser Freedom Index. The index measures the degree of economic freedom present in five major areas: size of government; legal system and security of property rights; sound money; freedom to trade internationally and regulation. The countries that took the top 10 places in 2016, in order, were Hong Kong, Singapore, New Zealand, Switzerland, Ireland, United States, Georgia, Mauritius, United Kingdom and Canada.

[2] Normally, the unit of reference of Gini indices are households rather than individuals. Frequently, the concept of equivalised income is used, which is a measure of household income, taking account of a household's size and composition. The Luxembourg Income Study (LIS) – a database covering high quality data on income distribution – for instance, defines equivalised income as unadjusted household income divided by the square root of the number of household members. All members of a given household therefore have the same equivalent income, regardless of age, gender, or relationship to the household head (Atkinson 2004; Förster and Vleminckx 2004).

redistribution of income by government can essentially take the form of (i) taxes, which can be more or less progressive; and/or (ii) transfers – including goods and services provided in kind such as education, health care, social housing –, which can be modulated in function of the level of household market income.[3]

To start with, the distribution of market income has clearly become more unequal since 1970 (Figure 1). The cross-section average of the Gini index based on market income climbed from around 40 in the early 1970s to close to 50 in 2015. To put this increase into perspective, a difference of 10 points is more than what currently divides Finland's and Greece's dispersion of income, Finland being an example of a comparatively low and Greece of a particularly high dispersion of market income.

In parallel to the conspicuous surge in the inequality of market income, real GDP per capita has almost doubled (Figure 1). A prominent implication of the combined increase in the dispersion of income and the upward trend in per capita income, especially in developing countries, is a pattern highlighted by Milanovic (2016): there is income convergence across countries yet divergence of household income within countries.

The growing dispersion of market outcomes has been mitigated to a large extent by government redistribution (Figure 1). As a consequence, the dispersion of disposable income has increased much less than market income. Since the late 1990s, the average Gini index of disposable income has effectively remained unchanged in both the full sample (Figure 1A, 1B) and the EU15 (Figure 1C, 1D)

Figure 1: **Distribution of market and disposable income from 1972-2014**

1A: Full sample: cross-section arithmetic means

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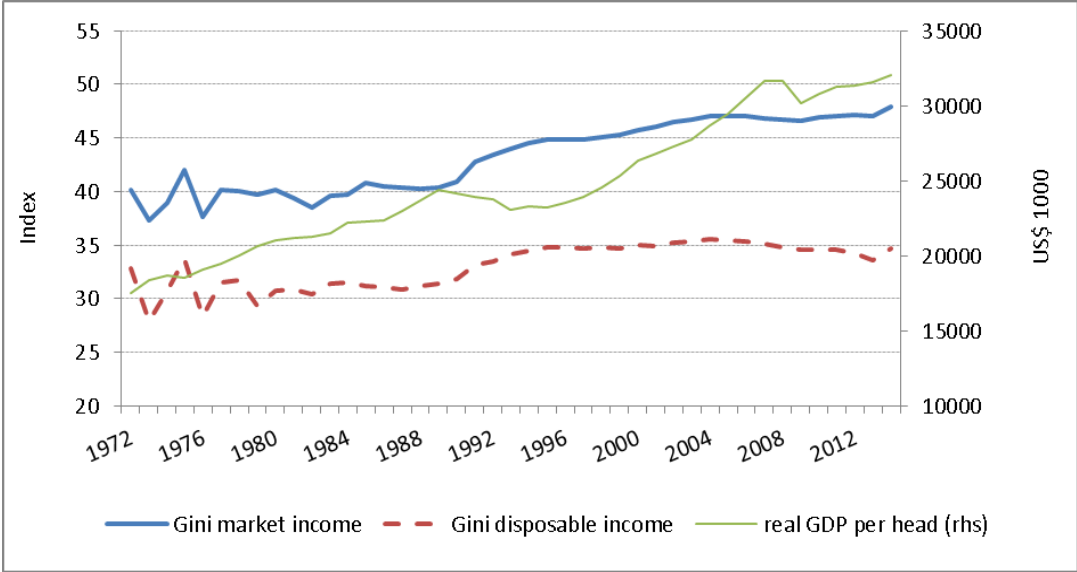
[3] In some countries redistribution through private entities such as charities may be more important than in others but generally plays a very minor role compared to government action (see Charities aid foundation, 2016).

1B: **Full sample: population-weighted cross-section arithmetic means**
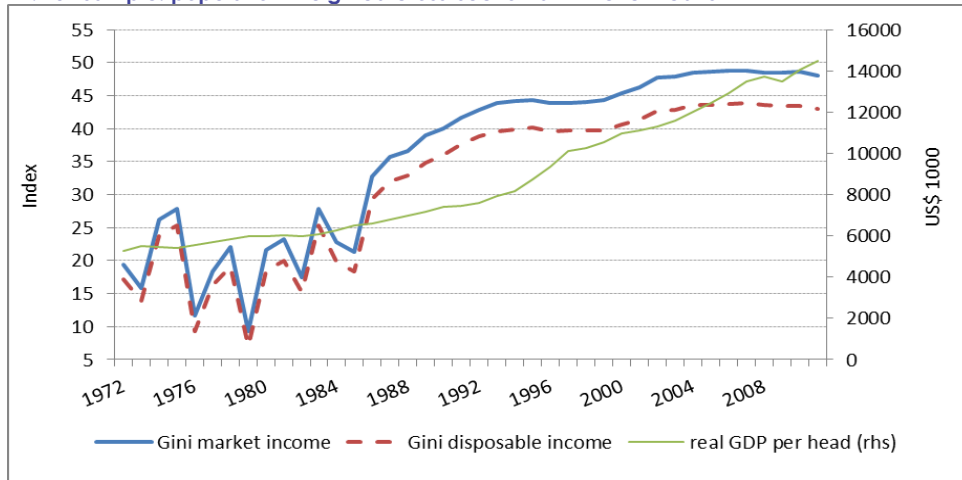
1C: **EU15: cross-section arithmetic means**
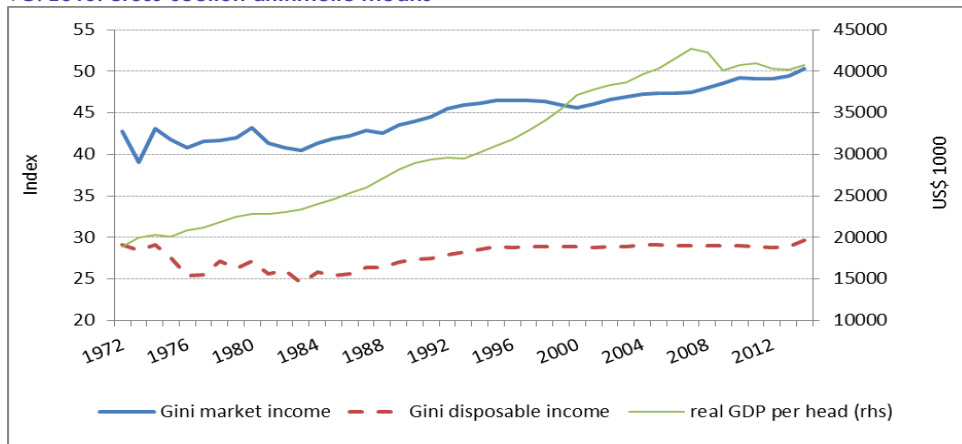
1D: **EU15: population-weighted cross-section arithmetic means**
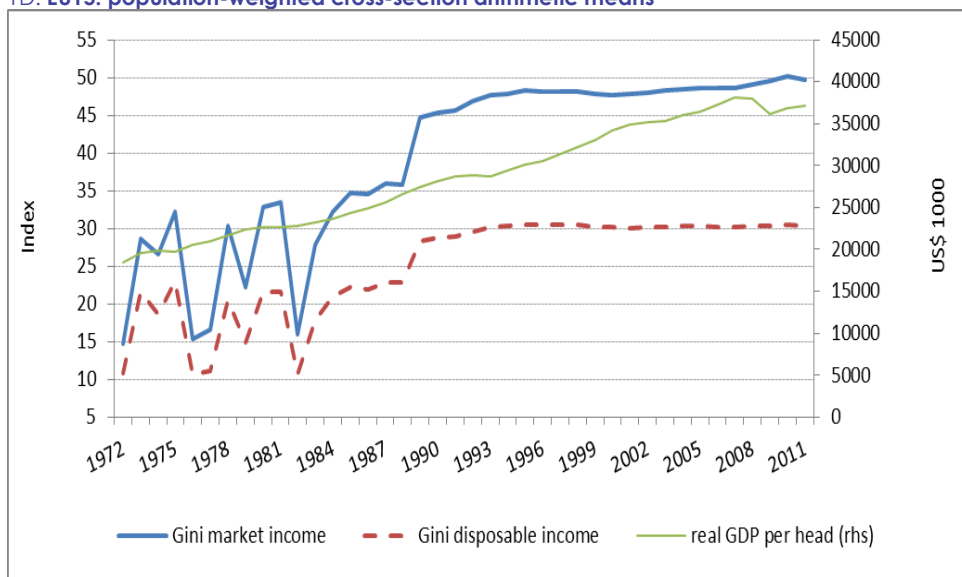
Source: SWIID, OECD, IMF

In the full sample, the mitigating effect of redistribution appears much smaller when population-weighed means instead of simple averages are used (Figure 1A, 1B). The most populous countries such as China, India or Brazil happen to be those which lag behind in terms of per capita income and, in turn, the capacity of government to afford more redistribution. Still, the degree of redistribution increased over time alongside the upward trend in per capita GDP. In the EU15, by contrast, there is not much difference between using simple or population-weighted means (Figure 1C, 1D). The more populous countries such as Germany, France or the UK are not economic 'laggards', and most of them are running comparatively large welfare programmes. The differences and volatility in the 1970s and early 1980s reflect data gaps including for the more populous countries.

Hence, the first important fact about the dispersion of income over time is that although market outcomes have become more unequal in advanced countries, the redistribution of income through fiscal policy has largely offset the trend. The growing degree of redistribution has been underpinned by significant progress in terms of real per-capita income.

Interestingly, the global trend towards more unequal market outcomes has been visible across all economic areas covered by our sample. The relative ranking of economic areas has not changed much since the 1970s with one exception (Figure 2, left hand panel). The group of non-OECD countries, which had the highest dispersion of market income in the 1970s has also seen an increase in inequality but significantly less so than in other areas. As a result, their average Gini index of market income is now even slightly below the OECD average.4 The group of non-OECD count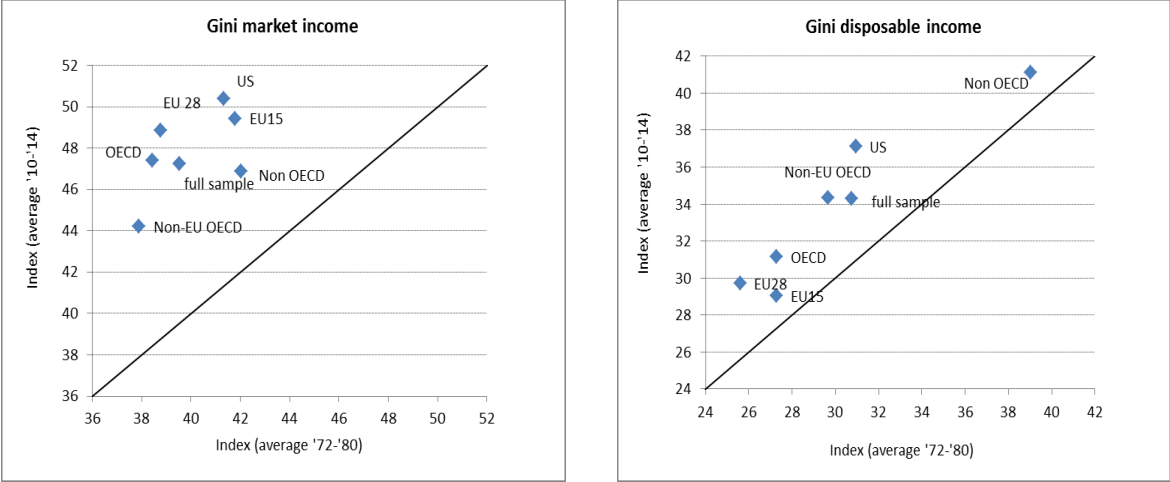ries includes low- or middle-income countries such as Morocco, South Africa but also Russia, which are at different stages of the economic catching-up process.[5]

Figure 2: **Distribution of market and disposable income – by groups of countries**

Source: SWIID

Of particular interest is the relative performance of the EU15 and the US. Starting from a relatively high dispersion of market income in the 1970s, inequality has increased almost in lockstep in both areas and is now the highest among the group of countries considered. The situation is distinctly different when it comes to income after transfers and taxes. While the dispersion of market income has very much rubbed off on households' disposable income in the US (and in most non-EU countries), the distribution of disposable income has broadly remained unchanged in the group of countries that formed the EU prior to 2004. Between the 1970s and recent years the Gini index of the 15 EU

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[4] This can be explained by data availability, e.g. new and relatively more developed countries may have been added to the database.

[5] A full list of countries covered by our sample and the mapping of economic areas is provided in Table A.1 in the Annex.

Member States merely shows a very minor increase and remains the lowest among the different economic areas considered. In other words, the governments of the EU15 have effectively offset the trend towards more unequal market outcomes.[6] In contrast, governments in other areas intervened less, either for ideological reasons (in countries like the US, Australia or New Zealand liberal economic thinking is deeply entrenched) or due to budget constraints, which prevented larger redistribution programmes; typically in low-income countries which inter alia still need to develop the necessary institutional and administrative infrastructure.

Hence, the second important fact about the distribution of income over time is that different countries and regions reacted differently to the growing dispersion of market income. In advanced economies, the differences may reflect diverging ideological views about how much the public sector should intervene into the market process. In the EU15, governments have decisively leaned against the wind to offset the impact on disposable income, while redistribution, already comparatively unimportant, has not been stepped up much outside the EU especially in the US.

Box 1. **EXCURSUS – REDISTRIBUTION IN THE EU15: COUNTRY-SPECIFIC INSIGHTS**

This box provides a more detailed look at the distribution of market and disposable income since the 1970s in the 15 EU countries, which were members of the EU before its enlargement in 2004. The so-called 'new' Member States, which joined the EU in 2004, are not considered, since the availability of data – in general and of inequality measures in particular – is comparatively limited. Reliable and comparable data only start in the 1990s. Overall, the trend towards a more unequal distribution of market income and the attempt to mitigate it are also visible in the 15 EU countries with very few exceptions.

The table below compares the distribution of market income and disposable income at the beginning and the end of the sample period, i.e. the 1970s and the post-2007 crisis period. To control for volatility in year-on-year changes as well as for data gaps in 1970s, the upper part of the table shows averages. For comparison and completeness, the lower part reports the same inequality measures for the first and last available year in the sample where the former varies markedly across the EU15 Member States.

In qualitative terms, and with very few exceptions, the overall picture emerging from the table is in line with the main facts described in Section 2. There is a trend towards a more unequal distribution of market income coupled with a significant effort to mitigate the impact on disposable income. All countries share a very sizable relative redistribution of on average 40%, i.e. in the past ten years the average distribution of disposable income is 40% less unequal than the one of market income, with a minimum of 33%.

In a limited number of countries – Belgium, Greece, Italy and the Netherlands - the trend towards a more unequal distribution of market income turns out to be less pronounced; in the case of the Netherlands, there is even a slight improvement. The reasons for the diverging path in these countries are likely to be numerous and idiosyncratic (e.g. Greece and the Netherlands are very different in many possible respects); describing them in detail goes beyond the scope of this paper. However, a salient feature in Belgium and the Netherlands is the comparatively large size of government already in the 1970s, which has acted as a buffer. Of note is also the improvement in the dispersion of disposable income in Greece accompanied by a very strong increase in the size of government, the largest among the EU15 countries. Ireland is the only EU15 country where the share of total expenditure-to-GDP significantly declined over the sample period. In the late 1970s early 1980s, Ireland underwent a very marked transformation from a fairly closed economy with an invasive role of government to a very open economy and a more Anglo-Saxon-type of government welfare state. The Netherlands and Sweden also started off with a comparatively large size of government yet underwent a less incisive adjustment of their welfare model.

There are very minor differences between the simple and population-weighted averages reported in the table. The main conclusions/facts about (re)distribution in the EU15 remain unchanged across the two alternative ways to capture the mean.

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[6] Box 1 provides a detailed discussion of communalities and idiosyncrasies within the EU15.

	Gini market income (index)				Gini disposable income (inex)				Total government expenditure (% of GDP)			
	average		Δ	Δ 2014-2007*	average		Δ	Δ 2014-2007*	average		Δ	Δ 2014-2007*
	1970-80	2006-14			1970-80	2006-14			1970-80	2006-14		
AT		47.9		-0.1		28.9		0.6	40.3	49.5	9.2	2.5
BE	42.4	44.2	1.8	2.3	23.0	24.9	1.9	-1.3	46.5	51.3	4.8	6.1
DK	41.1	46.0	5.0	5.1	25.5	24.2	-1.2	1.1	41.7	53.5	11.9	4.4
DE	42.2	50.5	8.2	0.6	28.2	28.8	0.6	1.1	40.6	43.5	3.0	1.6
ES	36.7	49.2	12.5	7.3	32.4	32.8	0.4	3.5	23.1	41.1	18.0	9.4
EL	53.4	50.3	-3.1	4.5	37.6	33.0	-4.6	1.7	24.1	48.8	24.8	5.0
IE	38.3	53.5	15.2	5.1	27.5	29.5	2.0	-0.6	41.6	34.4	-7.2	4.7
FR	40.5	47.4	6.8	-2.7	32.4	28.0	-4.4	-1.4	39.7	54.1	14.4	5.5
IT	49.7	48.5	-1.2	0.7	35.0	32.6	-2.4	0.0	34.9	47.9	13.1	5.2
LU		46.2		1.8		27.5		0.9		39.3		5.2
NL	45.5	45.5	0.0	-1.7	24.8	26.0	1.2	-2.1	43.8	44.4	0.6	4.1
PT	41.3	51.4	10.2	5.1	26.3	33.6	7.3	-1.8	27.2	46.7	19.4	5.2
SE	39.8	49.2	9.4	3.2	21.4	25.2	3.9	0.9	46.5	49.7	3.2	1.6
FI	39.8	46.5	6.7	-1.1	23.6	25.8	2.2	-1.3	33.0	53.6	20.6	11.1
UK	36.7	52.8	16.1	0.5	26.6	33.4	6.8	-1.2	36.4	41.9	5.5	2.5
EU15	42.1	48.6	6.7	2.0	28.0	29.0	1.0	0.0	37.1	46.7	10.1	4.9
EU15 (Pop. weighted)	41.0	49.4	8.4	1.2	29.1	30.3	1.2	0.1	36.6	46.3	9.7	4.5
US	41.0	49.7	8.7	2.0	30.9	37.0	6.2	-0.1	33.0	38.1	5.1	2.0
First and last year in sample	first & last year	first	last	Δ		first	last	Δ		first	last	Δ
AT	1983 & 2014	31.4	47.7	16.2		25.9	28.8	2.9		47.9	49.9	2.1
BE	1970 & 2013	42.4	45.4	3.0		23.0	24.4	1.3		52.7	53.7	1.0
DK	1970 & 2014	40.8	48.5	7.7		28.3	24.9	-3.4		36.0	53.9	17.9
DE	1970 & 2013	47.9	51.0	3.1		30.3	29.5	-0.8		34.9	43.7	8.8
ES	1973 & 2014	31.8	52.1	20.2		33.0	34.1	1.1		20.5	44.5	24.0
EL	1974 & 2014	53.4	52.4	-1.0		37.6	33.7	-3.9		23.6	49.2	25.6
IE	1973 & 2014	36.3	55.1	18.8		28.5	29.1	0.6		35.6	30.5	-5.1
FR	1970 &2013	38.9	45.2	6.4		38.7	26.8	-11.9		36.6	55.4	18.8
IT	1970 & 2013	52.2	48.7	-3.5		36.7	32.7	-4.1		29.9	50.2	20.3
LU	1985 & 2013	37.6	47.5	9.9		23.7	28.4	4.7			41.1	
NL	1975 & 2014	45.9	44.5	-1.4		25.7	25.3	-0.5		45.7	45.6	-0.1
PT	1980 & 2014	51.2	54.7	3.6		32.3	33.2	1.0		29.4	48.5	19.1
SE	1970 & 2013	42.2	50.7	8.5		24.2	25.5	1.3		38.1	51.1	13.0
FI	1971 & 2014	37.2	45.5	8.4		23.6	25.0	1.5		28.7	57.1	28.4
UK	1970 & 2015	34.4	52.2	17.8		26.5	32.6	6.0		32.7	41.2	8.5
EU15		41.6	49.4	7.8		29.2	28.9	-0.3		35.2	47.7	13.0
EU15 (Pop. weighted)		42.5	49.6	7.1		31.7	30.2	-1.5		33.3	47.4	14.1
US	1970 & 2014	39.5	50.2	10.7		30.5	37.0	6.6		32.1	37.6	5.5

Notes: * for DE< FR< IT and LU Δ 2013-2007

In the public debate, the post-2007 crisis is often associated with a significant impact on the dispersion of income. The common assumption is that the severe economic downturn accelerated the pre-crisis

trend especially in the EU because some euro area countries were forced to implement austerity programmes to safeguard the sustainability of public finances. Our dataset does not support this view, at least not as a general conclusion. The trend towards a more unequal distribution of market income continued during the crisis years but did not accelerate across the board. In the US, the crisis years did indeed have a noticeable impact, but not a very striking one, at least as regards market income. The average annual increase in the Gini index in 2007-2014 only marginally exceeds the one for the sample period as a whole. At the same time, the dispersion of disposable income has actually declined somewhat after 2007 as the US government, under the Obama administration, launched a comparatively large expenditure programme, which over the course of seven years led to an increase of total government expenditure by more than 2 percentage points of GDP, as compared to an increase of around 5 percentage points in more than four decades.

No adverse effect of the crisis is, on average, visible in non-OECD countries. The dispersion of both market and disposable income actually improved somewhat after 2007 most likely because of the general catching-up process that most of those countries have been going through and because they were less affected by the fall-out of the financial turbulences in the US and the euro area.

The situation is somewhat more diverse in the EU. On average, the crisis did not give rise to a steeper trend towards a wider dispersion of disposable income, mainly thanks to more benign developments in the post-2004 enlargement countries. The latter started off with a higher degree of inequality and recorded higher average per-capita GDP growth and a less pronounced increase in unemployment compared to the 'old' Member States.

In the EU15, by contrast, the trend has indeed worsened after 2007. However, a closer look shows that this deterioration does not exclusively reflect developments in countries that are commonly associated with severe adjustment programmes. The group of countries where market income has become increasingly more unequal after 2007 does indeed include Spain, Greece, Portugal and Ireland, but interestingly also Sweden and Denmark. More importantly, the distribution of disposable income actually improved in Portugal and Ireland, and it deteriorated much more in Spain than in Greece.[7] Less susceptible countries such as Germany, Denmark and Sweden also saw the dispersion of disposable income grow more strongly after the crisis. This is not to say that adjustment programmes did not have any negative impact on the economies concerned. Adjustment programmes weigh on aggregate economic activity, people lose jobs and houses, enterprises close. However, available evidence seems to suggest that the crisis did not affect the relative position of households across income levels in a consistent manner across countries.

Hence, the third important fact about the distribution of income is that, although very severe, deep and long lasting, the post-2007 economic and financial crisis did not accelerate the tendency towards more unequal income. The situation varies across economic areas and across countries. The common assumption that the crisis cum austerity made things worse is not confirmed in general.

Without a more detailed analysis it is difficult to pin down all the factors driving different trends in the redistribution of income; Section 3 takes a closer look at a series of possible determinants in a panel framework. However, one element that certainly plays a role is the size of government, a crude but still useful proxy for the role of government in a given macro-economy. The most widely used indicator of the size of government is the level of total government expenditure in per cent of GDP. Not all government outlays have the deliberate goal to re-distribute income across income groups, but the actual incidence of spending relative to taxation de facto always implies redistribution across income groups.

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[7] For the case of Ireland see Larch et al. (2016).

Figure 3: **Distribution of market income vs size of government 1970-2015**
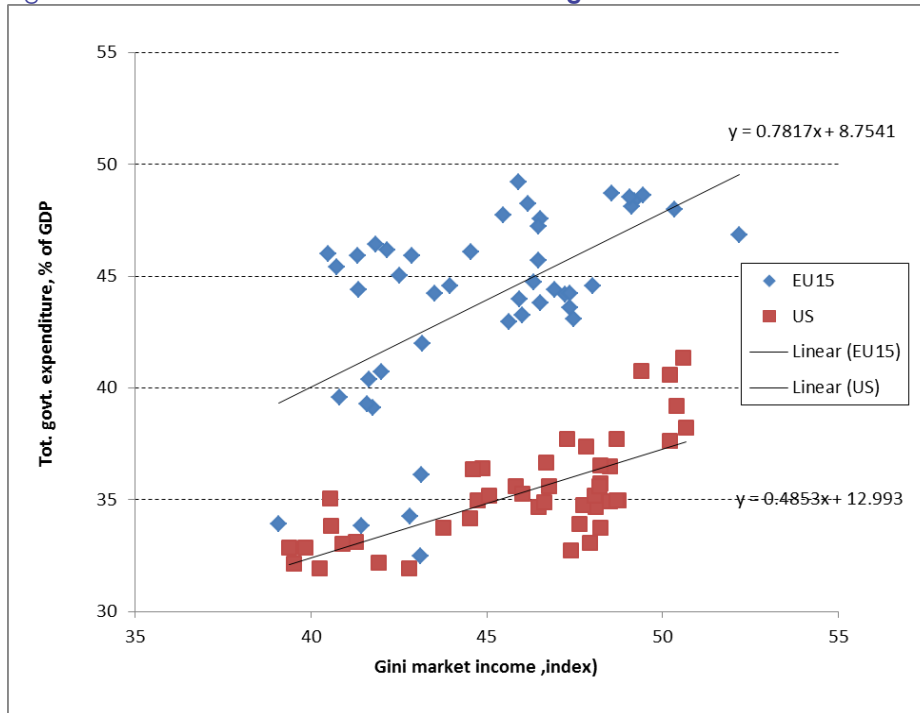
Source: SWIID, IMF, OECD

Figure 3 plots the size of government of the EU15 and the US in 1970-2014 against the respective distribution of market income. The patterns emerging from this simple juxtaposition are already quite revealing. With the exception of the early 1970s, the EU15 exhibit a markedly higher share of government expenditure for any given degree of income distribution. In addition, government expenditure in the EU15 also seems, on average, to be more sensitive to increases in income inequality.

In the early 1970s, the size of government was still comparable on both sides of the Atlantic with total government expenditure below 35 per cent of GDP. At the time, the US model still echoed the imprint of D. Roosevelt's New Deal Policy, which had led to a steep change in the US government's involvement in economic activity. The situation changed markedly in the face of the severe economic downturns triggered by the succession of oil crises starting in 1973. In the EU15 the size of government increased progressively towards an average of close to 50 per cent of GDP in the early 1990s. The size of government edged down during the sustained economic expansions of the 1990s and early 2000s, before approaching again 50 per cent in the wake of the post-2017 crisis.

In the US, total expenditure increased only very gradually to a maximum of 39 per cent of GDP at the end of the 1980s and early 1990s, fell back to the pre-oil-shocks level during the 1990s and early 2000s before posting an important increase to slightly more than 40 percent in the first years of the 'great recession'. It is now back to under 38 per cent of GDP.

The rate of unemployment is one important macroeconomic variable that influences both government expenditure and the distribution of income. A rise in unemployment, especially if it persists, will not only lead to an increase in unemployment benefits, which generally account only for a small share of total expenditure, they will also be associated with an increase in other expenditure categories, for instance expenditure on active labour market policies or expenditure on policies aimed at mitigating the loss of income/poverty more generally.

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Figure 4: **Redistribution of income vs cyclical conditions: EU15 vs US**
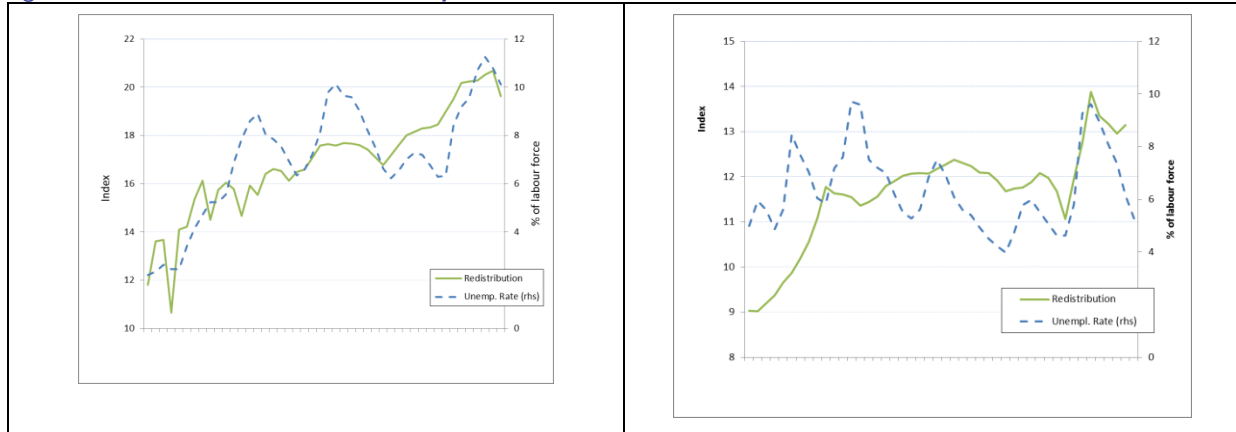
Note: Redistribution is defined as the difference between the Gini index of market income and the Gini index of disposable income.

Source: SWWI, OECD, IMF

A first visual inspection of the data suggests a nexus between labour market conditions on the one hand and the degree of redistribution on the other in the EU15 (Figure 4). The same nexus is less evident in the US (and other economic areas not shown in Figure 4) except maybe around the post-2007 crisis when the degree of redistribution increased visibly on the back of an exceptionally strong surge in the rate of unemployment. What also distinguishes the EU15 from the US is the overall trend in the rate of unemployment over time, a fact well known and documented in the literature (see Bean 1994 for an early survey). In the EU15, and in clear contrast to the US, the rate of unemployment only partially reversed increases recorded during an economic downturn; as a result, the underlying rate of unemployment has increased with obvious implications for the welfare state and redistribution of income.

There are many other factors beyond unemployment that may determine the degree of income redistribution. Table 1 below summarises the results of a simply one-way analysis of variance (ANOVA), an admittedly crude but still useful way to gain preliminary insights. We divide our sample into two groups using the average redistribution of income across time and across countries as discriminator. We then compare means across the two groups to check whether they exhibit statistically significant differences with respect to variables of interest.

Some of the ANOVA findings, which are organised by group of countries for each variable of interest, confirm our priors, other raise questions to be examined further in a statistical framework that allows to control for different determinants simultaneously. Focusing on the results that are in line with expectations, a higher degree of redistribution goes along with higher per-capita income, a higher share of people of 65 or more years of age and a larger size of government. The nexus between average redistribution and the average size of government also extends to some expenditure categories such as expenditure on social protection and education, although in the case of education differences are not always statistically significant.

What seems to play a role too is the quality of institutions: An above average redistribution of income seems to be linked with a higher reading of indicators measuring the effectiveness and efficiency of government institutions. Still within the realm of political factors, more frequent elections, as measured by the average percentage share of days before an election per year, are associated with a higher degree of redistribution.

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Table 1: **Above versus below-average redistribution of income – comparing means**

Variable	Redistribution below average		Redistribution above average		Test for equality of mean
	mean	count	mean	count	prob. value
real per capita GDP $US					
full sample	15386,0	397	31157,8	893	0,00
EU28	26288,1	248	31225,0	435	0,00
EU15	32801,4	251	32710,7	272	0,93
OECD	24974,5	437	31399,3	689	0,00
Non-EU OECD	17713,5	182	35332,7	261	0,00
Non OECD	5815,6	103	12870,9	61	0,00
Unemployment rate (% of labour force)					
full sample	6,9	285	7,8	829	0,00
EU28	9,3	213	7,8	408	0,00
EU15	8,2	232	7,2	256	0,01
OECD	6,1	408	7,9	639	0,00
Non-EU OECD	5,5	176	5,8	250	0,31
Non OECD	NA				
Temporary dependent employment (% of tot. empl.)					
full sample	13,9	144	11,2	651	0,00
EU28	12,2	236	10,2	352	0,00
EU15	12,9	198	11,2	207	0,01
OECD	12,9	241	10,9	520	0,00
Non-EU OECD	17,8	63	10,8	110	0,00
Non OECD	11,4	19	12,1	48	0,67
Social protection expenditure (% of GDP)					
full sample	6,1	70	16,0	498	0,00
EU28	15,4	142	18,3	268	0,00
EU15	16,5	132	20,0	154	0,00
OECD	9,0	160	17,3	402	0,00
Non-EU OECD	4,3	42	10,5	110	0,00
Non OECD	NA				
Education expenditure (% of GDP)					
full sample	4,7	70	5,4	498	0,00
EU28	5,3	142	5,5	268	0,11
EU15	5,1	132	5,7	154	0,00
OECD	5,4	160	5,4	402	0,95
Non-EU OECD	4,4	42	5,7	110	0,00
Non OECD	NA				
Total expenditure (% of GDP)					
full sample	31,4	135	42,9	849	0,00
EU28	41,4	236	45,5	434	0,00
EU15	42,6	245	47,5	271	0,00
OECD	35,2	337	44,5	647	0,00
Non-EU OECD	28,6	83	37,8	231	0,00
Non OECD	NA				

Table 1: **Above versus below-average redistribution of income – comparing means**

Variable	Redistribution below average		Redistribution above average		Test for equality of mean
	mean	count	mean	count	prob. value
Population over 65 (% of total population)					
full sample	13,1	160	14,6	902	0,00
EU28	15,1	325	14,9	449	0,16
EU15	15,3	245	15,3	268	0,89
OECD	13,6	366	14,8	696	0,00
Non-EU OECD	10,9	57	13,2	231	0,00
Non OECD	NA				
Quality of institution (index)					
full sample	0,0	416	1,2	501	0,00
EU28	0,8	173	1,4	228	0,00
EU15	1,2	116	1,6	119	0,00
OECD	0,9	226	1,2	374	0,00
Non-EU OECD	0,7	80	1042,0	119	0,00
Non OECD	-0,3	191	-0,2	126	0,04
Proportional electoral system					
full sample	1,5	160	1,6	904	0,25
EU28	1,9	329	1,8	447	0,01
EU15	1,7	249	1,8	270	0,14
OECD	1,4	366	1,7	698	0,00
Non-EU OECD	1,0	57	1,0	231	0,58
Non OECD	NA				
Share of days in a year before an election (%)					
full sample	3,4	985	14,6	1027	0,00
EU28	12,9	403	13,9	471	0,57
EU15	13,1	251	14,9	271	0,42
OECD	12,2	575	15,1	749	0,06
Non-EU OECD	7,4	189	19,8	261	0,00
Non OECD	NA				

3. TAKING A CLOSER LOOK AT THE DRIVERS OF REDISTRIBUTION: PANEL REGRESSIONS

3.1. ESTIMATION STRATEGY

We use a dynamic panel data framework to identify the key drivers of redistribution based on a sample of up to 49 countries (i) and nine five-year periods between 1970 and 2014 (t) (Table A.1 in the annex for an overview of the country sample). The sample is somewhat smaller than the one used in Section 2 due to the limited availability of some explanatory variables. Our panel framework can be formalised as follows:

$$ln\, red_{i,t} = \beta_1 ln\, red_{i,t-1} + \beta_3 ln\, X_{i,t} + \vartheta_t + \theta_i + \varepsilon_{i,t}$$

The degree of redistribution (*red*) is our dependent variable, which measures the difference between the Gini coefficient of market income and the Gini coefficient of disposable income. Both indicators are taken from the SWIID described in Section 2. A larger difference indicates a higher degree of redistribution. Explanatory variables, summarised in vector *X*, are selected in line with the literature and taken from a variety of sources (see Table A.2-A.4 in the annex). To facilitate the interpretation of the estimated coefficients, we log-transform the variables. We also control for year- (ϑ) and country-fixed effects (θ) to mitigate the risk of an omitted variable bias, while ε represents an error term.

The use of 5-year averages offers important advantages. It helps remove business cycle effects on the redistribution of income mostly linked to temporary swings in unemployment benefits and active labour market policies, and enables us to examine medium- to long-term relationships. It has the additional advantage of increasing comparability to the existing literature, since many studies also follow the same approach (e.g. Carter, 2006; Voitchovsky, 2005).

We test the sensitivity of our findings using three different samples. We run panel regressions including up to (i) 28 EU countries, (ii) 41 advanced OECD economies and (iii) 49 advanced and emerging countries (advanced economies plus 8 non-EU, non-OECD countries).

In terms of the estimation approach, we control for the endogeneity of the lagged dependent variable and the unemployment rate by using a first-difference generalised method of moments estimator (Blundell and Bond, 1998). We start with a very parsimonious specification, which is successively extended to include additional explanatory variables.

3.2. MAIN RESULTS

Our estimation results reveal that the redistribution of income is, to an important extent, determined by its past as shown by the highly significant coefficient of the lagged dependent variable. This is not surprising; redistributive policies typically exhibit a high degree of inertia due to the political economy of reforms. Barring revolutions, it takes time for the relevant institutional and structural factors to record significant changes that eventually impact the way income is distributed and redistributed across individuals in the economy as a whole.

Our regression analysis confirms the positive correlation between redistribution and the level of per capita income described in Section 2. In other words, redistribution is a matter of living standards: the higher per-capita income, the more redistribution a government can and will afford. This result is in line with the findings of Gründler and Köllner (2016). It is also robust across the different geographical regions used: it holds for the full sample (Table 3), the EU (Table 4) and OECD (Table 5).[8]

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[8] We also tested a broad range of additional indicators, which, however, turned out to be insignificant and are therefore not shown in the regression tables. These include variables related to the economic cycle (real GDP growth), labour market (non-accelerating inflation rate of unemployment), trade (the degree of openness as measured by the sum of exports and imports over GDP), skills (share of 25-99-year old with secondary or no education) as well as political-economy indicators (share of left- or right-wing parties in parliament/government, voter turnout).

Table 3: **Regression** results **(full sample)**

Dep. var.: ln redistribution	(1) FD-GMM	(2) FD-GMM	(3) FD-GMM	(4) FD-GMM	(5) FD-GMM	(6) FD-GMM	(7) FD-GMM
ln redistribution (t-1)	0.747***	0.857***	0.993***	0.908***	0.860***	0.787***	0.842***
	(4.514)	(5.576)	(5.326)	(7.091)	(7.534)	(5.066)	(10.171)
ln real GDP pc (t)	0.043*	0.030	0.017	0.020	0.055***	0.052***	0.058***
	(1.720)	(1.354)	(0.666)	(1.254)	(4.282)	(3.083)	(3.556)
ln headline balance (t)		-0.196**	-0.123**	-0.131**	-0.227*	-0.253*	-0.305*
		(-1.978)	(-2.010)	(-2.317)	(-1.771)	(-1.658)	(-1.786)
ln unemp rate (t)			0.005	0.003	0.023**	0.021	0.015
			(0.417)	(0.357)	(1.996)	(1.215)	(1.174)
ln union density (t)				-0.001	-0.007	-0.004	-0.015
				(-0.082)	(-0.804)	(-0.412)	(-1.368)
ln low-tech value added (t)					0.027**	0.030*	0.032***
					(2.116)	(1.948)	(2.617)
ln mean-median ratio (t-1)						-0.043	0.029
						(-0.314)	(0.402)
Dummy majoritarian system (t-1)							-3.668**
							(-2.207)
mean-med ratio x maj. system							0.766**
							(2.187)
# observations	319	253	240	218	130	105	105
# countries	49	45	42	40	30	25	25
Max # per country	8	8	8	8	8	8	8
Min # per country	3	3	3	1	2	1	1
Average # per country	6.51	5.622	5.714	5.45	4.333	4.2	4.2
Wald time dummies (p-value)	0.34	0.05	0.075	0.159	0.004	0	
AR(1) (p-value)	0.061	0.096	0.082	0.045	0.049	0.064	0.042
AR(2) (p-value)	0.161	0.108	0.121	0.156	0.219	0.12	0.164
Hansen (p-value)	0.324	0.199	0.213	0.122	0.228	0.316	0.95
# instruments	23	26	27	26	29	30	46
Interaction term (size)							0.794
interaction term (p-value)							0.024

Note: The sample includes up to 49 advanced and developed countries (see Table A.1. in the annex for an overview of countries), covering the period 1980-2014 using 5-year average. The dependent variable is redistribution as defined by the difference between the Gini of market and disposable income. All estimations include time dummies, which are not shown due to space constraints. The regressions are estimated using the first-step difference GMM estimator (FD GMM) following Blundell and Bond (1998), controlling for endogeneity of the lagged dependent variable and the real GDP per capita. Due to the small sample size the set of internal instrumental variables is restricted to up to 4 lags and the matrix of instruments is then "collapsed". The standard errors are corrected following Windmeijer (2005). AR(1,2) and Hansen tests confirm the validity of the GMM specifications. A marginal increase of the mean-median ratio has no statistically significant impact on the redistribution for countries with a proportional electoral system (coefficient of mean-median ratio of 0.029 is not statistically significant). However, the mean-median ratio becomes statistically significant and positive for countries with a majoritarian electoral system (the coefficient of 0.794 is statistically significant at the 5 per cent level as reported in the last two columns labelled "interaction terms"). ***, ** and * denote respectively statistical significance at 1, 5 and 10%.

Table 4: **Regression results (EU-28 sample)**

Dep. var.: ln redistribution	(1) FD-GMM	(2) FD-GMM	(3) FD-GMM	(4) FD-GMM	(5) FD-GMM	(6) FD-GMM	(7) FD-GMM
ln redistribution (t-1)	0.853***	0.824***	0.823***	0.816***	0.834***	0.735***	0.835***
	(13.020)	(10.455)	(10.638)	(8.608)	(9.601)	(4.435)	(7.457)
ln real GDP pc (t)	0.025***	0.020**	0.021**	0.021**	0.047***	0.058***	0.061***
	(3.060)	(1.980)	(1.985)	(1.964)	(3.019)	(3.406)	(2.762)
ln headline balance (t)		-0.057	-0.077	-0.073*	-0.297*	-0.416*	-0.509*
		(-0.647)	(-0.787)	(-1.918)	(-1.860)	(-1.770)	(-1.878)
ln unemp rate (t)			-0.003	-0.002	0.004	0.000	-0.005
			(-0.475)	(-0.320)	(0.490)	(0.024)	(-0.409)
ln union density (t)				0.004	-0.006	-0.006	-0.019
				(0.415)	(-1.022)	(-0.618)	(-1.267)
ln low-tech value added (t)					0.032*	0.043**	0.039**
					(1.944)	(2.267)	(2.542)
ln mean-median ratio (t-1)						-0.103	-0.030
						(-0.601)	(-0.131)
Dummy majoritarian system (t-1)							-0.364
							(-0.116)
mean-med ratio x maj. System							0.071
							(0.108)
# observations	170	162	162	162	98	83	83
# countries	28	28	28	28	23	19	19
Max # per country	8	8	8	8	8	8	8
Min # per country	3	3	3	3	3	3	3
Average # per country	6.071	5.786	5.786	5.786	4.261	4.368	4.368
Wald time dummies (p-value)	0.507	0.881	0.912	0.916	0	0	
AR(1) (p-value)	0.065	0.088	0.067	0.025	0.093	0.102	0.079
AR(2) (p-value)	0.173	0.229	0.228	0.121	0.189	0.372	0.302
Hansen (p-value)	0.111	0.162	0.156	0.138	0.417	0.99	0.95
# instruments	23	24	25	26	27	30	46
Interaction term (size)							0.041
interaction term (p-value)							0.959

Table 5**: Regression results (OECD sample)**

Dep. var.: ln redistribution	(1) FD-GMM	(2) FD-GMM	(3) FD-GMM	(4) FD-GMM	(5) FD-GMM	(6) FD-GMM	(7) FD-GMM
ln redistribution (t-1)	0.868***	0.825***	0.824***	0.861***	0.880***	0.815***	0.829***
	(10.323)	(7.245)	(7.683)	(6.445)	(7.296)	(5.328)	(8.675)
ln real GDP pc (t)	0.026**	0.023	0.030*	0.023*	0.056***	0.053***	0.059***
	(1.962)	(1.624)	(1.839)	(1.742)	(4.536)	(3.334)	(3.561)
ln headline balance (t)		-0.155*	-0.162*	-0.114*	-0.236*	-0.267*	-0.305*
		(-1.884)	(-1.769)	(-1.776)	(-1.815)	(-1.740)	(-1.932)
ln unemp rate (t)			0.009	0.006	0.022**	0.020	0.017
			(1.049)	(0.697)	(1.962)	(1.223)	(1.215)
ln union density (t)				0.002	-0.008	-0.006	-0.015
				(0.207)	(-0.934)	(-0.587)	(-1.411)
ln low-tech value added (t)					0.028**	0.030**	0.031**
					(2.289)	(2.038)	(2.446)
ln mean-median ratio (t-1)						-0.032	-0.005
						(-0.209)	(-0.039)
Dummy majoritarian system (t-1)							-3.009
							(-1.524)
mean-med ratio x maj. System							0.627
							(1.505)
# observations	261	227	227	210	127	102	102
# countries	41	38	38	37	29	24	24
Max # per country	8	8	8	8	8	8	8
Min # per country	3	3	3	2	2	1	1
Average # per country	6.366	5.974	5.974	5.676	4.379	4.25	4.25
Wald time dummies (p-value)	0.273	0.299	0.18	0.21	0	0	
AR(1) (p-value)	0.014	0.048	0.059	0.078	0.051	0.062	0.048
AR(2) (p-value)	0.113	0.103	0.203	0.203	0.222	0.118	0.152
Hansen (p-value)	0.342	0.119	0.134	0.191	0.268	0.359	0.95
# instruments	23	24	25	26	29	30	46
Interaction term (size)							0.622
interaction term (p-value)							0.099

There seems to be a systematic and statistically significant link between the state of public finances and the degree of redistribution. Our results suggest that countries with lower surpluses or higher deficits of the general government budget tend to be associated with a higher degree of redistribution as measured by the difference between the dispersion in market and disposable income. To exclude the possible effect of the business cycle on the budget, we would have preferred to use the cyclically-adjusted budget balance, but their availability is very limited pushing the size of our sample below levels that would support meaningful statistical inference. In the short run, and by design, unemployment benefits and government expenditure on active labour market policies strongly correlate with labour market conditions. In countries where unemployment benefits are sizeable, they very much contribute to smoothing wage losses and represent a very important part of redistribution (see left panel of Figure 4). Using five-year averages of the budget balance is not a perfect solution, but is likely to mitigate the possible effect of the cycle. This expectation is indirectly confirmed by the fact that in our regressions the rate of unemployment, or the five-year averages thereof, turns out to have a very small and, most importantly, a statistically insignificant effect on the redistribution of income.

Although the estimated link between the redistribution of income and the budget balance looks plausible at first – if a government borrows more money, it can (partly) spend it on redistribution – the causality is not entirely obvious. First, it is not clear why more deficit-spending should necessarily go into projects that mitigate the dispersion of income; expansionary fiscal policy can also accentuate income inequality. Secondly, the interaction could also work the other way round: in the face of a more unequal distribution of market income, political pressure on governments increases to find resources to address the issue. And for reasons extensively discussed in the literature (see Drazen, 2000, Alesina and Perotti, 1995), issuing new debt tends to be easier than increasing taxes. There are studies supporting both views about cause and effect. Larch (2012) argues that it is the combination of income inequality and political instability that tends to increase the government deficit. Agnello and Sousa (2012), by contrast, reason that fiscal adjustments have a negative impact on the income gap between the rich and the poor. Since their model is symmetric their findings logically imply that fiscal expansions tend to have redistributive effects.

At the macro level, that is, the level of our analysis, it is difficult to conclusively decide which of the two narratives is closer to reality. Both can be at play across time and countries. A clearer answer would require a more detailed analysis using micro data, which goes beyond the scope of our paper. However, irrespective of which narrative actually applies, both raise the issue of sustainability. To the extent that the inequality of market income were to further increase or to remain at current high levels, mitigating its impact on disposable income through redistribution could put additional pressure on policy makers at a time when the long-run sustainability of public finances is already challenged in many countries by high government debt levels and the budgetary impact of ageing.

To capture the possible role played by the structure of the economy or the composition of the labour force, our regressions include the share of low-tech sectors in total value added of manufacturing. We use the OECD classification of manufacturing industries based on R&D intensities which allows us to cover a sufficiently large set of countries. Our estimation results point to a statistically significant relationship in the sense that a higher share of low-tech sectors tends to go along with a high degree of redistribution. Although the exact mechanism may not be entirely obvious and may take different forms, this finding does not come as a complete surprise. Low-tech sectors tend to employ a larger share of low-skilled and low-paid workers (Shi 2002), a group of citizens and voters who may objectively be in need of income support and/or support political platforms favouring the redistribution of income.

But how do political demands for redistribution translate into actual policies? One of the early and still most compelling explanations rests on the median voter theorem. Using a general equilibrium model, Meltzer and Richards (1981) show that under a majoritarian electoral system, the degree of redistribution increases when mean income rises relative to that of the median income, that is, when the number of voters with income below average exceeds 50%. We test this well-known proposition in our panel framework by including the mean-median ratio together with a dummy variable which controls for the type of electoral system. In line with the Meltzer and Richards' hypothesis we find that an increase of the mean-to-median ratio increases the degree of redistribution in countries with a

majoritarian electoral system. By contrast, the mean-to-median ratio does not play a decisive role for proportional electoral systems because preferences over the redistribution of income are more fragmented. The findings are significant for the large country samples (OECD and full sample), but not for the EU-28. The difference can be explained by the fact that electoral systems with a simple plurality system or modified proportional representation are much less frequent in the EU28 (only 3 out of 28 countries in the sample ranging from 2010 to 2014, i.e. around 10% of the total number of countries) than in the OECD or full sample (8 out of 36 OECD countries, i.e. around 20%).[9]

Interestingly, the level of per capita income seems to dominate or dwarf a number of other factors which a priori one may expect to influence the degree of redistribution (Table 6).[10] Our expectation was that for a given level of economic development, as measured by per-capita income, redistribution should still differ significantly according to the role played by government and trade unions. In particular, one would expect redistribution to be less important in countries with smaller governments and weak trade unions and more redistribution in countries with a larger, more interventionist governments and stronger trade unions. However, these priors were not born out by our regression analysis. As long as per capita GDP is included as explanatory variable none of the other variables gauging the role of government and trade unions turns out to be statistically significant.

Table 6: **Robustness: testing additional independent variables**

OECD	(1) FD-GMM	(2) FD-GMM	(3) FD-GMM	(4) FD-GMM	(5) FD-GMM	(6) FD-GMM	(7) FD-GMM	(8) FD-GMM	(9) FD-GMM	(10) FD-GMM	(11) FD-GMM	(12) FD-GMM	(13) FD-GMM	(14) FD-GMM
ln redistribution (t-1)	0.868***	0.825***	0.824***	0.861***	0.880***	0.815***	0.775***	0.719***	0.858***	0.855***	0.799***	0.701***	0.804***	0.767***
	(10.323)	(7.245)	(7.683)	(6.445)	(7.296)	(5.328)	(4.641)	(4.654)	(6.257)	(5.949)	(5.381)	(4.714)	(5.297)	(4.256)
ln real GDP pc (t)	0.026**	0.023	0.030*	0.023*	0.056***	0.053***	0.046**	0.066***	0.059***	0.062***	0.050***	0.055**	0.053***	0.062*
	(1.962)	(1.624)	(1.839)	(1.742)	(4.536)	(3.334)	(2.518)	(5.330)	(3.806)	(3.658)	(3.131)	(2.509)	(3.253)	(1.645)
ln headline balance (t)		-0.155*	-0.162*	-0.114*	-0.236*	-0.267*	-0.229*	-0.506**	-0.286*	-0.287*	-0.243*	-0.238*	-0.275*	-0.218
		(-1.884)	(-1.769)	(-1.776)	(-1.815)	(-1.740)	(-1.740)	(-2.108)	(-1.759)	(-1.701)	(-1.736)	(-1.750)	(-1.749)	(-1.635)
ln unemp rate (t)			0.009	0.006	0.022**	0.020	0.019	0.003	0.018	0.019	0.017	0.036*	0.020	0.018
			(1.049)	(0.697)	(1.962)	(1.223)	(1.061)	(0.233)	(1.349)	(1.379)	(1.144)	(1.912)	(1.232)	(0.943)
ln union density (t)				0.002	-0.008	-0.006	-0.003	-0.007	-0.009	-0.009	-0.006	-0.003	-0.005	-0.002
				(0.207)	(-0.934)	(-0.587)	(-0.295)	(-0.647)	(-0.835)	(-0.858)	(-0.605)	(-0.224)	(-0.522)	(-0.193)
ln low-tech value added (t)					0.028**	0.030***	0.024	0.050***	0.035**	0.036**	0.031**	0.025*	0.031**	0.025
					(2.289)	(2.038)	(1.553)	(3.245)	(2.467)	(2.445)	(2.008)	(1.788)	(2.055)	(1.300)
ln mean-median ratio (t-1)						-0.032	-0.071	-0.119	0.021	0.027	-0.052	-0.108	-0.048	-0.092
						(-0.209)	(-0.490)	(-0.737)	(0.138)	(0.161)	(-0.352)	(-0.562)	(-0.301)	(-0.589)
ln economic freedom index (t)							-0.007							
							(-0.700)							
ln gross debt (t)								-0.007						
								(-1.098)						
ln pop > 65 (t)									-0.014					
									(-0.536)					
ln OADR (t)										-0.023				
										(-0.976)				
ln govt. left (t)											0.025			
											(1.598)			
ln govt. right (t)												-0.001		
												(-0.192)		
election year (t)													-0.000	
													(-1.511)	
WB govt. effectiveness (t)														-0.026
														(-0.699)
# observations	261	227	227	210	127	102	102	83	102	102	102	89	102	90
# countries	41	38	38	37	29	24	24	19	24	24	24	23	24	24
Max # per country	8	8	8	8	8	8	8	8	8	8	8	8	8	4
Min # per country	3	3	3	2	2	1	1	3	1	1	1	1	1	1
Average # per country	6.366	5.974	5.974	5.676	4.379	4.25	4.25	4.368	4.25	4.25	4.25	3.87	4.25	3.75
Wald time dummies (p-value)	0.273	0.299	0.18	0.21	0	0	0	0	0	0	0	0.003	0	0.623
AR(1) (p-value)	0.014	0.048	0.059	0.078	0.051	0.062	0.079	0.108	0.054	0.05	0.05	0.162	0.074	0.081
AR(2) (p-value)	0.113	0.103	0.203	0.203	0.222	0.118	0.119	0.51	0.112	0.112	0.177	0.153	0.164	0.118
Hansen (p-value)	0.342	0.119	0.134	0.191	0.268	0.359	0.363	0.964	0.601	0.657	0.834	0.839	0.818	0.509
# instruments	23	24	25	26	29	30	31	31	31	31	31	31	31	27

This does not mean that different types of government do not play a role at all. Our descriptive analysis clearly shows that the US, the UK and Australia exhibit visible differences as regards redistribution especially compared to high-income EU countries. But then, these evident differences do not play out in a larger sample of countries and over the medium and long term. Economic development seems to be the overriding factor very much in line with the prediction of Wagner's law according to which populations are voting for increasing welfare programmes as general income levels

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[9] We use the classification of prpportional and majoritarian systems in the Comparative Political Data Set compiled by Armingeon et al. (2016). Inter-Parliamentary Union; Ismayr (2003); Lijphart (2012); national sources and constitutions; EJPR Political Data Yearbook (various issues). The countries with simple plurality system or modified proporation representation are: Australia, Canada, France, Japan, Lithuania, New Zealand, United Kingdom and USA.

[10] Prime candidates also in light of our own descriptive analysis are the size of government, the political colour of the incumbent government, the prevailing economic doctrine or value system of a country, the strength of trade unions.

grow. Several empirical studies corroborate this trend showing also that government expenditure tends to outgrow income levels especially in catching up countries; see for instance Akitoby et. al. (2006), Arpaia and Turrini (2008) and Lamartina and Zaghini (2011). There are some countries where the trend is less pronounced, i.e. where more per capita income translates into less additional government spending and redistribution, such as the US or Australia, but the trend is visible nevertheless.

4. CONCLUSIONS

We have analysed a sample of developing and advanced countries since the 1970s with the intent to isolate macroeconomic, institutional and political factors driving the redistribution of income. We conducted the analysis against the backdrop of a persisting and widespread trend towards a more unequal distribution of market incomes.

We show how, since the late 1990s, redistribution has to a large extent mitigated the effect of increasingly unequal market outcomes: with the exception of some developing countries such as China, India and Brazil, the dispersion of disposable income has been broadly stabilised thanks to growing tax and transfer programmes of government. The expansion of redistribution has been underpinned by a significant progress in living standards. There is a clear trend for people to vote for growing welfare programmes as per-capita income increases. This trend is somewhat weaker in countries with a stronger free market ideology such as the US, Australia and New Zealand, but still visible.

The structure of the economy also seems to influence the degree of redistribution. Our results indicate that redistribution tends to increase with the share of low-tech sectors in total value added of the manufacturing sectors. This finding is not surprising. Low-tech industries tend to employ more low-skilled, low-pay workers who at the ballot box may, on average, support political parties favouring a redistribution from high to low income earners.

Importantly, our analysis also corroborates the median voter model: in countries with a majoritarian electoral system, redistribution tends to increase if more than half of the voters earn less than average income. The actual impact of a growing difference between mean and median income may be relatively small compared to other factors but still statistically significant.

Our findings belie the popular believe according to which macroeconomic adjustment programmes implemented in some euro area countries in the wake of the post-2007 crisis always came at the price of a more unequal distribution of disposable income. In some programme countries, notably Portugal and Ireland, the distribution of disposable income even improved somewhat during the programme as governments protected or even increased spending for low-income families; the composition of adjustment plays a crucial role.

Beyond crisis episodes, our analysis indicates that more redistribution tends to go along with lower government surpluses or higher government deficits. While the underlying causality is not entirely clear, this finding may not bode well going forward. If the inequality of market income were to further increase or to remain at current high levels mitigating its impact on disposable income through redistribution could confront policymakers with severe economic challenges.

APPENDIX

Table A1. **Country sample**

Country name	ISO alpha-3	EU-28	OECD	Full sample
Australia	AUS		x	x
Austria	AUT	x	x	x
Belgium	BEL	x	x	x
Bulgaria	BGR	x	x	x
Brasil	BRA			x
Canada	CAN		x	x
Switzerland	CHE		x	x
Chile	CHL		x	x
China	CHN			x
Colombia	COL			x
Costa Rica	CRI			x
Cyprus	CYP	x	x	x
Czechia	CZE	x	x	x
Germany	DEU	x	x	x
Denmark	DNK	x	x	x
Espania	ESP	x	x	x
Estonia	EST	x	x	x
Finland	FIN	x	x	x
France	FRA	x	x	x
Great Britain	GBR	x	x	x
Greece	GRC	x	x	x
Croatia	HRV	x	x	x
Hungary	HUN	x	x	x
Indonesia	IDN			x
India	IND			x
Ireland	IRL	x	x	x
Iceland	ISL		x	x
Israel	ISR		x	x
Italy	ITA	x	x	x
Japan	JPN		x	x
South Korea	KOR		x	x
Lithunia	LTU	x	x	x
Luxembourg	LUX	x	x	x
Latvia	LVA	x	x	x
Mexico	MEX		x	x
Malta	MLT	x	x	x
The Netherlands	NLD	x	x	x
Norway	NOR		x	x
New Zealand	NZL		x	x
Poland	POL	x	x	x
Portugal	PRT	x	x	x
Romania	ROU	x	x	x
Russia	RUS			x
Slovak Republic	SVK	x	x	x
Slovenia	SVN	x	x	x
Sweden	SWE	x	x	x
Turkey	TUR		x	x
The United States of America	USA		x	x
South Africa	ZAF			x
# total		28	41	49

Table A2. **Description of variables and sources**

Variable name	Source
Redistribution Gini market	Standardized World Income Inequality Database (SWIID)
Median und average incomes	Wang and Caminada (2017) based on data from Luxembourg Income Study (LIS)
Real GDP pc (USD) Real GDP growth Unemployment rate Nairu General govt. headline balance Gross general govt. debt Degree of openness Share of pop > 65 in total population Share of pop < 14 in total population Share of 25-99-year old with sec. education Share of 25-99-year old with no education	OECD Economic Outlook
Fraser size of government Fraser top marginal tax rate	Fraser Institute, Economic Freedom of the World, 2016 Annual Report
Share of high-tech per compensation Share of high-tech value added	OECD National Accounts
Share govt. left Share election month in a year	Armingeon et al. (2016), Comparative Political Data Set, 1960-2014
WB political stability and absence of violence WB government effectiveness WB summary indicator	Worldbank, Worldwide Governance Indicators (WGI)

Table A3. **Summary statistics**

Variable		Mean	Std. Dev.	Min	Max	Obs.	
Redistribution	overall	14.0	6.0	0.1	26.1	N =	497
	between		5.3	1.2	22.7	n =	66
	within		2.8	2.6	22.2	bar =	7.5
Gini market	overall	43.7	6.4	23.0	58.6	N =	497
	between		4.5	32.6	52.7	n =	66
	within		4.6	26.8	57.6	bar =	7.5
Real GDP pc (USD)	overall	29.6	19.1	3.4	104.9	N =	508
	between		17.8	4.8	77.2	n =	65
	within		7.1	-6.3	57.2	bar =	7.8
Real GDP growth	overall	2.8	1.9	-4.9	10.1	N =	309
	between		1.3	1.1	6.4	n =	44
	within		1.4	-3.2	8.1	bar =	7.0
Unemployment rate	overall	7.6	3.8	0.5	23.3	N =	312
	between		3.2	2.7	16.3	n =	46
	within		2.2	0.2	19.2	bar =	6.8
Nairu	overall	7.0	3.1	1.2	17.8	N =	185
	between		2.9	2.9	15.0	n =	34
	within		1.1	4.2	10.8	bar =	5.4
Headline balance	overall	-2.6	3.7	-12.4	15.8	N =	285
	between		2.8	-8.3	7.6	n =	45
	within		2.3	-10.5	5.6	bar =	6.3
Gross govt. debt	overall	53.7	29.9	4.8	167.0	N =	187
	between		24.4	6.4	109.9	n =	29
	within		16.9	-8.3	127.3	bar =	6.4
Fraser size of government	overall	5.1	1.3	2.0	8.3	N =	502
	between		1.1	2.9	7.1	n =	65
	within		0.8	2.7	7.4	bar =	7.7
Top marginal tax rate	overall	3.6	2.2	0.0	8.1	N =	438
	between		1.6	0.7	7.7	n =	65
	within		1.5	-0.8	7.4	bar =	6.7
Degree of openness	overall	78.9	47.6	17.4	345.2	N =	307
	between		43.6	22.8	241.5	n =	44
	within		18.4	11.0	182.7	bar =	7.0
Share of high-tech per compensation	overall	2.2	1.0	0.4	5.4	N =	129
	between		0.9	0.4	5.0	n =	31
	within		0.3	1.1	3.6	bar =	4.1
Share of high-tech value added	overall	2.7	2.3	0.3	14.8	N =	134
	between		2.3	0.3	11.7	n =	32
	within		0.7	0.3	5.9	bar =	4.1
Share of pop > 65 in total population	overall	13.1	3.3	3.8	22.9	N =	576
	between		2.8	4.7	17.4	n =	64
	within		1.8	7.1	21.0	T =	9
Share of pop < 14 in total population	overall	20.7	5.3	13.3	45.3	N =	576
	between		4.5	15.7	37.1	n =	64
	within		2.9	13.6	28.9	T =	9
Share of 25-99-year old with secondary education	overall	47.5	15.5	6.2	87.4	N =	558
	between		12.5	15.3	68.9	n =	62
	within		9.4	16.4	71.4	T =	9
Share of 25-99-year old with no education	overall	5.0	7.0	0.0	47.5	N =	558
	between		5.9	0.2	26.5	n =	62
	within		3.8	-11.5	25.9	T =	9
Share govt. left	overall	33.6	29.6	0.0	100.0	N =	275
	between		17.1	0.0	60.6	n =	36
	within		24.1	-22.9	102.1	bar =	7.6
Share election month in a year	overall	22.2	13.5	0.0	57.0	N =	594
	between		10.5	0.0	51.0	n =	66
	within		8.6	-2.2	49.4	T =	9
WB political stability and absence of violence	overall	0.7	0.6	-1.4	1.6	N =	258
	between		0.6	-1.3	1.5	n =	65
	within		0.2	0.2	1.1	bar =	4.0
WB government effectiveness	overall	1.3	0.6	-0.2	2.2	N =	258
	between		0.6	0.0	2.1	n =	65
	within		0.1	0.8	1.6	bar =	4.0
WB summary indicator	overall	1.1	0.6	-0.3	2.0	N =	258
	between		0.6	-0.2	1.9	n =	65
	within		0.1	0.7	1.3	bar =	4.0

Table A4. **Correlation matrix**

	Redistribution	Gini market	Real GDP pc (USD)	Real GDP pc sqaured (USD)	Real GDP growth	Unemployment rate	Nairu	Headline balance	Gross govt. debt	Fraser size of government	Fraser top marginal tax rate	Degree of openness	Share of high-tech per compensation	Share of high-tech value added	Share of pop > 65 in total population	Share of pop < 14 in total population	Share of 25-99-year old with sec. education	Share of 25-99-year old with no education	Share govt. left	Share election month in a year	WB political stability and absence of violence	WB government effectiveness	WB summary indicator
Redistribution	1																						
Gini market	0.45	1																					
Real GDP pc (USD)	0.38	0.00	1																				
Real GDP pc sqaured (USD)	0.29	-0.01	0.91	1																			
Real GDP growth	-0.37	-0.14	-0.29	-0.19	1																		
Unemployment rate	0.23	0.40	-0.41	-0.32	-0.07	1																	
Nairu	0.28	0.49	-0.39	-0.33	-0.07	0.95	1																
Headline balance	-0.11	-0.31	0.44	0.40	0.28	-0.44	-0.44	1															
Gross govt. debt	0.18	0.24	0.02	-0.13	-0.45	0.25	0.30	-0.46	1														
Fraser size of government	-0.47	0.19	-0.11	-0.02	0.19	-0.08	-0.12	0.02	-0.12	1													
Fraser top marginal tax rate	-0.29	0.20	-0.01	0.11	0.10	-0.03	-0.08	0.07	-0.23	0.77	1												
Degree of openness	0.34	0.06	0.34	0.54	0.09	-0.03	-0.04	0.15	-0.25	-0.05	0.06	1											
Share of high-tech per compensation	-0.03	-0.24	-0.15	-0.11	0.27	-0.07	0.01	0.16	-0.13	-0.25	-0.24	0.32	1										
Share of high-tech value added	0.00	-0.13	0.15	0.17	0.24	-0.12	-0.03	0.12	-0.06	0.05	0.00	0.42	0.79	1									
Share of pop > 65 in total population	0.61	0.15	0.37	0.32	-0.44	0.10	0.08	0.05	0.27	-0.27	-0.03	0.20	-0.13	-0.19	1								
Share of pop < 14 in total population	-0.57	-0.06	-0.34	-0.32	0.32	-0.10	-0.11	-0.03	-0.10	0.14	-0.08	-0.30	0.04	0.09	-0.89	1							
Share of 25-99-year old with sec. education	0.40	0.07	0.10	0.13	-0.03	0.07	-0.01	0.09	-0.17	-0.03	0.17	0.33	0.14	-0.01	0.42	-0.54	1						
Share of 25-99-year old with no education	-0.37	0.07	-0.28	-0.20	0.12	0.09	0.16	-0.16	0.12	0.11	-0.07	-0.24	-0.06	0.00	-0.42	0.52	-0.55	1					
Share govt. left	0.03	-0.06	0.02	0.00	-0.02	0.01	0.11	0.09	0.00	-0.26	-0.16	0.00	0.11	-0.05	0.09	-0.05	0.01	0.15	1				
Share election month in a year	0.38	0.08	0.24	0.15	-0.31	0.06	-0.01	-0.17	0.08	-0.16	-0.08	-0.05	-0.35	-0.28	0.44	-0.46	0.26	-0.31	-0.15	1			
WB political stability and absence of violence	0.39	-0.20	0.49	0.41	-0.09	-0.30	-0.30	0.32	-0.16	-0.29	-0.20	0.30	0.12	0.27	0.40	-0.51	0.29	-0.39	0.03	0.49	1		
WB government effectiveness	0.36	-0.03	0.77	0.56	-0.16	-0.43	-0.34	0.40	0.03	-0.22	-0.26	0.08	0.07	0.23	0.20	-0.15	-0.08	-0.29	0.04	0.24	0.60	1	
WB summary indicator	0.39	-0.05	0.75	0.57	-0.16	-0.42	-0.33	0.42	-0.03	-0.23	-0.23	0.16	0.06	0.25	0.27	-0.27	0.01	-0.36	0.06	0.35	0.76	0.96	1

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