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Article

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Martin Larch and Philipp Mohl*

Mitigating the Gap Between the Rich and the Poor: Key Trends and Drivers of Redistribution

The growing inequality of market income has attracted considerable attention; less so the redistribution of income. This article analyses key trends and drivers of income redistribution in the EU and the world. It shows that in the EU increasing redistribution has largely stabilised the dispersion of disposable income since the late 1990s. Only some advanced countries with a dominant free market ideology have recorded an increasing inequality of disposable income alongside a growing inequality of market outcomes. The evidence from panel data shows that the degree of redistribution increases with per capita income and with the share of low-tech, low-income sectors in manufacturing as well as, 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. More redistribution is associated with lower budgetary surpluses or higher deficits.

Condemned to live in the shadows of the policy debate for a long time, income inequality has taken centre stage in the wake of the Great Recession of 2007. Academics and policymakers alike have paid increased attention to the growing income gap between the rich and the poor. The post-2007 crisis was only the trigger – not the cause – of the change of heart. Since the 1980s, the distribution of market income has become more unequal in almost all advanced countries.

The policy discussion has paid less attention to the evolution of redistribution, which increased significantly over the past decades. Classical median voter models represent the conventional view wherein redistribution is expected to increase with a rising income gap between the mean and the median voter (Meltzer and Richard, 1981). By contrast,

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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 illness. Finally, some models conclude that redistribution runs from the ends of the income distribution towards the middle class (Stigler, 1970; Dixit and Londregan, 1998; Epple and Romano, 1996).

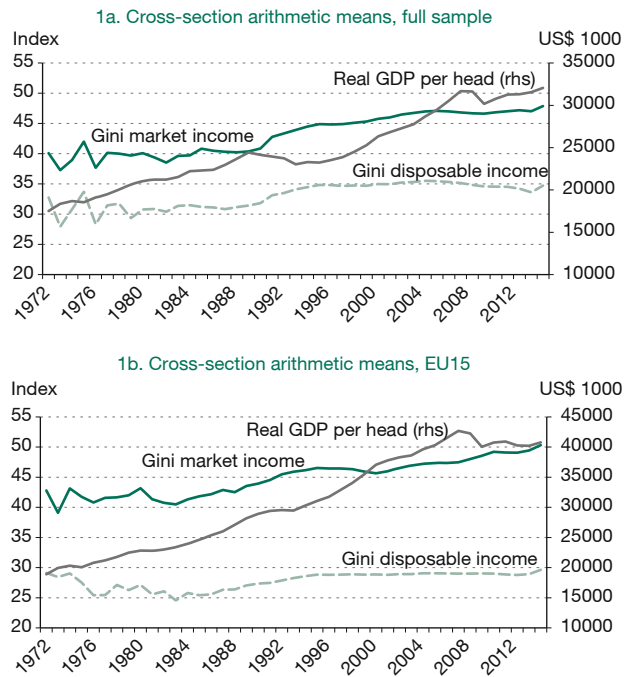
Against this background, this paper analyses key trends and drivers of income redistribution in the EU and the world. This study goes beyond the existing literature by exploring a wider range of economic, political and institutional factors. In particular, it offers an empirical test of the median voter model.

Income redistribution in the EU: Main trends and facts

Despite the booming interest in distributional issues, the availability and comparability of inequality data remains limited. This paper relies mainly on the Gini index from the Standardized World Income Inequality Database (SWIID), compiled by Solt (2016) and widely used in the literature (e.g. Ostry et al., 2014), and covers a large set of countries (66 advanced and developing countries from the early 1970s to 2015). We measure the degree of redistribution as the difference between the Gini index of market income and the Gini index of disposable income.

The first important fact to highlight is how the redistribution of income via fiscal policy has largely offset the trend

Figure 1
Distribution of market and disposable income, 1972-2014



Sources: SWIID, OECD, IMF.

towards increasingly unequal market outcomes in advanced countries. The growing degree of redistribution has been underpinned by significant progress in terms of real per capita income (Figures 1 and 2).

The distribution of market income has grown much more unequal. The average cross-section Gini index climbed from around 40 in the early 1970s to close to 50 in 2015. To put this into perspective, a difference of ten points is more than what currently divides Finland and Greece, with Finland being an example of a comparatively low dispersion of market income and Greece as an example of a particularly high dispersion.

Alongside the conspicuous surge in the inequality of market income, real GDP per capita has almost doubled, not least thanks to the catching up of lagging countries. A prominent implication of the combined increase, 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 to a large extent been mitigated by government redistribution policies. Since the late 1990s, the average Gini index of dis-

posable income has effectively remained unchanged in both the full sample (Figure 1a) and the EU15 (Figure 1b).

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, differences also reflect diverging ideological views about how much the public sector should intervene into the market process (Figure 2).

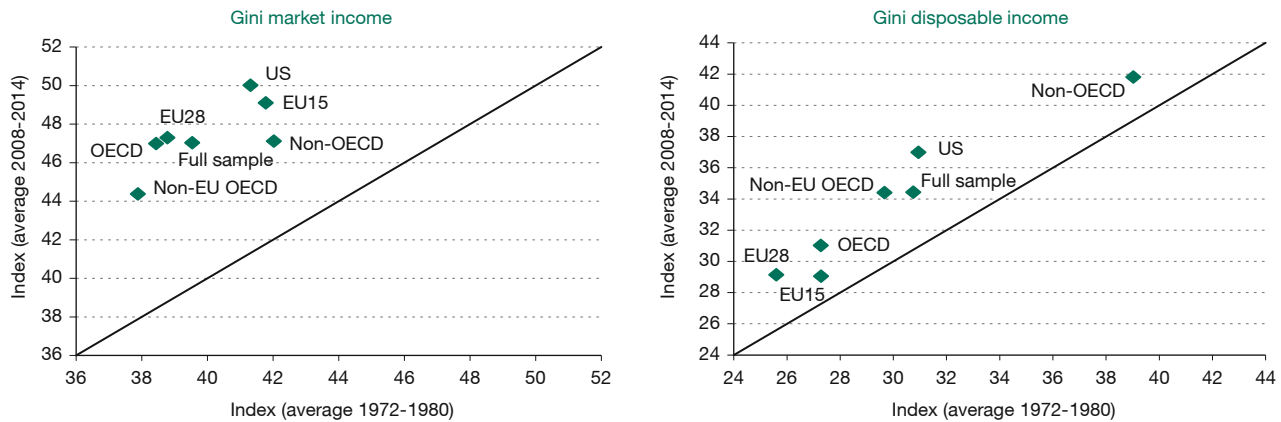
The global trend towards more unequal market outcomes is visible across all economic areas covered by our sample.¹ The relative ranking of economic areas has not changed much since the 1970s with one exception (Figure 2, left-hand panel). The group of non-OECD countries, which had the highest dispersion 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.² The group of non-OECD countries includes low- or middle-income countries (such as Morocco, South Africa and Russia) that are all at different stages of the economic catching-up process.

The relative performance of the EU15 and the US is of particular interest. 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 disposable income after transfers and taxes (Figure 2, right-hand panel). 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. Since the 1970s, the Gini index of the EU15 countries 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. 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

1 List of countries in the sample: Australia, Austria, Belgium, Bulgaria, Brazil, Canada, Switzerland, Chile, China, Colombia, Costa Rica, Cyprus, the Czech Republic, Germany, Denmark, Estonia, Finland, France, Greece, Croatia, Hungary, Indonesia, India, Ireland, Iceland, Israel, Italy, Japan, South Korea, Lithuania, Luxembourg, Latvia, Mexico, Malta, the Netherlands, Norway, New Zealand, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Turkey, South Africa, the UK, the US.

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

Figure 2
Distribution of market and disposable income by groups of countries



Source: SWIID.

larger redistribution programmes (typically in low-income countries which inter alia still need to develop the necessary institutional and administrative infrastructure).

The third important fact about the distribution of income is that the post-2007 economic and financial crisis did not accelerate the tendency towards more unequal income. While the situation varies across economic areas and across countries, the assumption that the crisis cum austerity policies made things worse is not generally confirmed (Table 1).

In the public debate, the post-2007 crisis is often associated with a significant rise in income inequality – not least because euro area countries implemented sizeable austerity programmes, some under tightly monitored assistance programmes. 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 striking one, at least as regards market income. The average annual increase in the Gini index of market income 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 launched a comparatively large expenditure programme, which over the course of seven years led to an increase of total government expenditure by more than two percentage points of GDP, as compared to an increase of around five 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 af-

ter 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 fallout of the financial crisis.

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 worsened after 2007 but not only in countries that are commonly associated with severe adjustment programmes. The group of countries where market income has become increasingly unequal after 2007 includes Spain, Greece, Portugal and Ireland, and interestingly also Sweden and Denmark. More importantly, the distribution of disposable income actually improved in Portugal and Ireland, and it deteriorated further in Spain than in Greece. Less susceptible countries such as Germany, Denmark and Sweden also saw their dispersion of disposable income grow more intensely 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, and 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.

Without a more detailed analysis it is difficult to pin down the factors driving different trends in the redistribution of

Table 1
Evolution of income distribution, selected countries

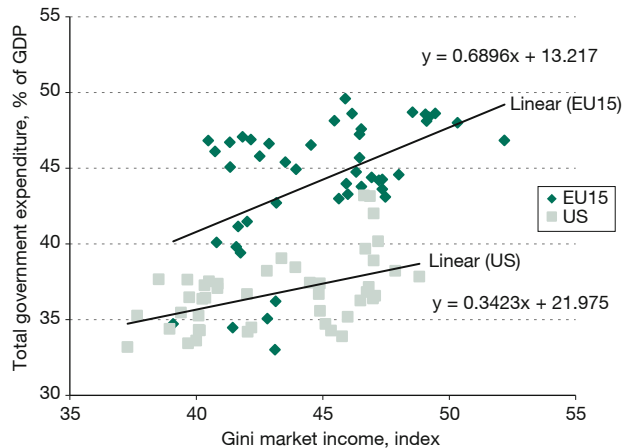
Market and disposable income

	Gini market income (index)				Gini disposable income (index)				Total government expenditure (% of GDP)			
	average				average				average			
	1970-1980	2006-2014	Δ	Δ 2014-2007*	1970-1980	2006-2014	Δ	Δ 2014-2007*	1970-1980	2006-2014	Δ	Δ 2014-2007*
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	Δ	first	last	Δ		first	last	Δ	
AT	1983 and 2014	31.4	47.7	16.2	25.9	28.8	2.9		47.9	49.9	2.1	
BE	1970 and 2013	42.4	45.4	3.0	23.0	24.4	1.3		52.7	53.7	1.0	
DK	1970 and 2014	40.8	48.5	7.7	28.3	24.9	-3.4		36.0	53.9	17.9	
DE	1970 and 2013	47.9	51.0	3.1	30.3	29.5	-0.8		34.9	43.7	8.8	
ES	1973 and 2014	31.8	52.1	20.2	33.0	34.1	1.1		20.5	44.5	24.0	
EL	1974 and 2014	53.4	52.4	-1.0	37.6	33.7	-3.9		23.6	49.2	25.6	
IE	1973 and 2014	36.3	55.1	18.8	28.5	29.1	0.6		35.6	30.5	-5.1	
FR	1970 and 2013	38.9	45.2	6.4	38.7	26.8	-11.9		36.6	55.4	18.8	
IT	1970 and 2013	52.2	48.7	-3.5	36.7	32.7	-4.1		29.9	50.2	20.3	
LU	1985 and 2013	37.6	47.5	9.9	23.7	28.4	4.7			41.1		
NL	1975 and 2014	45.9	44.5	-1.4	25.7	25.3	-0.5		45.7	45.6	-0.1	
PT	1980 and 2014	51.2	54.7	3.6	32.3	33.2	1.0		29.4	48.5	19.1	
SE	1970 and 2013	42.2	50.7	8.5	24.2	25.5	1.3		38.1	51.1	13.0	
FI	1971 and 2014	37.2	45.5	8.4	23.6	25.0	1.5		28.7	57.1	28.4	
UK	1970 and 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 and 2014	39.5	50.2	10.7	30.5	37.0	6.6		32.1	37.6	5.5	

Note: * For DE, FR, IT and LU, Δ 2013-2007.

Source: SWIID.

Figure 3
Distribution of market income versus size of government, 1970-2015



Sources: SWIID, IMF, OECD.

income. The following section takes a closer look at 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 fiscal policy. The most widely used indicator of the size of government is the level of total government expenditure in percent of GDP. Not all government outlays have the deliberate goal of redistributing income across income groups, but the actual incidence of spending relative to taxation de facto always implies redistribution across income groups.

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 quite revealing. With the exception of the early 1970s, the EU15 countries 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% of GDP. At the time, the US model still echoed the imprint of 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% of GDP in the early 1990s. The size of government edged down during the sustained economic expansions of the 1990s and ear-

ly 2000s, before again approaching 50% in the wake of the post-2007 crisis.

In the US, total expenditure increased only very gradually to a maximum of 39% 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% in the first years of the Great Recession. It is now back to under 38% of GDP.

Taking a closer look at the drivers of redistribution

We use a dynamic panel data framework to identify the key drivers of redistribution based on a sample of up to 49 countries indexed with the subscript i and nine five-year periods t between 1970 and 2014. The sample is somewhat smaller than the one used in the previous section due to the limited availability of some explanatory variables. Our panel framework can be formalised as follows:

$$\ln red_{i,t} = \beta_1 \ln red_{i,t-1} + \beta_2 \ln X_{i,t} + \vartheta_t + \theta_i + \varepsilon_{i,t} \quad (1)$$

The degree of redistribution (red) is the dependent variable that measures the difference between the Gini coefficient of market income and the Gini coefficient of disposable income. Both indicators are taken from the SWIID. 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 2).

The use of five-year averages offers important advantages. It helps to 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).³

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

³ 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 parsimonious specification and successively extend it to include additional explanatory variables.

Table 2
Description of variables and sources

Variable name	Source
Redistribution Gini market	Standardized World Income Inequality Database (SWIID)
Median and average incomes	Wang and Caminda (2017)
Real GDP per capita (US\$)	OECD Economic Outlook
Real GDP growth	
Unemployment rate	
NAIRU	
General govt. headline balance	
Gross general govt. debt	
Degree of openness	
Share of population aged over 65	
Share of 25-99 year-olds with sec. education	
Share of 25-99 year-olds with no education	
Fraser size of government	Fraser Institute, Economic Freedom
Fraser top marginal tax rate	
Share of low-tech sectors in value added of manufacturing	OECD National Accounts
Share of left-wing parties in govt.	Armingeon et al. (2016)
Share election month in a year	
Political stability and absence of violence	World Bank, World- wide Governance
Government effectiveness	
Summary indicator	
Quality of the governmental framework	

Source: Authors' compilation.

income is distributed and redistributed across individuals in the economy as a whole.

The regression analysis confirms the positive correlation between redistribution and the level of per capita income described above. 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 considered: it holds for the full sample (Table 3), the EU (Table 4) and the OECD (Table 5). We also tested a broad range of additional indicators, which 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-olds with secondary or no education) as well as political economy indicators (share of left- or right-wing parties in parliament/government, voter turnout).

Our results also 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 the 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. Using five-year averages of the budget balance is not a perfect solution, but it is likely to mitigate the possible effects 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, 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 to find resources to address the issue may increase. 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 it is the combination of income inequality and political instability that tends to increase the government deficit. Agnello and Sousa (2012), by contrast, reason 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, it is difficult to conclude 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 this 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

Table 3
Regression results, full sample

Dependent variable: In redistribution	(1)	(2)	(3)	(4)	(5)	(6)	(7)
In redistribution (t-1)	0.747*** (4.514)	0.857*** (5.576)	0.993*** (5.326)	0.908*** (7.091)	0.860*** (7.534)	0.787*** (5.066)	0.842*** (10.171)
In real GDP per capita (t)	0.043* (1.720)	0.030 (0.354)	0.017 (0.666)	0.020 (1.254)	0.055*** (4.282)	0.052*** (3.083)	0.058*** (3.556)
In headline balance (t)		0.196** (-1.978)	-0.123** (-2.010)	-0.131** (-2.317)	-0.227* (-1.771)	-0.253* (-1.658)	-0.305* (-1.786)
In unemployment rate (t)			0.005 (0.417)	0.003 (0.357)	0.023** (1.996)	0.021 (1.215)	0.015 (1.174)
In union density (t)				-0.001 (-0.082)	-0.007 (-0.804)	-0.004 (-0.412)	-0.015 (-1.368)
In low-tech value added (t)					0.027** (2.116)	0.030* (1.948)	0.032*** (2.617)
In mean-median ratio (t-1)						-0.043 (-0.314)	0.029 (0.402)
Dummy majoritarian system (t-1)							-3.668* (-2.207)
Mean-median ratio x majoritarian system							0.766** (2.187)
No. observations	319	253	240	218	130	105	105
No. countries	49	45	42	40	30	25	25
Max No. per country	8	8	8	8	8	8	8
Min No. per country	3	3	3	1	2	1	1
Average No. per country	6,510	5,622	5,714	5,450	4,333	4,200	4,200
Wald time dummies (p-value)	0,340	0,050	0,075	0,159	0,004	0,000	0,000
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	0,120	0,164
Hansen (p-value)	0,324	0,199	0,213	0,122	0,228	0,316	0,950
No. instruments	23	26	27	26	29	30	45

Notes: The sample includes up to 49 advanced and developed countries, covering the period 1980-2014 using five-year averages. The dependent variable is redistribution as defined by the difference between the Gini indices 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 four 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%, as reported in the last two columns labelled "interaction terms"). ***, ** and * denote statistical significance at 1%, 5% and 10% respectively.

Source: Authors' estimation.

through redistribution could put additional pressure on policymakers 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 re-

search and development 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 sup-

Table 4
Regression results, EU28 sample

Dependent variable: In redistribution	(1)	(2)	(3)	(4)	(5)	(6)	(7)
In redistribution (t-1)	0.853*** (13.020)	0.824*** (10.455)	0.823*** (10.638)	0.816*** (8.608)	0.834*** (9.601)	0.735*** (4.435)	0.835*** (7.457)
In real GDP per capita (t)	0.025*** (3.060)	0.020** (1.980)	0.021** (1.985)	0.021** (1.964)	0.047*** (3.019)	0.058*** (3.406)	0.061*** (2.762)
In headline balance (t)		-0.057 (-0.647)	-0.077 (-0.787)	-0.073* (-1.918)	-0.297* (-1.860)	-0.416* (-1.770)	-0.509* (-1.878)
In unemployment rate (t)			-0.030 (-0.475)	0.002 (-0.320)	0.004 (0.490)	0.000 (0.024)	-0.005 (-0.409)
In union density (t)				0.004 (0.415)	-0.006 (-1.022)	-0.006 (-0.618)	-0.019 (-1.267)
In low-tech value added (t)					0.032* (1.944)	0.043** (2.267)	0.039* (2.542)
In mean-median ratio (t-1)						-0.103 (-0.601)	-0.030 (-0.131)
Dummy majoritarian system (t-1)							-0.364 (-0.116)
Mean-median ratio x majoritarian system							0.071 (0.108)
No. observations	170	162	162	162	98	83	83
No. countries	28	28	28	28	28	28	28
Max No. per country	8	8	8	8	8	8	8
Min No. per country	3	3	3	3	3	3	3
Average No. 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	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	0,990	0,950
No. instruments	23	24	25	26	27	30	46
Interaction term (size)							0,041
Interaction term (p-value)							0,959

Note: See notes to Table 3.

Source: Authors' estimation.

port 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 median income, that is, when the number of voters with below average income exceeds 50%. We test this well-known proposition in our panel framework by including the mean-median ratio together with a dummy variable that 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 EU28. This 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 three 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 (eight out of 36 OECD countries, i.e. around 20%).⁴

4 We use the classification of proportional 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).

Table 5
Regression results, OECD sample

Dependent variable: ln redistribution	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln redistribution (t-1)	0.868*** (10.323)	0.825*** (7.245)	0.824*** (7.683)	0.861*** (6.445)	0.880*** (7.296)	0.698*** (5.417)	0.743*** (7.886)
ln real GDP per capita (t)	0.026** (1.962)	0.023 (1.624)	0.030* (1.839)	0.023* (1.742)	0.056*** (4.536)	0.047** (2.482)	0.047** (2.358)
ln headline balance (t)		-0.155* (-1.884)	-0.162* (-1.769)	-0.114* (-1.776)	-0.236* (-1.815)	-0.270* (-1.860)	-0.302** (-2.044)
ln unemployment rate (t)			0.009 (1.049)	0.006 (0.697)	0.022** (1.962)	0.027 (1.625)	0.026* (1.908)
ln union density (t)				0.002 (0.207)	-0.008 (-0.934)	-0.001 (-0.046)	-0.008 (-1.021)
ln low-tech value added (t)					0.028* (2.289)	0.022* (1.821)	0.019 (1.120)
ln mean-median ratio (t-1)						-0.222 (-1.518)	-0.400** (-1.967)
Dummy majoritarian system (t-1)							-3.766*** (-3.268)
Mean-median ratio x majoritarian system							0.788*** (3.248)
No. observations	261	227	227	210	127	102	102
No. countries	41	38	38	37	29	24	24
Max No. per country	8	8	8	8	8	8	8
Min No. per country	3	3	3	2	2	1	1
Average No. 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	0,012	0
AR(1) (p-value)	0,014	0,048	0,059	0,078	0,051	0,092	0,068
AR(2) (p-value)	0,113	0,103	0,203	0,203	0,222	0,181	0,194
Hansen (p-value)	0,342	0,119	0,134	0,191	0,268	0,442	0,95
No. instruments	23	24	25	26	29	30	44
Interaction term (size)							0,389
Interaction term (p-value)							0,007

Note: See notes to Table 3.

Source: Authors' estimation.

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). Prime factors (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 and the strength of trade unions. 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 important in countries with 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 turn out to be statistically significant.

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 grow.

Table 6
Robustness: Testing additional independent variables

Dep. var.: In redistribution	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
In redistribution (t-1)	0.868*** (10.323)	0.825*** (7.245)	0.824*** (7.683)	0.861*** (6.445)	0.880*** (7.296)	0.815*** (5.328)	0.775*** (4.641)	0.719*** (4.654)	0.858*** (6.257)	0.855*** (5.949)	0.799*** (5.381)	0.701*** (4.714)	0.804*** (5.297)	0.767*** (4.256)
In real GDP per capita (t)	0.026** (1.962)	0.023 (1.624)	0.030* (1.839)	0.023* (1.742)	0.056*** (4.536)	0.053*** (3.334)	0.046*** (2.518)	0.066*** (5.330)	0.059*** (3.806)	0.062*** (3.658)	0.050*** (3.131)	0.055** (2.509)	0.053*** (3.253)	0.062* (1.645)
In headline balance (t)		-0.155* (-1.884)	-0.162* (-1.769)	-0.114* (-1.776)	-0.236* (-1.815)	-0.267* (-1.740)	-0.229* (-1.740)	0.506** (-2.108)	-0.286* (-1.759)	-0.287* (-1.701)	-0.243* (-1.736)	-0.238* (-1.750)	-0.275* (-1.749)	-0.218 (-1.635)
In unemployment rate (t)			0.009 (1.049)	0.006 (0.697)	0.022** (1.962)	0.020 (1.223)	0.019 (1.061)	0.003 (0.233)	0.018 (1.349)	0.019 (1.379)	0.017 (1.144)	0.036* (1.912)	0.020 (1.232)	0.018 (0.943)
In union density (t)				0.002 (0.207)	-0.008 (-0.934)	-0.006 (-0.587)	-0.003 (-0.295)	-0.007 (-0.647)	-0.009 (-0.835)	-0.009 (-0.858)	-0.006 (-0.605)	-0.003 (0.224)	-0.005 (-0.522)	-0.002 (0.193)
In low-tech value added (t)					0.028** (2.289)	0.030** (2.038)	0.024 (1.553)	0.050*** (3.245)	0.035** (2.467)	0.036** (2.445)	0.031** (2.008)	0.025* (1.788)	0.031** (2.055)	0.025 (1.300)
In mean-median ratio (t-1)						-0.032 (-0.209)	-0.071 (-0.490)	-0.119 (-0.737)	0.021 (0.138)	0.027 (0.161)	0.052 (-0.352)	0.108 (-0.562)	0.048 (-0.301)	0.092 (-0.589)
In economic freedom index (t)							-0.007 (-0.700)							
In gross debt (t)								0.007 (-1.098)						
In pop > 65 (t)									0.014 (-0.536)					
In OADR (t)										0.023 (-0.976)				
In govt. left (t)											0.025 (1.598)			
In govt. right (t)												0.001 (-0.192)		
Election year (t)													0.000 (-1.511)	
WB govt. effectiveness (t)														0.026 (-0.699)
No. observations	261	227	227	210	127	102	102	83	102	102	102	89	102	90
No. countries	41	38	38	37	29	24	24	19	24	74	74	23	24	24
Max No. per country	8	8	8	8	8	8	8	8	8	8	8	8	8	4
Min No. per country	3	3	3	2	2	1	1	3	1	1	1	1	1	1
Average No. 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	0,180	0,210	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	0,267	0,359	0,363	0,964	0,601	0,657	0,834	0,839	0,818	0,509
No. instruments	23	24	25	26	29	30	31	31	31	31	31	31	31	27

Note: See notes to Table 3.

Source: Authors' estimation.

Several empirical studies corroborate this trend showing also that government expenditure tends to outgrow income levels especially in catching-up countries (see e.g. Akitoby et al., 2006; 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.

Conclusions

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. The top ten jurisdictions, in order, were New Zealand, Switzerland, Hong Kong, Australia, Canada, the Netherlands, Denmark, Ireland, the UK and Finland.

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.

Finally, our findings belie the popular belief that 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, 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.

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