Redistribution in the Age of Austerity:
Evidence from Europe 2006 - 2013

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by

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Abstract

We examine the relationship between changes in a country's public sector fiscal position on inequality at the top and bottom of the income distribution during the age of austerity from 2006 to 2013. We use a parametric Lorenz curve model and Gini-like indices of inequality as our measures to assess distributional changes. Based on SLIC and IMF data for 12 European countries, we find that more severe adjustments to the cyclically adjusted primary balance (i.e., more austerity) are associated with a more unequal distribution of income driven by rising inequality at the top. The data also weakly suggests a decrease in inequality at the bottom. The distributional impact of austerity measures reflects the reliance on regressive policies and likely produces increased incentives for rent-seeking while reducing incentives for workers to increase productivity.

Research Highlights

- We assess the distributional impact of austerity policies matters.

- We examine the relationship between changes in a country's public sector fiscal position on inequality at the top and bottom of the income distribution during the austerity era from 2006 to 2013 for 12 EU countries.

- We find severe austerity increases inequality by increasing inequality at the top.

- We find a decrease in inequality at the bottom.

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Introduction

Did austerity increase inequality in Europe? Austerity is a policy of "cutting the state's budget to stabilize public finances, restore competitiveness through wage cuts, and create better investment expectations by lowering future tax burdens" (Blyth, 2013, pp. 866–67). We show that austerity in 12 European countries between 2006 and 2013 increased inequality by fattening the upper tail of the income distribution while possibly reducing inequality at the bottom of the income distribution. We detail who gains and who loses based on their position in the income distribution as a result of austerity policies most European governments turned to after 2008. The changes in distribution that we document are inconsistent with the position that freeing markets increases the incentives for the majority of the population to optimally participate in their national economies. These changes are, however, consistent with the position that austerity measures redistribute income from the bottom to the top – from workers to owners of assets.

Instead of liberalization leading to greater incentives for the majority of a population, our results imply that the incentives for most people are actually reduced, while only the incentives for the elite at the very top increase, consistent with the findings of Guajardo et al. (2014) and Kinsella (2012). In so far as top incomes reflect rent-seeking (Gordon and Dew-Becker, 2007; Stiglitz, 2014), austerity appears to incentivize misbehavior – especially in financial markets, as argued byStiglitz (2012), who showed that inequality of outcomes does not generate the 'right' incentives if it rests on rents. At the same time, austerity may reduce the incentives for workers to increase their productivity. The impact of these distortionary effects is consistent with inequality negatively affecting growth and its sustainability, as shown by Dabla-Norris et al. (2015) and Ostry et al. (2014).

Looking at the sample of 12 European countries[1] as a panel over 7 years and allowing for fixed effects permits us to tease out the distributional impact of changes to a country's Cyclically Adjusted Primary Balance (CAPB) in the name of austerity while controlling for differences in the commitment and timing of such policy packages.

The dependent variables in our analysis are the Gini coefficient as a measure of inequality overall as well as two Gini-like indices for inequality at the bottom and at the top of the distribution respectively. This approach allows us to not only comment on the general distributional impact of austerity, but also on what part of a country's distribution of income appears to bear the brunt of the impact. The two Gini-like indices of inequality that capture inequality at the top and the bottom respectively were proposed by Jantzen and Volpert (2012). This methodology is based on a parametric Lorenz curve model also described by Sarabia et al. (1999), and was fruitfully applied to US tax data by Schneider and Tavani (2015) to show a more

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[1]Austria, Belgium, France, Germany, Greece, Italy, Ireland, Luxembourg, Netherlands, Portugal, Spain, United Kingdom

nuanced picture of the evolution of inequality from 1921 to 2012.

Methods

We take a very straightforward approach to test for a potential correlation between the degree to which austerity measures were implemented and the effect on distribution. The base model simply regresses the %-change in the inequality index against the %-change in a countries CAPB, see (1). The CAPB estimates were taken from the IMF (International Monetary Fund, 2014).

$$\Delta INEQU_{it} = \alpha_t + \beta_i + \beta_1 \Delta CAPB_{it} + \beta_2 \Delta g_{i(t-1)} + u_{it} \tag{1}$$

We also control for changes in a country's growth rate (g), which are affected by structural adjustments and likely affect the distribution of income. To avoid the obvious endogeneity with growth, we use the lagged change in the growth rate. The estimation is an ordinary least-squares panel data estimation of the parameters while controlling for country and time fixed effects (using country and year dummies). Standard errors are assumed to be clustered by country.

The parametric Lorenz curve model given by (2), where x is the cumulative population share and $L(x; p, q)$ the cumulative income share, has three useful features. Sarabia et al. (1999) spell out strict criteria for Lorenz dominance based on the specific parameterization, it fits actual income data very well (e.g., in our analysis, the R^2 is greater than 0.999 for all countries and all years), and Jantzen and Volpert (2012) develop two Gini-like indices based on it. Lorenz curve coordinates were created from Eurostat decile income shares (European Commission, 2014).

$$L(x; p, q) = x^p \left(1 - (1 - x)^q\right) \tag{2}$$

Right self-similarity is a well-known phenomena associated with a power-law distribution for high incomes. It suggests that the top 10% capture as much of total income as the top 1% capture of the top 10%'s share, and so on down the income distribution. For incomes x, the parameter q captures the degree of right self-similarity. G_1 is strictly decreasing in q. Inequality at the bottom is somewhat less intuitive, though the self-similarity reasoning behind it is the same as for the upper tail. It describes the degree of inequality that is replicated when comparing the income share going to the bottom 20% versus the bottom 40%, and the bottom 10% compared to the bottom 20%. G_0 is a strictly increasing function of the parameter p that captures the degree of left self-similarity.

The fitted Lorenz-curve can be used to calculate the Gini, G given by (3), to capture an overall degree of inequality – where $\Gamma()$ is the Gamma function – as well as the degree of inequality at the bottom, G_0, and at the top, G_1, given by (4) and (5) respectively.[2] These Gini-like indices are based on the degree of asymptotic self-similarity in the left and right tails of

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[2]Note that our formulation of G_0 differs slightly from Jantzen and Volpert (2012) so that it takes a value between 0 and 1.

the distribution.

$$G = 1 - \frac{2}{p+1} + 2\frac{\Gamma(p+1)\Gamma(q+1)}{\Gamma(p+q+2)} \tag{3}$$

$$G_0 = \frac{3p}{p+2} \tag{4}$$

$$G_1 = \frac{1-q}{1+q} \tag{5}$$

In so far as inequality reflects an incentive structure for individual behavior, we suggest it is inequality at the bottom that is most associated with increasing rewards for hard work. For one, the bottom of the distribution covers the majority of the population and thus reflects the incentive structure relevant to most people. Second, most movements within the income distribution are from one quintile to either neighboring quintile, and high inequality at the bottom implies that such local moves up yield relatively big rewards in terms of extra share in total income going to the household able to make it. Higher inequality at the bottom also means that those left behind receive a smaller share of total income. Whether or not this is socially acceptable depends on the effectiveness and cost of the social safety net for protecting the most vulnerable.

A lack of inequality at the bottom means the vast majority of households have no real incentives to move up, because increases in productivity through education, training, or experience reap only small additional rewards. The share of the pie going to the bottom 80% – dominated by households whose main source of income is from labor – is fixed and divided relatively equally.

Inequality at the top reflects an incentive structure that applies only to a small elite of income earners. Worse, if suspicions are borne out that a substantial portion of these incomes reflect rent-seeking, then more inequality at the top actually implies increased incentives to misbehave (Gordon and Dew-Becker, 2007; Stiglitz, 2014). This is undesirable on many grounds, not the least of which is that rent-seeking implies net economic inefficiency. If the policy agenda is motivated by economic efficiency and tapping the potential of markets, then surely the desired result of policy is to increase inequality at the bottom but limit inequality at the top.[3] Looking at all three indices – G, G_0, and G_1 – allows us to relate the degree of austerity imposed across countries to overall inequality, as well as to which portion of a country's distribution was affected. We can also use this to make some judgements about the welfare impacts of the distributional changes, and to compare these results to the desired policy outcomes.

Results

Our findings suggest that there appears to be a statistically significant and robust association between positive changes in CAPB and an increase in inequality as indicated by regressions (1)

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[3]We already know that this result has not been achieved in the "neoliberal era" post 1980.

and (2) in Table 1, which is consistent with comparable findings by Schaltegger and Weder (2014) (and others summarized therein). The positive association between deficit reduction (or surplus increase) and inequality is driven by associated increases in inequality at the top of the distribution as indicated by regressions (4) and (5) in which the percentage change in G_1 is the dependent variable. In fact, regression (4) indicates a semi-elasticity of approximately 1 so that a 1%-point change in CAPB (as % of potential GDP) corresponds to a 1% increase in G_1. These results are robust to the exclusion of Greece, which might be seen as an outlier in terms of how much of an adjustment it has made in CAPB.

Table 1: Panel Regression Results

Dependent Variable:	Gini, G		G_0	G_1	
	(1)	(2)	(3)	(4)	(5)
$\Delta CAPB$	0.363***	0.303***	-0.440	1.096***	0.800**
	(0.0965)	(0.0806)	(0.273)	(0.351)	(0.264)
Δg_{t-1}	-0.237*	0.0585	-0.906**	0.132	0.358*
	(0.108)	(0.0884)	(0.312)	(0.384)	(0.193)
Constant	3.41*	0.558	9.93***	0.301	-1.410*
	(1.848)	(0.312)	(2.73)	(4.65)	(0.689)
Country Fixed Effects	Yes***	Yes***	Yes***	Yes***	Yes***
Time Fixed Effects	Yes	No	Yes**	Yes*	No
R^2	0.178	0.128	0.287	0.239	0.137

Statistical significance at 1%, 5%, and 10% is indicated by ***, **, and * respectively; standard errors shown in parenthesis.

Changes in inequality at the bottom appear to largely reflect business cycle effects, although there is weak evidence of fiscal consolidation decreasing G_0. The coefficient on $\Delta CAPB$ in regression (3) is not statistically significant, but its magnitude and sign are notable. Hence, austerity may have some incentive reducing impacts at the bottom of the income distribution, or at least there is no evidence of it increasing the incentives for higher productivity among the vast majority of the population.

Unlike Dollar et al. (2015), we do find a correlation between lagged changes in the growth rate and distributional changes in our panel. It appears that faster growth is associated with decreased inequality next period – especially less inequality at the bottom of the distribution, as indicated by regression (3).

Conclusion: Intuition & Welfare Implications

Consistent with general economic intuition, we find that faster growth is inequality reducing, especially at the bottom of the income distribution. However, it has been shown generally that austerity is not growth inducing (Zezza, 2012; Bougrine, 2012; Dabla-Norris et al., 2015). Our results indicate that fiscal consolidation is associated with increasing inequality specifically at the top of the income distribution, which likely represents a welfare loss (a la Atkinson, 1970) for

society if there is no compensating growth. The weak result that inequality at the bottom may decrease as a result of fiscal tightening – together with increasing inequality at the top – further suggests that such measures actually reduce pro-growth incentives by undermining the gains for productivity increases while incentivizing rent-seeking.

Shorrocks (1983) generalized Atkinson (1970)'s welfare analysis for situations when mean income grows by suggesting re-scaling the vertical axis of the Lorenz curve using mean income per capita. In theorem 2, Shorrocks (1983) spelled out general conditions to establish a welfare ranking for observed income distributions based on general assumptions for an implied social welfare function: if the new generalized Lorenz curve – after growth and distributional changes – lies strictly below the original generalized Lorenz curve, welfare was lost regardless of society's degree of inequality aversion. Dollar et al. (2015) offer a related analysis by taking 5-year windows and then asking how much per capita income would have had to change for the new generalized Lorenz curve *a la* Schorrocks to not lie below the old curve given the actual distributional changes. Like Dollar et al. (2015), we thus conclude that increased inequality requires compensating growth; we offer further that while austerity increases inequality, the associated distortion to incentives are likely to undermine that required compensating growth.

References

Atkinson, A. B. (1970). On the measurement of inequality. *Journal of Economic Theory 2*(3), 244–263.

Blyth, M. (2013, Nov). Austerity as ideology. *Comparative European Politics 11*(6), 737–751.

Bougrine, H. (2012). Fiscal austerity, the Great Recession and the rise of new dictatorships. *Review of Keynesian Economics 1*(1), 109–125.

Dabla-Norris, M. E., M. K. Kochhar, M. N. Suphaphiphat, M. F. Ricka, and E. Tsounta (2015). *Causes and consequences of income inequality: A global perspective.* International Monetary Fund.

Dollar, D., T. Kleineberg, and A. Kraay (2015). Growth, inequality, and social welfare: Cross-country evidence. *Economic Policy 30*(82), 335–377.

European Commission (2014). Statistics on Income and Living Conditions (SILC). Accessed December 1, 2014: `http://epp.eurostat.ec.europa.eu/portal/page/portal/income_social_inclusion_living_conditions/data/database`.

Gordon, R. J. and I. Dew-Becker (2007). Selected issues in the rise of income inequality. *Brookings Paper on Economic Activity 2007*, 169–190.

Guajardo, J., D. Leigh, and A. Pescatori (2014). Expansionary austerity? International evidence. *Journal of the European Economic Association 12*(4), 949–968.

International Monetary Fund (April 2014). IMF Fiscal Monitor – Public Expenditure Reform: Making Difficult Choices. Accessed February 21, 2015: `http://www.imf.org/external/pubs/ft/fm/2014/01/fmindex.htm`.

Jantzen, R. T. and K. Volpert (2012). On the mathematics of income inequality: Splitting the gini index in two. *The American Mathematical Monthly 119*(10), 824–837.

Kinsella, S. (2012). Is Ireland really the role model for austerity? *Cambridge Journal of Economics 36*(1), 223–235.

Ostry, M. J. D., M. A. Berg, and M. C. G. Tsangarides (2014). *Redistribution, inequality, and growth.* International Monetary Fund.

Sarabia, J.-M., E. Castillo, and D. J. Slottje (1999). An ordered family of Lorenz curves. *Journal of Econometrics 91*(1), 43–60.

Schaltegger, C. A. and M. Weder (2014). Austerity, inequality and politics. *European Journal of Political Economy 35*, 1–22.

Schneider, M. P. A. and D. Tavani (2015). Tale of two Ginis in the US, 1921 – 2012. *Levy Institute Working Paper 826.* `http://www.levyinstitute.org/publications/tale-of-two-ginis-in-the-united-states-1921-2012`.

Shorrocks, A. F. (1983). Ranking income distributions. *Economica 50*(197), 3–17.

Stiglitz, J. E. (2012). *The price of inequality.* W. W. Norton & Co.

Stiglitz, J. E. (2014). New theoretical perspectives on the distribution of income and wealth among individuals. forthcoming in Inequality and Growth: Patterns and Policy, vol. 1.

Zezza, G. (2012). The impact of fiscal austerity in the Eurozone. *Review of Keynesian Economics 1*(1), 37–54.