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Do fiscal rules breed inequality? First evidence for the EU

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Abstract

Research into the effects of fiscal rules has so far focused on their budgetary impact. Possible unwanted side effects of having fiscal rules have gone largely unexplored. This is unfortunate since such side effects are highly probable. For instance, governments attempting to abide by a fiscal rule might curb social expenditure; and this could lead to a higher level of income inequality. We test this hypothesis with data from the Standardized World Income Inequality Database (SWIID) and a new set of fiscal rules dummy variables for EU countries. We find that after 'hard' rules, i.e. rules that are reinforced by sanctions and/or automatic correction mechanisms, have been in place for several years, the amount of redistribution in a country declines, leading to an increase in inequality based on disposable income measures.

1. Introduction

Fiscal rules are on the rise, not only in Europe, but also in the Americas and in Africa (see Lledó et al. 2017). Research into their effects, however, has so far narrowed on their budgetary impact, with the consensus being that they are effective in enforcing fiscal discipline (see Heinemann et al. 2018, for a recent review of the literature). Only few papers have looked beyond that, inquiring the social consequences of fiscal rules. Penner and Weisner (2001) found no strong evidence that fiscal rules restrain welfare spending in the US federal states. One reason might be that welfare belongs to the 'entitlement spending', which cannot be cut easily. Studies for other regions found different results. Nerlich and Reuter (2013), for instance, report that fiscal rules have a strong negative impact on expenditures on social protection in the EU, while Dahan and Strawczynski (2013) found negative effects of fiscal rules on the ratio of social transfers to government consumption in OECD countries. Brändle et al. (2018) show that fiscal rules in Swiss cantons lead to a crowding out of cantonal health care premium subsidies.

If fiscal rules crowd out social expenditures, it is straightforward to ask whether they breed inequality. Focusing on EU countries, we test this hypothesis with data from the Standardized World Income Inequality Database (SWIID) and a new set of fiscal rules dummy variables. The SWIID database contains information on market Gini coefficients (which measure inequality in a country before redistribution through taxes and transfers), net Gini coefficients (which measure inequality after redistribution, i.e. using disposable income measures) as well as 'redistribution' defined as the difference between market and net Gini coefficients. We regress these measures of inequality and redistribution on fiscal rules dummies and control variables using pooled cross-country time-series data. Also, since it is likely that it takes time for a certain fiscal rule regime to exert influence on the economy and hence on inequality and that regimes that last longer have a stronger impact compared to regimes with a short duration, we interact each regime with the number of years that it was in place.

2. Methodology and data

To estimate the impact of fiscal rules on income inequality, we run:

$$G_{i,t} = \alpha_i + \delta_t + \beta FR_{i,t} + \gamma D_{i,t} + \rho FR_{i,t} * D_{i,t} + \lambda X_{i,t-1} + \varepsilon_{i,t} \tag{1}$$

where α_i, δ_t and $\varepsilon_{i,t}$ are country and year fixed effects and a stochastic error term, respectively. $G_{i,t}$ is a measure of income inequality, or redistribution. We use market and net Gini coefficients from the Standardized World Income Inequality Database (SWIID) provided by Solt (2016) as well as 'redistribution' defined as the difference between market and net Gini coefficients as dependent variables. $FR_{i,t}$ is a dummy variable that takes the value of one for countries and years with a fiscal rule in place at the general or central government level and zero otherwise. The IMF distinguishes four different forms of fiscal rules: expenditure rules (ER), balanced

budget rules (BBR), revenue rules (RR) and debt rules (DR) (see Lledó et al. 2017). We concentrate on the first two because, as Nerlich and Reuter (2013, p. 6) point out, RR and DR are uncommon in the EU at the government levels on which we focus. Accordingly, we construct dummy variables based on Table A.2 in Nerlich and Reuter (2013).[1] This table also contains information on whether a fiscal rule in place is reinforced by sanctions and/or automatic correction mechanisms. If it is, we call it a 'hard' ER or BBR and a 'soft' one otherwise. Given that it is likely that fiscal regimes that last longer have a stronger impact on inequality compared to regimes with a short duration, we interact each regime with the number of years ($D_{i,t}$) that it was in place. Besides including the interaction term, $FR_{i,t} * D_{i,t}$, we also include the duration variable individually and thereby capture general trends that occur during a specific fiscal rule regime.

In Equation (1), X denotes a vector of control variables that should have an impact on inequality or redistribution, according to economic theory. In the case of redistribution, the long-standing hypothesis assumes a nexus between actual inequality and redistribution (see Meltzer and Richard 1981), so we include the market Gini coefficient in X. Regarding income inequality, the famous Kuznets curve posits that with rising per-capita GDP inequality first rises and then falls (see Kuznets 1955). So we include the log of per-capita GDP and its square in X. The literature suggests globalization and a lack of education as further determinants of income inequality (see e.g. Cornia 2004 and Roser and Cuaresma 2016 for discussions). We therefore include the newest release of the KOF Globalisation Index (see Gygli et al. 2018) and a human capital index as provided by the Penn World Tables in X, too. Finally, there might be a relationship between population size and inequality, even though the direction is unclear. Campante and Do (2007), for instance, document a negative relationship between population size and inequality in cross-country data while Streeten (1993) claims that there is less inequality in small countries than in large ones. We include the log of population size in order to control for its possible impact. To reduce the probability of reverse causality, all control variables enter the specification with a lag.[2]

3.   Results

Table 1 shows our estimation results. In the column 'Variables', the first four explanatory variables are the fiscal rule dummies themselves. Subsequently, the variable measuring the

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[1] 2012 is the cut-off year for that table. Since Croatia entered the EU only on July, 1st, 2013, we do not have FR data for Croatia. In addition, we drop Cyprus, Latvia and Malta from our sample because Solt (2016) warns that for these countries market and net Gini coefficients are not comparable as they stem from different sources. Therefore, our analysis pertains to 24 EU countries covering 1975 until 2012.

[2] Although this is not a proper test against reverse causality, not lagging the control variables does not change our conclusions.

duration of the regime is listed, i.e. the number of years a certain fiscal rule has been in place in a country. The next six variables are the lagged controls suggested by economic theory (see section 2). Finally, the last four variables are the fiscal rule dummies interacted with the duration variable.

Table 1: Regression results

VARIABLES	(1) gini_net	(2) gini_market	(3) redistribution
Expenditure Rules soft	-0.00787*	0.000239	0.00811
	(-1.815)	(0.171)	(1.588)
Expenditure Rules hard	-0.000707	-0.00164	-0.000938
	(-0.118)	(-0.831)	(-0.129)
Budget Rules soft	0.00709	0.000996	-0.00610
	(1.295)	(0.749)	(-1.078)
Budget Rules hard	-0.00118	-0.000314	0.000869
	(-0.257)	(-0.203)	(0.164)
Regime duration	0.510***	0.936***	0.426***
	(10.84)	(67.90)	(8.966)
Market Gini (previous period)	-0.00797	-0.191***	-0.183
	(-0.0713)	(-3.259)	(-1.615)
log GDP per capita (previous period)	0.000943	0.00967***	0.00873
	(0.162)	(3.235)	(1.473)
log GDP per capita squared (previous period)	-3.79e-05	0.000340**	0.000378
	(-0.137)	(2.352)	(1.134)
log KOF Globalisation Index (previous period)	-0.00309	-0.0102	-0.00715
	(-0.184)	(-1.419)	(-0.335)
log Human Capital Index (previous period)	-0.0694**	-0.00714	0.0623*
	(-2.305)	(-0.482)	(1.902)
log Population (previous period)	4.73e-05	6.91e-05	2.18e-05
	(0.266)	(0.945)	(0.0976)
Exp.Rules, soft x regime duration	0.000752*	-0.000167	-0.000919**
	(2.041)	(-1.201)	(-2.197)
Exp.Rules, hard x regime duration	0.00161***	-0.000215	-0.00183***
	(3.186)	(-0.990)	(-3.048)
Bud.Rules, soft x regime duration	-0.000858**	7.09e-05	0.000929**
	(-2.150)	(0.546)	(2.292)
Bud.Rules, hard x regime duration	0.00112**	-0.000272	-0.00139**
	(2.424)	(-1.237)	(-2.588)
Adjusted R-squared	0.685	0.976	0.777
Number of observations	718	718	718
Number of countries	24	24	24
Number of years	38	38	38
Sample start	1975	1975	1975
Sample end	2012	2012	2012

Notes: Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Fixed country and year effects are included, but not reported.

Column (1) of Table 1 shows the results for the net Gini coefficient. All coefficients on the fiscal rule variables are significant when interacted with the duration variable.[3] Three of them are positive, indicating that fiscal rules raise the net Gini coefficient and hence inequality when they are in place long enough. The coefficient on the interacted soft budget rule points in the opposite direction, however. Of the control variables, only the lagged human capital index is significant with a negative sign, confirming that better education reduces inequality.

Given the use of interaction terms, one should, however, not only look at the individual coefficient estimates, but rather at the marginal effects of the fiscal rule variable conditional on the duration of a regime (see Brambor et al. 2006). The four parts in Figure 1, one for each of the fiscal rule variables, do exactly this. The frequency bars in the figures show how many countries had a certain fiscal rule in place for how long. For instance, the top left quadrant of Figure 1 shows that there are 16 countries that had a soft budget rule in place for at least one year, 15 that had one in place for at least two years and so on.[4] The straight lines show the average marginal effects calculated from the estimated coefficients. If the confidence interval does not include the zero line, the effects are significant at the 5 percent level. Figure 1 shows that hard fiscal rules had a significant positive effect on the net Gini coefficient in the long run, which kicked in after 5 or 6 years. Soft fiscal rules, on the other hand, do not seem to have an impact on inequality.[5]

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[3] We have checked for multicollinearity by calculating variance inflation factors. All fiscal rule and duration variables have variance inflation factors that are below 10 and mostly hover around a value of 3. As a rule of thumb, a variable with a variance inflation factor greater than 10 may face multicollinearity and therefore unstable coefficient estimates associated with inflated standard errors.

[4] Of course, then, the last bars cannot be higher than the second to last as in Figure 1. Somehow, Stata adds the last bar and the one before that together into one bar. Hence, the last bar should be split into two bars. We have not managed to correct this Stata behaviour.

[5] In this note we focus on income inequality since data on wealth inequality are not available for most EU countries. Since wealth is accumulated from income it can be expected that the impact of fiscal rules on wealth inequality is even stronger than their impact on income inequality. This awaits future scrutiny, however.

Figure 1: Dependent variable net Gini

Dependent variable: gini_net
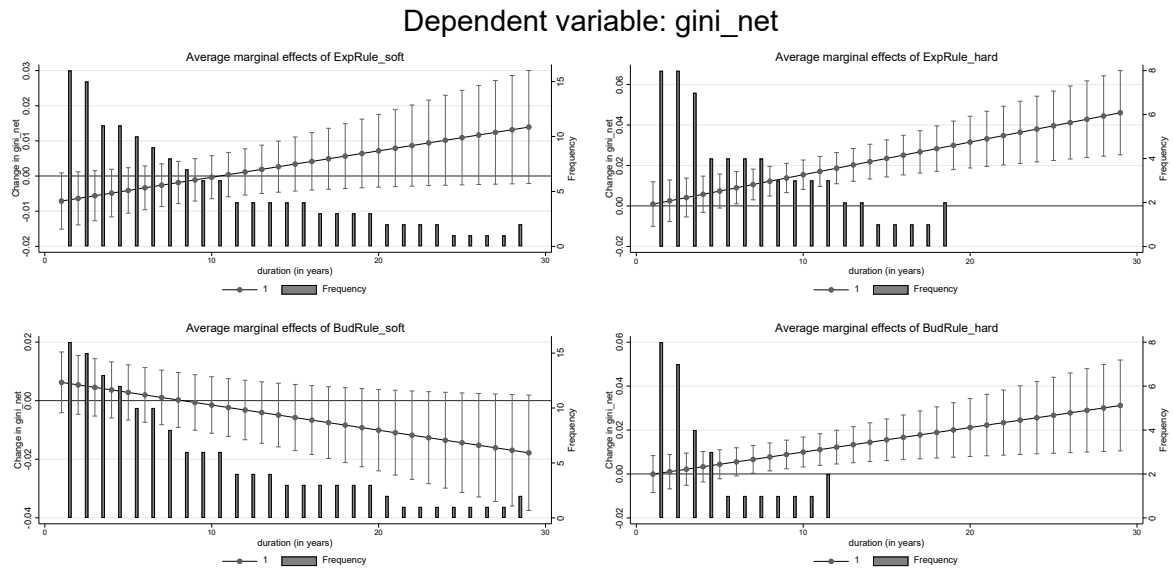
Column (2) of Table 1 reports coefficients for the market Gini coefficient as dependent variable. Not a single fiscal rule variable is significant. Fiscal rules do not lead to an increase in inequality produced by markets. This is confirmed by Figure 2 showing the marginal effects. If anything, we find that hard rules slightly reduce market-based inequality. This result, however, is not robust to changes in the specification. Of the control variables, lagged GDP and its square are significant, but Kuznets' 'trickle-down' hypothesis cannot be confirmed. The lagged market Gini coefficient is also significant.[6]

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[6] By including the lagged market Gini coefficient in specification (2), this becomes a dynamic panel subject to the Nickell bias (Nickell 1981). The Nickell bias is especially a problem in panels with large N and small T. The size of the bias decreases with T, and in our case T is fairly large relative to N.

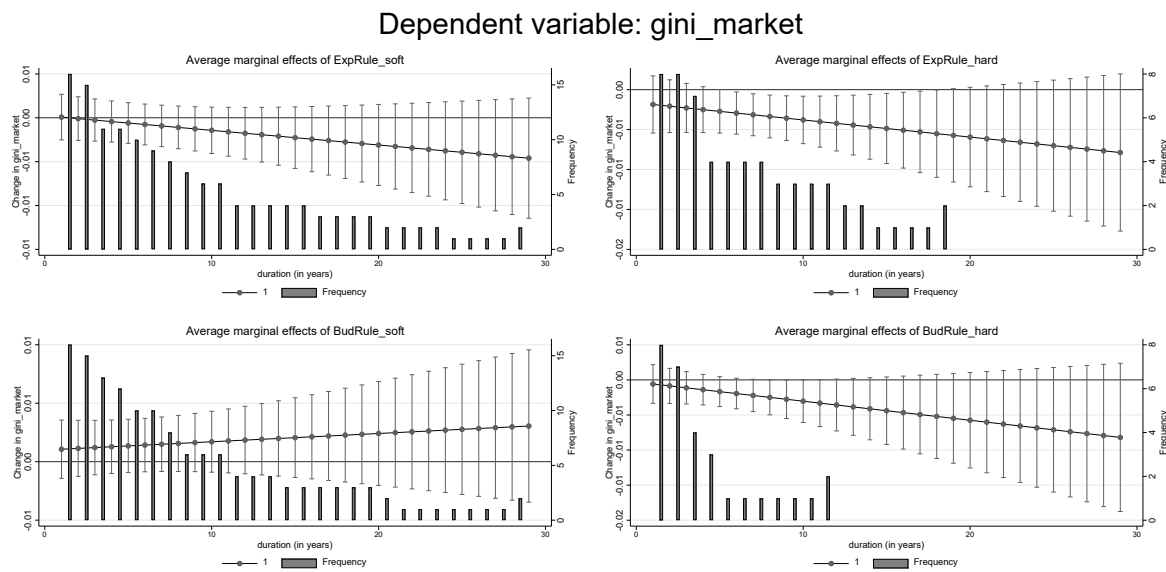Dependent variable: gini_market

Figure 3 shows the results for redistribution. They are in line with those for the net Gini coefficient. Hard expenditure and budget rules go hand in hand with significantly lower redistribution. This – in combination with a market Gini coefficient that is hardly responsive to fiscal rules – leads to an increase in the net Gini coefficient in the presence of hard expenditure and budget rules.

Figure 3: Dependent variable redistribution

Dependent variable: abs_red
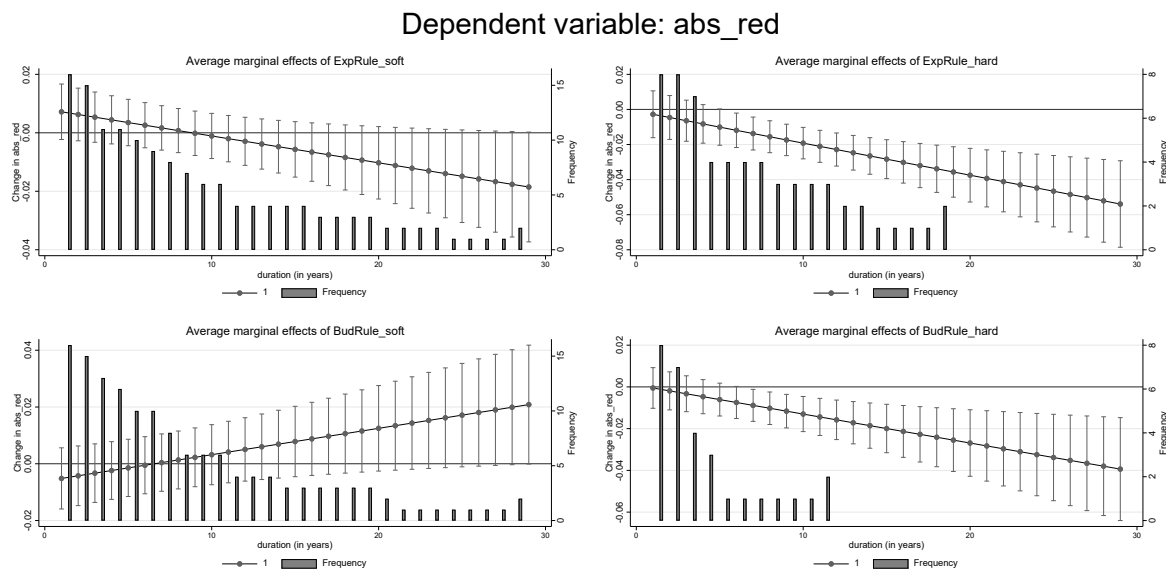
4.   Conclusion

We study the impact of fiscal rules on income inequality and redistribution in the EU over the period 1975-2012. We use a standard panel-econometric setup, interacting each fiscal rule regime with the number of years that it was in place.

We find that 'hard' fiscal rules, i.e. expenditure or balanced budget rules that are reinforced by sanctions and/or automatic correction mechanisms, significantly raise income inequality as measured by the net Gini coefficient (which measures inequality after redistribution) when being in place for at least five years. This is because 'hard' fiscal rules significantly reduce redistribution over time while the market Gini coefficient (which measures inequality before redistribution through taxes and transfers) is not responsive to the presence of fiscal rules. Since inequality is now widely believed to harm economic growth and other societal values (see OECD 2015) it is important, from a policy perspective, to be aware of side effects on inequality of different types of fiscal rules.

Acknowledgement

References

Brändle, T., Colombier, C. and Hartwig, J. (2018) "Are healthcare premium subsidies crowded out under fiscal rules? Evidence from Swiss cantons" Paper presented at the European Health Economics Association 2018 conference, July 12, Maastricht.

Brambor, T., Clark, W. and Golder, M. (2006) "Understanding interaction models: improving empirical analyses" *Political Analysis* **14**, 63-82.

Campante, F. and Do, Q.-A (2007) "Inequality, redistribution, and population" Harvard University, John F. Kennedy School of Government Faculty Research Working Paper Series, RWP07-046.

Cornia, G.A., Ed. (2004) *Inequality Growth and Poverty in an Era of Liberalization and Globalization*, Oxford Scholarship Online.

Dahan, M. and Strawczynski, M. (2013) "Fiscal rules and the composition of government expenditures in OECD countries" *Journal of Policy Analysis and Management* **32**, 484-504.

Gygli, S., Haelg, F. and Sturm, J.-E. (2018) "The KOF Globalisation Index – revisited" KOF Working Paper number 439.

Heinemann, F., Moessinger, M.-D. and Yeter, M. (2018) "Do fiscal rules constrain fiscal policy? A meta-regression analysis" *European Journal of Political Economy* **51**, 69-92.

Kuznets, S. (1955) "Economic growth and income inequality" *American Economic Review* **45**, 1-28.

Lledó, V., Yoon, S., Fang, X., Mbaye, S. and Kim, Y. (2017) "Fiscal rules at a glance" IMF Background Paper.

Meltzer, A.H. and Richard, S.F. (1981) "A rational theory of the size of government" *Journal of Political Economy* **89**, 914-927.

Nerlich, C. and Reuter, W.H. (2013) "The design of national fiscal frameworks and their budgetary impact" ECB Working Paper number 1588.

Nickell, S. (1981) "Biases in dynamic models with fixed effects" *Econometrica* **49**, 1417-1426.

OECD (2015) *In it together. Why less inequality benefits all*, OECD Publishing: Paris.

Penner, R.C. and Weisner, M. (2001) "Do state budget rules affect welfare spending?" The Urban Institute Occasional Paper number 43.

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

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

Streeten, P. (1993) "The special problems of small countries" *World Development* **21**, 197-202.