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REDISTRIBUTION AND INEQUALITY IMPACT ON ECONOMIC GROWTH TO THE EXTENT OF ECONOMIC FREEDOM

Abstract:

In this paper, redistribution and inequality impact on economic growth are observed for the countries in the panel framework approach, to the extent of their economic freedom score. There exists a growing research interest on inequality and economic growth relationships in the global level. On the other hand, redistributive policies and their effects are highly controversial since some views cover that the interventions for equality may have negative effects on economic growth. I apply system GMM estimation on a dynamic panel model as to test inequality and redistribution effects on economic growth and compare with ordinary least squares, within group and difference GMM estimations. Dataset includes annual observations from 1995 to 2011 for 141 countries. According to the SYS-GMM estimation results, for economically free countries, both net inequality and redistribution have negative impact on economic growth . The impact of net inequality is absolutely higher than impact of redistribution. For economically unfree countries, net inequality has positive significant effect, while redistribution has negative significant effect which is very low.

Keywords:

Economic growth, GDP, GMM, inequality, redistribution, economic freedom

JEL Classification: O40, C23, E62

Introduction

There exists a growing research interest on inequality and economic growth relationships in the global level. On the other hand, redistributive policies and their effects are highly controversial since some views cover that the interventions for equality may have negative effects on economic growth. In this paper, system GMM estimation has been applied on a dynamic panel model as to test inequality and redistribution effects on economic growth and compared with ordinary least squares, within group and difference GMM estimations. Dataset includes annual observations from 1995 to 2011 for 141 countries. According to the SYS-GMM estimation results, for economically free countries, both net inequality and redistribution have negative impact on economic growth. The impact of net inequality is absolutely higher than impact of redistribution. For economically unfree countries, net inequality has positive significant effect, while redistribution has negative significant effect which is very low.

The paper starts with an overview of the recent works on inequality, redistribution and growth regressions. Following sections introduce the data and the methodology which are used in the research. Last section gives results and conclusion.

Literature Review

The relationship between growth and inequality became an interesting area for economists, since inequality may cause destructive effects on growth. On the other hand, a treatment for inequality as redistributive policies may be also worse for growth than disease itself, as for the Okun's big trade-off hypothesis, for societies, it is not possible to have both perfect equality and perfect efficiency.

Some inequality is integral to the effective functioning of a market economy and the incentives needed for investment and growth, but inequality can also be destructive to growth (Berg and Ostry, 2011). Rajan (2010) shows that inequality causes the leverage and financial cycle, thus the crisis; Stiglitz (2012) emphasizes the role of political-economy factors in economic crisis.

In one of the research papers of IMF; Berg, Ostry and Tsangarides (2014) observe the separate effects of inequality and redistribution. For inequality and redistribution data, they use the dataset SWIID which is created by Frederick Solt, includes inequality in net (post-tax, post-transfer) income, inequality in market (pre-tax, pre-transfer) income, absolute redistribution (market-income inequality minus net-income inequality) and relative redistribution (market-income inequality minus net-income inequality, divided by market-income inequality). The SWIID currently incorporates comparable Gini indices of net and market income inequality for 174 countries for as many years as possible from 1960 to the present as stated on the web site of Frederick Solt. In their paper, they mention that market and net inequality have to be taken into account separately. Indeed, market inequality is inequality before taxes and transfers; net inequality is inequality after taxes and transfers; absolute redistribution is market inequality minus net inequality; relative distribution is market inequality minus net inequality divided by market inequality. As they mention, redistribution measure captures direct taxes and subsidies and they could not analyse the redistributive effects of in-kind government provision of health and education.

They find that inequality remains harmful for growth (growth rate of per capita GDP), even when controlling for redistribution, and that no evidence that redistribution is harmful. They noted that the data tend to reject the Okun assumption that there is a trade-off between redistribution and growth. They investigate whether redistribution is pro- or anti-growth in practice. According to their result, on average redistribution is pro-growth, taking into account its effects on inequality.

While, in the recent IMF research which is multi-decade and multi-country, by Berg and Ostry (2011), they find that greater equality can help sustain growth.

Separating the sample, they find that higher inequality is bad for growth for both OECD and non-OECD countries (with the effect higher in OECD than in non-OECD countries), while redistribution remains insignificant, in contrast with the results of Thewissen (2013), who finds no robust association between either inequality or redistribution and growth for a smaller set of OECD countries using the LIS inequality database and World Top Income data.

In the following part of their research, Berg, Ostry and Tsangarides (2014) focus on growth spells (risk that the growth spell will end). They assume that the probability that a growth spell will end next year (the 'hazard') depends on its current length and various possible determinants, measured either in the current year (lagged one year relative to the potential end of the spell) or at the beginning of the spell. They use a limited set of covariates, in addition to two variables of interest (inequality and redistribution), and examine how the results hold up in the face of a more extensive set of controls and across different sub-samples. Their main result is that inequality has a statistically significant negative relationship with the duration of growth spells. They find also that when redistribution is already high, there is evidence that further redistribution is indeed harmful to growth, as the Okun's "big trade-off" hypothesis suggests. When it is below that level, there is no evidence that further redistribution has any effect on growth. Inequality which can undermine progress in health, education, cause investment reducing political and economic instability and undercut the social consensus required to adjust in the face of shocks.

Methodology

A panel data framework approach which is developed by Islam (1995) from Solow type growth model is used. This approach makes it possible to allow unobservable individual country and period specific. The model allows testing the relationship between net inequality, redistribution and growth rate of GDP per capita.

The model is estimated as below:

$$Y_{it} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 NI_{it} + \beta_3 R_{it} + \eta_i + \nu_{it} \quad \text{for i=1, …, N and t=2, …, T.} \qquad (1)$$

Where

$Y_{i,t-1}$: growth rate per capita GDP of country i for time t-1.

Y_{it}: growth rate per capita GDP of country i for time t.

NI_{it}: net inequality of country i for time t.

R_{it}: redistribution of country i for time t.

η_i: unobserved country-specific effects

$NI_{i,t-1}$ and $R_{i,t-1}$ which are first lagged terms of variables are used as instrumental variables, in the system GMM, henceforth SYS-GMM, estimation, which appropriately exploit both the cross-sectional and time-series variation in the data.

Estimating growth regressions becomes problematic, since the right-hand-side variables are typically endogenous and measured with error, and there are omitted variables. One variable that should be included in a conditional convergence regression, the initial level of efficiency, is not observed. This will imply that least squares parameter estimates are biased, since the omitted variable is correlated with one of the regressors. (Bond, Hoeffler and Temple, 2001)

The SYS-GMM estimator is unbiased and most efficient if there are endogenous predetermined regressors. Following the model of Blundell and Bond, the model is estimated with SYS-GMM approach including time dummies.

The difference and system GMM estimators are designed for panel analysis and embody the following assumptions as mentioned Roodman (2009):

• The process may be dynamic, with current realizations of the dependent variable influenced by past ones.

• There may be arbitrarily distributed fixed individual effects. This argues against cross-section regressions, which must essentially assume fixed effects away, and in favour of a panel setup, where variation over time can be used to identify parameters.

• Some regressors may be endogenous.

• The idiosyncratic disturbances (those apart from the fixed effects) may have individual specific patterns of heteroskedasticity and serial correlation.

• The idiosyncratic disturbances are uncorrelated across individuals.

• Some regressors can be predetermined but not strictly exogenous; that is, independent of current disturbances, some regressors can be influenced by past ones.

• The number of time periods of available data, T, may be small.

Finally, because the estimators are designed for general use, they do not assume that good instruments are available outside the immediate dataset. In effect, it is assumed that the only available instruments are “internal”—based on lags of the instrumented variables. However, the estimators do allow inclusion of external instruments (Roodman, 2009).

Applying OLS creates the problem that $Y_{i,t-1}$ is correlated with the fixed effects in the error term, which causes dynamic panel bias (Nickell, 1981).

By construction, the residuals of the differenced equation should possess serial correlation, but if the assumption of serial independence in the original errors is warranted, the differenced residuals should not exhibit significant AR(2) behaviour. If a significant AR(2) statistic is encountered, the second lags of endogenous variables will not be appropriate instruments for their current values (Baum, 2013).

Advantages of SYS-GMM compare to DIFF-GMM:

SYS-GMM estimator has advantage in variables which are random-walk or close to be random-walk variables (Bond, 2002; Roodman, 2006; Baum, 2006, Roodman, 2007).

By using DIFF-GMM, differencing variables within groups will remove any variable that is constant.

SYS-GMM produces more efficient and precise estimates compared to DIFF-GMM, by improving precision and reducing the finite sample bias (Baltagi, 2008).

While working unbalanced panel, DIFF-GMM approach is weak in filling gaps (Roodman, 2006, p.20).

Data

Dataset includes annual observations from 1995 to 2011 for 141 countries. Countries and periods are restricted to the availability of data. As to analyze net inequality and redistribution impact on economic growth, I use income data from PWT (Penn World Table), inequality and redistribution data from SWIID 5.0 and economic freedom index from the World Heritage Foundation.

Economic freedom score is based on 10 quantitative and qualitative factors, property rights, freedom from corruption, fiscal freedom, government spending, business freedom, labour freedom, monetary freedom, trade freedom, investment freedom and financial freedom, which are graded on a scale of 0 to 100. A country's overall score is derived by averaging these ten economic freedoms, with equal weight being given to each.

Economic freedom overall score:

- Free 80-100
- Mostly free 70-79.9
- Moderately free 60-69.9
- Mostly unfree 50-59.9
- Repressed 40-49.9

By regrouping this score, I defined two main sub-groups of economic freedom as:

- Free, mostly free and moderately free 60-100
- Mostly unfree and repressed 40-59.9

Results and Conclusion

Inequality and redistribution impact on growth of GDP per capita for economically free countries which have EF score higher and equal to 60. This analysis is realized for 113 countries and for 1995-2011 period annually.

Table 1. Correlation Matrix

	Log of GDP per capita	Growth of GDP per capita	Net Inequality	Relative Redistribution	Absolute Redistribution
Log of GDP per capita	1				
Growth of GDP per capita	0.7723	1			
Net Inequality	0.055	0.0973	1		
Relative Redistribution	-0.1741	-0.2345	-0.684	1	
Absolute Redistribution	-0.177	-0.2395	-0.7456	0.9882	1

Source: PWT 8.0, SWIID 5.0, World Heritage Foundation and author's calculations.

According to correlation matrix, correlation between redistribution and economic growth is negative, while between net inequality and economic growth there is low positive correlation.

Table 2. Comparison of the models

	OLS	WG	Kiviet Bias Corrected WG	DIFF-GMM	SYS-GMM
L.growth	0.0719***	-0.0163	0.0659**	0.0143	0.0151***
	(0.0233)	(0.0241)	(0.0281)	(0.0099)	(0.0022)
Net inequality	-0.1215***	-0.2702***	-0.2609	-0.3400***	-0.2493***
	(0.0258)	(0.0573)	(0.4208)	(0.0698)	(0.0109)
Redistribution	-0.1149***	-0.1868***	-0.1811	-0.2361***	-0.1874***
	(0.0319)	(0.0661)	(0.4895)	(0.0585)	(0.0134)
Constant	0.0754***	0.1398***		0.1673***	0.1312***
	(0.012)	(0.0248)		-0.03	-0.005
Sargan				0.0038	0.2702
AR1				0.0007	0.0007
AR2				0.4042	0.3789
Number of Instruments				45	87

Source: PWT 8.0, SWIID 5.0, World Heritage Foundation and author's calculations.

By construction, the residuals of the differenced equation should possess serial correlation, but if the assumption of serial independence in the original errors is warranted, the differenced residuals should not exhibit significant AR(2) behaviour. If a significant AR(2) statistic is encountered, the second lags of endogenous variables will not be appropriate instruments for their current values (Baum, 2013). As expected, in the SYS-GMM estimation, there exists first order serial correlation and no second order

correlation. Null hypothesis that overidentifying restrictions are valid cannot be rejected as to the p-value of Sargan test.

Additional check for the DPD estimates' validity is that the estimated coefficient of the lagged dependent variable lies between the values obtained from OLS and FE estimators, as suggested by Bond (2002). This is confirmed here as OLS=0.0719>SYS-GMM=-0.0151>FE=-0.0163.

For mostly unfree and repressed countries which have EF score between 40 and 59.9, there is very low positive correlation between economic growth and net inequality and there is very low negative correlation between economic growth and redistribution (See Table 3). These relationships are significant and in the same direction only in the SYS-GMM model. The impact of net inequality is absolutely higher than impact of redistribution on economic growth (See Table 4).

Table 3. Correlation Matrix for economically unfree and repressed countries

	Log of GDP per capita	Growth of GDP per capita	Net Inequality	Relative Redistribution	Absolute Redistribution
Log of GDP per capita	1				
Growth of GDP per capita	0.6516	1			
Net inequality	0.0401	0.0761	1		
Relative Redistribution	-0.0422	-0.0649	-0.4312	1	
Absolute Redistribution	-0.047	-0.0661	-0.5012	0.9848	1

Source: PWT 8.0, SWIID 5.0, World Heritage Foundation and author's calculations.

Table 4. Comparison of the models for economically unfree and repressed countries

	OLS	WG	Kiviet Bias Corrected WG	DIFF-GMM	SYS-GMM
L.growth	0.2885***	0.1341***	0.2351***	0.1807***	0.2649***
	(0.0328)	(0.0366)	(0.0245)	(0.0200)	(0.0028)
Net inequality	-0.0235	-0.0778	-0.0748	0.0562	0.1487***
	(0.0429)	(0.0733)	(0.3333)	(0.0623)	(0.0109)
Redistribution	-0.0653	-0.1225	-0.1230	-0.0105	-0.0248**
	(0.0607)	(0.0893)	(0.4466)	(0.0460)	(0.0122)
Constant	0.0383**	0.0676**		0.0040	-0.0308***
	(0.0185)	(0.0309)		(0.0257)	(0.0051)
Sargan				0.0924	0.2641
AR1				0.0002	0.0001
AR2				0.7722	0.9958
Number of Instruments				45	87

Source: PWT 8.0, SWIID 5.0, World Heritage Foundation and author's calculations.

For mostly unfree and repressed countries which have EF score between 40 and 59.9, net inequality impact which is significant only in the SYS-GMM estimation. Redistribution impact which is only significant in the SYS-GMM estimation is very low.

According to the SYS-GMM estimation results, for economically free countries, both net inequality and redistribution have negative impact on economic growth. The impact of net inequality is absolutely higher than impact of redistribution. For economically unfree countries, net inequality has positive significant impact but not consistent comparing with other estimation methods, while redistribution has a very low negative significant impact.

References

Baum, C.F. and Schaffer, M.E., 2003, Instrumental variables and GMM: Estimation and testing, *The Stata Journal,* 3, Number 1, pp. 1-31.

Baum, C.F., Schaffer, M.E. and Stillman, S., 2207, *The Stata Journal*, Enhanced routines for instrumental variables/generalized method of moments estimation and testing, 7, Number 4, pp. 465-506.

Berg, A., Ostry, J.D. and Zettelmeyer, J., 2012, "What Makes Growth Sustained?" *Journal of Development Economics*, Vol. 98(2), pp. 149–66.

Berg, A. and Ostry, J.D., 2011, Inequality and unsustainable growth: Two sides of the same coin?, *IMF Staff Discussion Note*, April.

Berg, A., Ostry, J.D. and Tsangarides, C.D., 2014, Redistribution, inequality, and growth, *IMF Staff Discussion Note,* February.

Bond, S., Anke, H. and Temple, J., 2001, GMM Estimation of Empirical Growth Models, *CEPR Discussion Papers*, 3048.

Forbes, K., 2000, A Reassessment of the Relationship between Inequality and Growth, *American Economic Reviews*, American Economic Association, Vol. 90(4), pp. 869-887, September.

Islam, N., 1995, Growth Empirics: A Panel Data Approach, *The Quarterly Journal of Economics*, Vol. 110(4), pp. 1127-70, November.

Okun, A.M., 1975, *Equality and Efficiency: the Big Trade-Off*, Washington: Brookings Institution Press.

Penn World Table, *PWT version 8.0*, (2012). pwt.sas.upenn.edu

Phillips, P.C.B. and Sul, D., 2003, Dynamic panel estimation and homogeneity testing under cross section dependence, *Econometrics Journal*, Vol. 6, pp. 217-259.

Piketty, T., 2014, *Capital in the 21st Century*

Roodman, D., 2009, How to do xtabond2: An introduction to difference and system GMM, *Stata Journal*, StataCorp LP, vol. 9(1), pp. 86-136, March.

Solt, F., 2009, Standardizing the World Income Inequality Database, *Social Science Quarterly* 90(2), pp. 231-242.

Solt, F., 2014, The Standardized World Income Inequality Database, Working paper. *SWIID Version 5.0*, October 2014.

Stiglitz, J., 2012, *The Price of Inequality: How Today's Divided Society Endangers Our Future*, W. W. Norton & Company.