Opposing Inequality:

Globalization and the State

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International trade theory frequently argues that integrative processes create winners and losers within economic systems. Using the Heckscher-Ohlin (H-O) model as a foundation, winners are those industries within a country that reflect the comparative advantage of a country's resources, whereas losers are located in industries that do not reflect comparative advantage. While the H-O model has come under significant criticism, the initial identification of winners and losers from economic integration appear prescient, especially when analyzed within the current environment of anti-globalization fervor.[1] An additional outcome of the winners-losers paradigm of integrative processes is that losers of integration feel the impact of losses greater than winners feel their winnings from integrative processes. As a result, political lobbying by losers of integration is likely to lead to policies that in some way ameliorate the impact of economic losses on integration's losers or stop integrative processes entirely.[2]

Recent advances in data on inequality and globalization allow for the use of quantitative models to test the proposition that tax redistribution can ameliorate the effects of economic globalization on economic inequality. Tax redistribution is one possible mechanism for the losers of economic globalization to recoup some of their losses. The Standardized World Income Inequality Database (SWIID) provides income inequality data, broken down as pre- and post-tax redistribution Gini coefficients. Additionally, the KOF economic globalization index provides a useful measure to identify how economically integrated a nation is with the rest of the global economic system. The University of Texas Inequality Project data on wage inequality is also a useful measure to see if wage inequality behaves similarly to income inequality when connected to economic globalization.

If the gains from economic globalization are clustered in certain industries that reflect a country's abundant factor endowments, one would expect the relationship between pre-tax redistribution inequality and economic globalization to be positive, identifying how winners reap greater gains than losers in the integrative process. Alternatively, the post-tax redistribution

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[1] A recent review of the development and criticism of the H-O model is Robert E. Baldwin, <u>The Development and Testing of Heckscher-Ohlin Trade Models: A Review</u> (Massachusetts, MA: MIT Press, 2008). See also Ann Harrison, John McLaren, and Margaret McMillan, "Recent Perspectives on Trade and Inequality," *World Bank Policy Research Working Paper* 5754 (2011), available online at http://library1.nida.ac.th/worldbankf/fulltext/wps05754.pdf. Also published in *Annual Review of Economics* 3 (2011): 261-289. Future page citations for Harrison et al will refer to the working paper due to access reasons.
[2] Numerous research has argued that technological change is the likely largest source of inequality growth, but technology is not pursued here as the focus is on the effects of tax redistribution programs. See John Van Reenen, "Wage Inequality, Technology and Trade: 21st Century Evidence," *Labour Economics* 18 (2011):730-741.

inequality and economic globalization could have a negative relationship, as the losers from integration are likely to lobby for tax-redistribution policies that reduce the impact of their economic losses.[3]

Section one begins by reviewing the economic literature between globalization and inequality, identifying how globalization often leads to increasing inequality. Section two reviews the data used in the analysis. Section three specifies several models and tests for an inequality-economic globalization relationship. Section four concludes by summarizing the major findings.

Section One: Economic Globalization and Income Inequality - Perceiving Possibilities

Most analysis of economic globalization begins with the Heckscher-Ohlin (H-O) model. Countries produce goods that either requires an abundance of skill-based labor or non-skilled labor. As countries liberalize, they will export goods that reflect the abundant factors in the economy, leading to specialization and increased efficiencies from trade. Specialization leads to changes in wages, where factors that are abundant lead to higher wages, and factors that are scarce lead to lower wages, frequently identified as the Stolper-Samuelson theory.[4] As a result, the H-O model anticipates a restructuring of the economy along factor endowments, creating winners and losers within the economy based on which sectors of the economy are associated with particular factors.[5]

By creating winners and losers, economic globalization has the potential to have important impacts on inequality.[6] While trade liberalization may have overall net benefits at the system level of an economy, a subset of individuals within the economy are certain to be injured. This inevitably leads to questions of reimbursement: should the winners of economic

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[3] The theoretical relationships discussed here likely only apply to developed nations. The distinction between developing and developed nations will be discussed in more detail below. See Elena Meschi and Marco Vivarelli, "Trade and Income Inequality in Developing Countries," *World Development* 37 no. 2 (2009): 287-302.

[4] Harrison et al., 2.

[5] Andy Baker, "Who Wants to Globalize? Consumer Tastes and Labor Markets in a Theory of Trade Policy Beliefs," *American Journal of Political Science* 49 no. 4 (2005): 924-925. See also Ethan B. Kapstein, "Winners and Losers in the Global Economy," *International Organization* 54 (2000): 367, 359-384.

[6] Karen L. O'Brien and Robin M. Leichenko, "Winners and Losers in the Context of Global Change," *Annals of the Association of American Geographers* 93 no. 1 (2003): 89-103.

globalization pay compensation to the losers, ensuring continued liberalization and overall net benefits for an economy: "if compensation is paid to those whose incomes fall under free trade, no one would be worse off and everyone could potentially be better off. In this case, free trade would prove best not just for national wealth, but for national welfare as well."[7] Compensation has an additional political-economy rationale: if losers are compensated for their losses from liberalization, they are less likely to lobby the government to try and halt further integration efforts.[8]

In addition to identifying winners and losers from trade, the H-O model infers different anticipated impacts of trade on developed and developing nations. Developed nations, with abundant amounts of skilled labor, should experience a rise in inequality as the gap between skilled and unskilled labor increases. Alternatively, developing nations, with abundant supplies of unskilled labor, should experience reduced inequality as the majority of the labor supply is unskilled. While recent research has questioned the divide between developed and developing nations in terms of trade and inequality,[9] prudence suggests the developed~developing distinction should be included in analyses of inequality and trade.

One way to examine the distribution effects of economic globalization is to use data on economic inequality. Research has identified economic globalization as increasing both wage and income inequality.[10] Increasing capital flows and trade have led to difficulties for labor to achieve greater financial gains, as labor's bargaining position has been made problematic by the threat of outsourcing. As a result, the balance of power between capital and labor may be tilting

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[7] Douglas A. Irwin, Against the Tide: An Intellectual History of Free Trade (Princeton, N.J.: Princeton University Press, 1996): 183, cited in Kapstein, 364.

[8] D. Rodrik, "Why Do More Open Economies Have Bigger Governments?" *Journal of Political Economy* 106 (1998): 997-1032.

[9] Harrison et al., 3.

[10] See for example Harald Beyer, Patricio Rojas, and Rodrigo Vergara, "Trade Liberalization and Wage Inequality," *Journal of Development Economics* 59 no. 1 (1999): 103-123, Adrian Wood, "Globalisation and the Rise in Labour Market Inequalities," *The Economic Journal* 108 no. 450 (1998): 1463-1482, Jeffrey Kentor, "The Long Term Effects of Globalization on Income Inequality, Population Growth, and Economic Development," *Social Problems* 48 no. 4 (2001): 435-455, Melinda Mills, "Globalization and Inequality," *European Sociological Review* 25 no. 1 (2009): 1-8, Axel Dreher and Noel Gaston, "Has Globalization Increased Inequality," *Review of International Economics* 16 no. 3 (2008): 516-536, and Sadullah Celik and Ulkem Basdas, "How Does Globalization Affect Income Inequality? A Panel Data Analysis," *International Advances in Economic Analysis* 16 no. 4 (2010): 358-370.

in the favor of capital, and in turn, technological and efficiency gains create increasing gaps between skilled and unskilled labor.[11]

If economic globalization has the potential to increase economic inequality, there will likely be institutional responses in order to blunt the effect. Using recent advances in inequality measurements, as well as measurements for economic globalization, several models are constructed to identify whether or not tax redistribution schemes lessen the impact of economic globalization on economic inequality. Have state redistribution policies been effective in blunting the potential negative economic effects of globalization?

Based on the previous literature review, Table 1 identifies some testable hypotheses relating economic globalization and economic inequality. Globalization is anticipated to increase pre-tax redistribution income inequality for developed nations, as the process of integration creates winners and losers, where the winnings of integration become clustered in the hands of capitol, at the expense of labor. Alternatively, developing nations, following the H-O model, should experience reduced income inequality as trade opens new opportunities for unskilled labor to find employment. Post-tax redistribution income inequality is likely to have a negative relationship with economic globalization, for both developed and developing nations, because the state redistributes wealth to the losers of integration, hoping to ensure continued support for further integration efforts. While developed nations are likely to have more effective redistribution programs, both developed and developing nations pursue similar efforts to reduce the negative potential of trade. Finally, wage inequality is predicted to have a positive relationship with economic globalization, as the gains to labor become disproportionately allocated in high skilled sectors, creating a divide between the skilled and unskilled.

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[11] Arthur S. Alderson and Francois Nielsen, "Globalization and the Great U-Turn: Income Inequality Trends in 16 OECD Countries," *American Journal of Sociology* 107 no. 5 (2002): 1282.1

Table 1: Anticipated Relationships Between Inequality and Globalization

	Pre-Tax Income Inequality Developed Nations	Pre-Tax Income Inequality Developing Nations	Post-Tax Income Inequality	Wage Inequality
Economic Globalization	+	–	–	+
Rationale	The gains from increased economic integration become concentrated in holders of capitol and finance, increasing inequality	Trade creates new opportunities for unskilled workers to find work, decreasing inequality	Tax redistribution schemes reduce the pain experienced by adjustments due to economic globalization, causing inequality to decrease.	Wage inequality increases as the pay gap between skilled and unskilled workers increases within an economy.

Section Two: Measuring Economic Inequality and Economic Globalization

When discussing income inequality, the primary measurement is the Gini coefficient.[12] The Gini coefficient is a measure of income inequality for a whole society that ranges from a score of zero, where everyone makes the same income, and a score of one, where a single individual makes 100% of the societies income. The Gini Coefficient is calculated by identifying the difference between perfect equality in a society and the actual distribution of income, which is known as the Lorenz Curve. The difference between perfect equality and actual equality is then divided by total income. As a result, the Gini coefficient is a proportional measurement that is especially useful for cross-national comparisons. Unfortunately, because the Gini coefficient is about the relative difference in income distributions, it does not take into account variance in absolute variance in income distribution. The Gini's primary benefit is an ease of interpretation.

Unfortunately, one of the major problems in analyzing economic inequality is the lack of broadly comparable data. The major datasets that have been used in previous analysis are simply

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[12] James K. Galbraith, Inequality and Instability: A Study of the World Economy Just Before the Great Crisis (New York: Oxford University Press, 2012): 1-46.

not useful for time series, macro analysis. The first database, published by Deininger and Squire in 1996, and updated by the World Bank, has Gini coefficient data that measures income inequality for many countries from 1950, but data is scattered, some countries having many data points, while others are sparsely populated.[13] In addition, the inequality data that is collected for each country is often different, some using gross household incomes, while others use net income. These two types of inequality are not directly comparable. Another, more detailed dataset, the Luxembourg Income Studies, is also deficient in that it covers only a handful of wealthy nations. [14]

To address previous data difficulties, several datasets have been constantly refined to provide greater coverage. An important database on inequality, focusing on differences in wages, comes from the University of Texas Inequality Project (UTIP), a massive database on inequality that includes a total of 3554 observations for many countries from 1963 to 2003.[15] Whereas previous inequality analysis has been usually limited to members within the Organization for Economic Cooperation and Development (OECD) due to the ease of access to Gini coefficient data, the UTIP data has dramatically increased the time and geographic areas of analysis. However, unlike other inequality databases, the UTIP data is *NOT* a Gini coefficient. Rather, they calculate a Theil index.[16] Instead of looking at individual averages of income like the Gini would use, the Theil index instead uses economic data aggregated by economic, industrial, or geographic groupings. These data depict average incomes of many people, and are useful estimates for shifts in a society's inequality. The major benefit of the Theil index is that it is additive, a total country's inequality score is just the sum of the scores of the underlying parts. However, interpretation of the Theil index is more difficult than the Gini; while a score of zero means everyone has the same income, there is not an upper bound, but higher scores are associated with greater inequality.

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[13] Klaus Deininger, and Lyn Squire, "A New Data Set Measuring Income Inequality," *The World Bank Economic Review*, 10 no 3 (1996): 565-591. The World Bank updated webpage for this database is http://go.worldbank.org/UVPO9KSJJ0.

[14] James K. Galbraith and Hyunsub Kum, "Inequality and Economic Growth: Data Comparisons and Econometric Tests," *UTIP Working Paper* 21, published online at http://utip.gov.utexas.edu/papers/utip_21rv.pdf.

[15] http://utip.gov.utexas.edu/.

[16] For a more detailed breakdown of the Theil index and its benefits/costs versus the Gini, see Galbraith, 2012, 29-32.

The culmination of all Gini coefficient data on economic inequality has been organized into the Standardized World Income Inequality Database (SWIID).[17]   Using data from the Luxembourg Income Study (LIS), the World Bank Deininger and Squire database, The U.N. University World Income Inequality Database (UNU-WIDER), the UTIP dataset, and finally the Standardized Income Distribution Database (SIDD), the SWIID provides Gini coefficient data for 171 countries from 1960 to 2008, and is frequently used for time series panel research to explain the causes and effects of income inequality. Most important to the questions posed here, the SWIID dataset has pre-tax redistribution and post-tax redistribution Gini coefficients, creating the opportunity to identify whether or not redistribution programs are effective in changing the effects of economic globalization.

To measure economic globalization, the KOF Index of Globalization is used. The KOF Index of Economic Globalization uses economic flows, as well as restrictions of flows, in order to create a weighted index. The index is described in Table 2. The KOF Index takes into account both flows and restrictions to flows, attempting to generate an overall evaluation of how integrated and connected nations are to the global economy. Unfortunately, because of the aggregation used, it is impossible to identify, by using the index alone, whether flows or restrictions are the particular sources of increasing or decreasing inequality. However, the perspective pursued here is they all work together, creating a milieu of economic integration in which states operate.

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[17] Frederick Solt, "The Standardized World Income Inequality Database," *Social Science Quarterly* 90 no. 2 (2009): 231-242.Current database accessible at
http://dvn.iq.harvard.edu/dvn/dv/fsolt/faces/study/StudyPage.xhtml?globalId=hdl:1902.1/11992.

Table 2 :Variables and Weights Included in the KOF Index of Economic Globalization (Source: http://globalization.kof.ethz.ch/static/pdf/variables_2011.pdf)	
Variable	**Weight**
1. Economic Globalization	
A. Actual Flows	50%
- Trade (percent of GDP) (22%) - Foreign Direct Investment, stocks (percent of GDP) (29%) - Portfolio Investment (percent of GDP) (22%) - Income Payments to Foreign Nationals (percent of GDP) (27%)	
B. Restrictions	50%
- Hidden Import Barriers (22%) - Mean Tariff Rate (28%) - Taxes on International Trade (percent of current revenue) (27%) - Capital Account Restrictions (23%)	

Section Three: Method and Data Analysis

Before analyzing several regression models, summary statistics are introduced in Table 3. Additionally, Table 4 provides a pairwise correlation coefficient table between the inequality and globalization indicators.[18] As one would expect, the inequality indicators are all positively correlated and significant at the .000 level. However, the relationships between the inequality indicators and economic globalization are particularly intriguing. Economic globalization and pre-tax redistribution income inequality do not have a significant relationship, contrary to what was expected in the theoretical discussion. Alternatively, economic globalization and post-tax redistribution inequality are significantly correlated and have a slight negative relationship, indicating that redistribution programs dull the effects of economic globalization. Finally, economic globalization and wage inequality also are opposite of what was expected, having a significant and slightly negative relationship.

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[18] Listwise correlations were also produced, and provide roughly the same relationships.

Table 3: Summary Statistics for Inequality and Globalization Indices

Variable		Mean	Std. Dev.	Min	Max	Observations	
Pre-Tax Ineq.	overall	44.03	9.43	17.59	77.97	N =	4345
	between		8.21	27.20	66.39	n =	168
	within		5.04	24.05	67.90		
Post-Tax Ineq.	overall	37.48	10.69	15.05	71.33	N =	4413
	between		9.82	20.12	65.28	n =	168
	within		3.86	18.10	57.45		
Wage Ineq. (Natural Log)	overall	-1.46	0.44	-3.00	0.02	N =	3387
	between		0.42	-2.65	-0.07	n =	152
	within		0.22	-2.45	-0.09		
Econ. Global.	overall	49.68	19.30	9.42	98.88	N =	5463
	between		16.91	15.65	94.98	n =	149
	within		9.16	23.68	82.65		

Table 4: Pairwise Correlation Table for Inequality and Globalization

	Pre-Tax Ineq.	Post-Tax Ineq.	Wage Ineq.	Econ. Global.
Pre-Tax	1			
Post-Tax	0.77***	1		
Wage Ineq.	0.43***	0.64***	1	
Econ. Global.	0.01	-0.29***	-0.23***	1

*** = p score significant at .000 level

To further illustrate the relationships between the variables, Graph 1, Graph 2, and Graph 3 provide scatterplots between economic globalization and pre-tax inequality, post-tax inequality, and wage inequality.[19] These confirm and illustrate the findings from the correlation table.

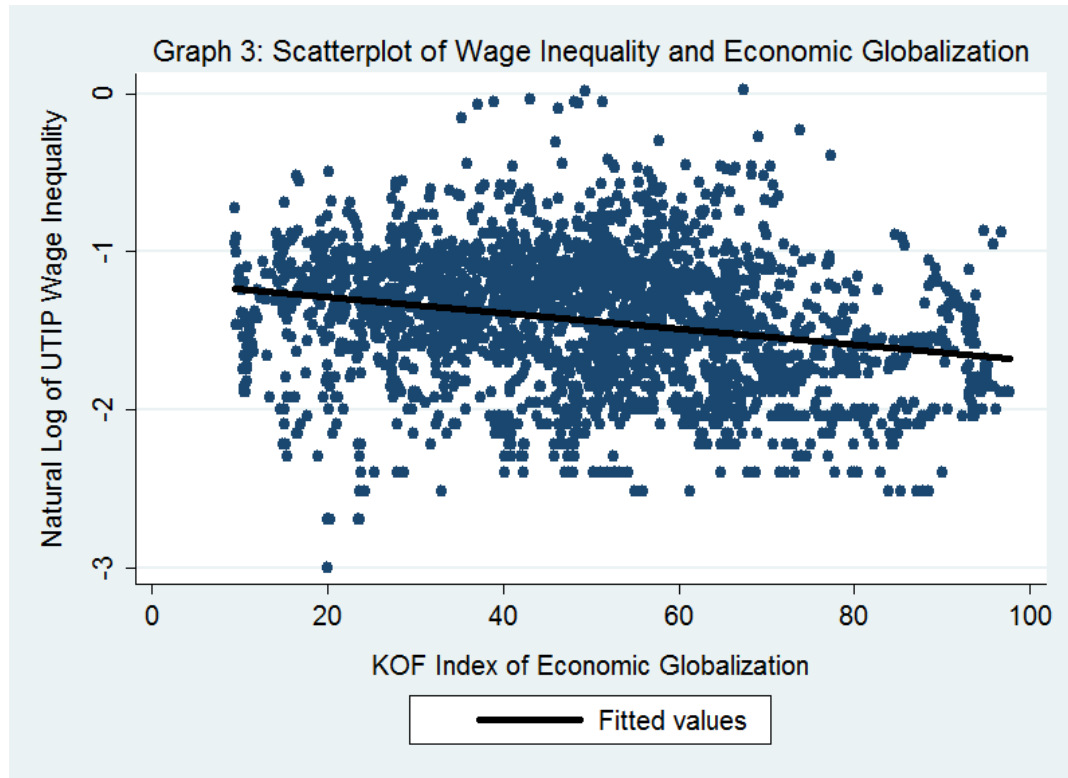[19] Many thanks to Michael Roberts at the University of Hawaii for this suggestion.

Graph 1: Scatterplot of Pre-Tax Income Inequality and Economic Globalization

Graph 2: Scatterplot of Post-Tax Income Inequality and Economic Globalization

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Graph 3: Scatterplot of Wage Inequality and Economic Globalization
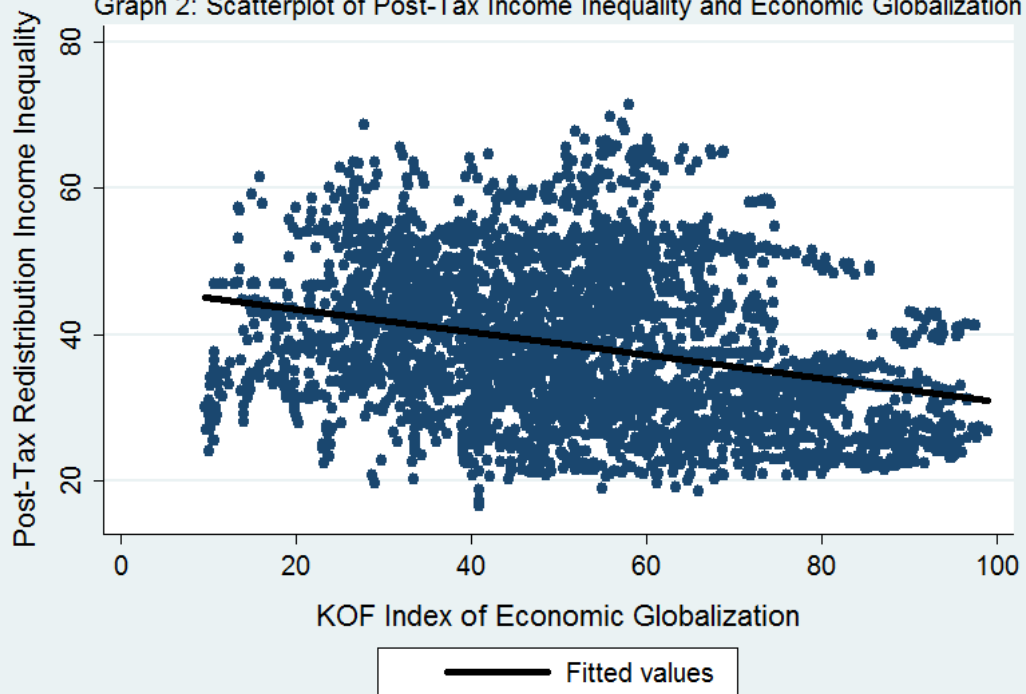
To further explore the relationship between inequality and economic globalization, controls are introduced using several fixed effects panel regressions. As serial correlation and heteroscedasticity are frequently a problem, cluster robust standard errors are used.[20] These models are an initial investigation into the relationship between tax redistribution schemes and their impact in reduced the effect of economic globalization on economic inequality. If any fruitful conclusions are identified here, future avenues of research should include GMM models with lagged values for inequality.

The models includes country fixed effects and time dummies. The equation estimated is:

$$y_{it} = \beta G_{it} + \alpha GDP_{it} + n_i + n_t + \varepsilon_{it},$$

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[20] Joshua Angrist and Jorn-Steffen Pischke, Mostly Harmless Econometrics: An Empiricist's Companion (Princeton: Princeton University Press, 2009): 237. Also, GMM analysis would be particularly relevant to take care of the serial correlation associated with inequality, but is not applied due to difficulties in implementation.

where y stands for various measures of inequality at country i and time t, G is economic globalization, X is a series of economic development variables, n_i is country fixed effects, n_t is time dummies, and ε_{it} represents the residual.

Table 5 represents the results from fixed effects regression between the inequality and globalization measures, using country fixed effects, time dummies and cluster robust standard errors. The model represents an initial analysis of the potential relationships between inequality and economic globalization.

	(1)	(2)	(3)
Table 5: Inequality and Globalization: Fixed Effects Results with Time Dummies and Cluster Robust Standard Errors			
VARIABLES	Pre-Tax Inequality	Post-Tax Inequality	Wage Inequality
KOF Economic Globalization	0.176***	0.0986***	0.00417
	(0.0535)	(0.0294)	(0.00276)
Constant	41.29***	34.93***	-1.636***
	(2.445)	(1.326)	(0.115)
Observations	3,547	3,578	2,550
R-squared (within)	0.091	0.048	0.154
Number of countries	142	142	129
Pr > F	.0000	.0003	.0021

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Contrary to the results from the scatterplots and correlation coefficients, adding fixed effects and time dummies significantly changes the perceived relationship between inequality and globalization. Both pre-tax and post-tax redistribution income inequality are increased by economic globalization and significant at the .000 level. However, the impact of the increase is significantly lower for post-tax redistribution income inequality, indicating that redistribution is having a significant effect in reducing the effects of globalization on income inequality. Wage inequality and economic globalization did not have a significant relationship. The low r^2 scores also indicate that economic globalization plays at best a small role in affecting economic inequality.

To test the robustness of the previous models, the natural log of GDP per capita and GDP per capita squared are introduced into the model. Levels of economic development are frequently considered to be one of the most important indicators of inequality levels, and the relationship was initially explored by Simon Kuznets. According to Kuznets, inequality was linked with GDP growth, where inequality grew during early stages of development while tapering off after the economy had matured.[21] Adding GDP per capita and GDP per capita into the model attempts to reflect the inverse U-shaped development hypothesis, where inequality should rise during early economic development, but decrease as the economy matures.

Table 6 adds in economic development as a control variable. Economic globalization is significant in both pre-tax and post-tax income inequality, as in Table 5. Again, the size of the impact of economic globalization on post-tax redistribution income inequality is smaller than on pre-tax income inequality, providing some support that the findings from Table 5 are robust to the inclusion of a basic development model. Again, wage inequality had no relationship with economic inequality; however, including the fixed effects, time dummies, and cluster robust standard errors causes a degrees of freedom problem that makes the validity of the overall regression unreliable.

To highlight the distinction between developed and developing countries, one final model is presented. GDP per capita of $10,000 is chosen as an arbitrary cutoff point between developed and developing nations.[22] For both developed and developing nations, economic globalization had a lower coefficient for after-tax redistribution.[23] Intriguingly, economic development is only significant for pre-tax redistribution income inequality for developed nations, but contra Kuznets, inequality decreases with GDP and increases with GDP squared. As countries become more economically developed, they experience higher levels of income inequality.[24]

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[21] Simone Borghesi, "Inequality and Poverty in the Globalized World," in Popeo Della Posta, et al. eds., Globalization, Development and Integration: A European Perspective (New York: Palgrave Macmillan, 2009): 70.

[22] GDP Per Capita of $10,000 was chosen after discussions with Professor Sumner La Croix, a development economist at the University of Hawaii at Manoa. This arbitrary cutoff was chosen for its simplicity and is not meant to be a final determinant between developed and developing nations. Other cutoff points were chosen with similar overall results. Many thanks to Professor La Croix for his assistance.

[23] To ensure the change in coefficient size not due to varying characteristics between pre- and post-tax redistribution data, the coefficients were standardized (not reported), and the results were the same.

[24] For a discussion with similar results for wage inequality rather than income inequality, see Galbraith, 2012, 67-69.

The models also demonstrate that developed nations have more refined redistribution systems that ameliorate the effect of economic globalization on income inequality. Both the coefficient and significance tests were lower for developed nations in the post-tax redistribution income inequality models. For developing nations, economic globalization stayed significant at the .05 level for both pre-tax and post-tax income inequality, and the coefficient decreased slightly. Tax redistribution helped reduce the positive effect of economic globalization on income inequality, but developed nations were more effective in using tax-redistribution.

	(1)	(2)	(3)
VARIABLES	Pre-Tax Inequality	Post-Tax Inequality	Wage Inequality
KOF Economic Globalization	0.168***	0.0863***	0.00386
	(0.0482)	(0.0277)	(0.00268)
GDP Per Capita (LN)	-22.73***	-7.435	0.814*
	(8.689)	(6.007)	(0.491)
GDP Per Capita Sq. (LN)	1.549***	0.488	-0.0603**
	(0.506)	(0.339)	(0.0277)
Constant	122.1***	63.12**	-4.157*
	(38.92)	(26.91)	(2.203)
Observations	3,499	3,530	2,508
R-squared (within)	0.129	0.043	0.191
Number of Countries	142	142	127
Pr > F	.0000	.0019	[a]

Table 6: Inequality and Globalization with Economic Development: Fixed Effects with Time Dummies and Cluster Robust Standard Errors

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
[a] An f-test could not be conducted due to a lack of degrees of freedom.

Table 7: Inequality and Globalization: Developed and Developing States

VARIABLES	(1) Pre-Tax Inequality Developed Nations	(2) Post-Tax Inequality Developed Nations	(3) Wage Inequality Developed Nations	(4) Pre-Tax Inequality Developing Nations	(5) Post-Tax Inequality Developing Nations	(6) Wage Inequality Developing Nations
Economic Globalization	0.170***	0.0635*	-0.000869	0.132**	0.0906**	0.00712**
	(0.0539)	(0.0357)	(0.00353)	(0.0638)	(0.0403)	(0.00347)
GDP Per Capita (LN)	-61.28*	-5.242	1.278	25.41*	-3.393	0.849
	(32.54)	(21.87)	(1.691)	(14.72)	(11.53)	(0.867)
GDP Per Capita Sq. (LN)	3.315**	0.304	-0.0778	-1.422	0.283	-0.0620
	(1.589)	(1.080)	(0.0823)	(0.951)	(0.720)	(0.0523)
Constant	315.6*	49.19	-6.752	-61.49	50.29	-4.446
	(166.9)	(110.6)	(8.700)	(57.46)	(45.88)	(3.592)
Observations	1,257	1,257	898	2,242	2,273	1,610
R-squared	0.266	0.150	0.193	0.187	0.045	0.198
Number of States	54	54	43	110	110	97
Pr > F	.0000	.0000	a	.0000	.0003	.0000

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

a: There were not enough degrees of freedom to produce an F-test. The model was rerun without time dummies, and the results were similar. The f-test without time-dummies was .0305

Section 4: Conclusions

In all the models, economic globalization had a different effect on inequality when analyzing pre and post-tax redistribution income inequality. In the pooled analysis, economic globalization increased levels of pre-tax income inequality, whereas there was a negative relationship with post-tax redistribution inequality. When fixed effects, time dummies, and economic development controls are added into the model, economic globalization increased both pre and post-tax redistribution income inequality, but the size of the increase was always smaller after tax redistribution. These findings provide some support for the belief that tax-redistribution ameliorates the full impact of economic globalization on a nations level of inequality.

Recent research encourages additional extensions of the redistribution effects considered here. Alvaredo et al have identified that much of the recent rise income in inequality has occurred at 1% and higher levels of GDP.[25] Dramatic rises in both income growth and economic inequality at the top of the income distribution embolden an institutional research perspective; as elites acquire a greater percent of GDP, their influence on policies beneficial to their cohort likely increases. Some tax-redistribution policies may ensure that continued economic globalization occurs unabated, but the wealthy beneficiaries of economic globalization can concurrently use their trade-boosted wealth to influence the policy process and pass lucrative tax cutting legislation.

However, these findings are only a preliminary analysis. Inequality is a slow moving variable, and serial correlation is a serious concern.[26] Further analysis, using either Autoregressive (AR1) models, or Generalized Methods of Moments (GMM), will allow for additional techniques to control for the bias created by serial correlation. These techniques, however, are fraught with difficulties, including instrument proliferation and serial correlation in lagged levels of instruments that require significant additional work to ensure taking into account serial correlation of inequality levels to not also induce additional biases into the models.

Regardless, the models demonstrated here show that states are not simply at the whim of economic markets and the business cycle in long term shifts in inequality levels. Intelligently engineered economic redistribution programs can go a long way in helping states control the

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[25] Facundo Alvaredo, Anthony B. Atkinson, Thomas Piketty, and Emmanuel Saez, "The Top 1 Percent in International and Historical Perspective," *Journal of Economic Perspectives* 27 no. 3 (2013): 3-20.

[26] Hongyi Li, Lyn Squire, and Heng-fu Zou, "Explaining International and Intertemporal Variations in Income Inequality," *The Economic Journal* 108 (1998): 26-43.

effect of international economic integration from causing increasing levels of inequality. Rising inequality may threaten a country's political stability and economic growth, causing long-term disruptions to the social system if inequality is not closely analyzed and understood.[27]

In order to facilitate a greater understanding of the role of social welfare programs in reducing inequality growth, additional data needs to be gathered identifying different types of tax-redistribution and social welfare systems. This data facilitates further modeling to help identify which programs are most effective in helping governments fight against increasing economic inequality.

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[27] For a review of the literature, see Gunhild Gram Giskemo, "Exploring the Relationship Between Socio-Economic Inequality, Political Instability and Economic Growth: Why Do We Know So Little?" *CMI Working Paper* (2012): 2. Accessed August 2, 2013 at http://www.cmi.no/publications/file/4379-exploring-the-relationship-between-socio-economic.pdf. One of the most cited papers in this area is Alberto Alesina, and Roberto Perotti, "Income distribution, Political Instability, and Investment," *European Economic Review* 40 (1996): 1203-1228. Alesina and Perotti, 1996, was updated in Kentor, 2001, and Thorbeck and Charumilind, "Economic Inequality and Its Socioeconomic Impact," *World Development* 30 no. 9 (2002): 1477-1495. Finally, see Pushan Dutt and Devashish Mitra, "Inequality and the Instability of Polity and Policy," *The Economic Journal* 111 (2008): 1285-1314 for a recent analysis of the relationship between inequality and political instability.

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