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Do economic liberalization and globalization increase income inequality?

Abstract

Using the newly developed KOF-index of globalization, as well as the economic freedom index from the Fraser institute, we examine if globalization and economic liberalizations are linked to increases in income inequality within countries. Studying changes between 1980 and 2000, we find a positive link between inequality and liberalization only for certain types of reforms: Trade liberalizations, deregulation of product and labor markets and economic globalization. The Scandinavian welfare states have increased economic freedom and globalization more than other countries, but they have also experienced high increases in income inequality.

Keywords

Economic freedom; Globalization; Income Inequality; Gini Coefficient; Welfare states

JEL-codes

D63; O11; P51

Introduction

During the 1980s and 1990s, many countries around the world experienced increased degrees of economic freedom and globalization. In the popular debate, there is a prevailing belief that such changes may be beneficial for economic growth but also that they have substantial costs in terms of increased inequality within countries. The aim in this paper is to examine the latter of these views: Have recent increases in economic freedom and globalization in fact been associated with increasing income inequality?

Regarding the first view, the relationship between liberalization and globalization on one hand, and economic development on the other, the debate is not completely settled. For example, the proper measurement of globalization, and the direction of the causality is still subject to intense debate, see for example Rodriguez and Rodrik (2000) and the response by Lee Ha et al. (2004). Nevertheless, most existing evidence does confirm the link between economic freedom and globalization on the one hand, and economic growth on the other hand. For example, Doucouliagos and Ulubasoglu (2006) conduct a meta-study of 52 studies dealing with the impact of economic freedom on economic growth, and conclude that “economic freedom has a robust positive effect on economic growth regardless of how it is measured” (p. 68). Similarly, Dreher (2006) surveys the literature and presents results based on the newly developed KOF-index of globalization, arguing that globalization as measured by the index is growth promoting.

Turning to the effects of economic freedom and globalization on income inequality, simple economic intuition suggests that trade openness leads to lower inequality between countries, but higher inequality within countries. Formal models, however, reveal that the relation is more complex, with many models featuring multiple equilibria for some levels of openness, see for example Krugman and Venables (1995) and Das (2005). O'Rourke (2001) empirically finds that late 19th century globalization had varying effects on within-country income distribution: increased trade and migration (but not capital flows) made the rich new world more unequal, and the (less rich) old world more equal. The evidence on the links between within-country inequality and globalization in the late 20th century is mixed. In all,

O'Rourke confirms that globalization is a force for convergence between countries, but the effect on inequality within countries is less clear.

Furthermore, economic freedom and globalization are broader concepts than just trade openness, and several mechanisms are theoretically ambiguous. For example, more secure property rights, lower and more stable inflation levels are examples of increases the degree of economic freedom that a priori could hardly be expected to increase income inequality. The same goes for political globalization: If politicians in different countries cooperate more on an international level, should we expect income inequality to be lower or higher? One might for example argue that while economic globalization tends to increase inequality, political globalization, such as membership in international organizations, may at least partially mitigate this effect.

Some early studies of the relationship between trade policy and income inequality within countries exist, but suffer from limited data. For example, Sebastian (1997) found no evidence linking openness or trade liberalization to increases in inequality whereas Savvides (1998) found that among less developed countries, more open economies experienced increased income inequality during the late 1980s.

More recently, studies have used composite indexes of economic freedom to empirically examine the link between economic freedom and inequality: Berggren (1999), Scully (2002) and Carter (2006) using national data, and Ashby and Sobel (2007) using US states. The results so far are surprisingly conflicting. As discussed by especially Carter (2006), the first studies – notably Berggren's – suffered from some mistakes and poor data quality. For example, Berggren used data from the Deininger Squire (1996) and Scully used data from the World Income Inequality Database (WIID) v1.0. Both these datasets are inferior to the currently available WIID 2.0, released in 2005. Berggren has also been criticized for not properly accounting for differences between different types of Gini coefficients (for example if the Gini coefficient is calculated using gross income, net income, or consumption).

Carter (2006) does a good job of describing the problems in earlier studies, and for this reason we focus here on describing how our study differs from Carter's. Most importantly, in addition to the economic freedom index, we also analyze the newly

developed KOF-index of globalization, which is decomposable into three sub-components, describing economic, social and political globalization. To our knowledge, this has not been done before. We also decompose the economic freedom index into its five subcomponents to examine if different types of economic freedom have different effects on inequality. Furthermore, we investigate if the evolution of inequality and liberalization differs systematically between different types of welfare states.

Carter uses an unbalanced panel data set, and assumes that the relation between economic freedom and inequality is non-linear.¹ While the benefits of a panel data set are obvious, it should be noted that Gini coefficients change little over time, and are likely to be associated with substantial measurement errors (as also pointed out by Carter). For this reason, it can be argued that the development of inequality should be measured by taking the difference over a longer time period, a method used for example by Sylwester (2002) and Sylwester (2003) when analyzing the effect of education policy on inequality. Furthermore, Carter's panel suffers from severe data limitations especially for the early years in the panel, with data for only 7 countries in 1980 and 15 countries in 1985, and even in these cases data are often taken from other years. Thus, there are good reasons to examine if Carter's results hold when the dependent variable is the difference in Gini inequality over a longer time, the approach used by among others Sylwester (2002, 2003) as well as Sebastian (1997) and Savvides (1998). Compared to earlier studies, we benefit from having access to a long time period: Our approach is to examine if an increase in economic freedom between 1980 and 2000 is associated with increasing inequality during the same period, controlling for initial levels of economic freedom and inequality.²

In short, we view our study as a complement and an expansion of Carter's, and our results are more in line with his findings than those of earlier studies. Basically, we confirm the result that increases in economic freedom are linked to higher income inequality. Interestingly, we find that increasing inequality seems to be caused by two of the five dimensions of the index: Deregulation and trade openness, whereas other

¹ From low levels, more economic freedom will decrease inequality, but at higher levels the opposite holds.

² Just like Carter, we must sometimes content ourselves with data from years close to 1980 and 2000.

types of economic liberalization have no significant effect on inequality. Globalization as measured by the KOF-index has a similar effect, and we find that the effect on inequality comes from economic globalization rather than social and political globalization. Interestingly, we find no clear differences between different types of welfare states, and while both economic freedom and globalization has increased substantially in universal welfare states like Sweden and Denmark, these countries have also experienced increased inequality.

The paper proceeds as follows: In the next section we describe the two indexes and the remaining data we use, and section three contains our main regressions. Section four focuses on a number of countries often used for comparative welfare state research, and section five concludes the paper.

Data and Empirical Model

The economic freedom index developed by Gwartney and Lawson (2003) (properly titled economic freedom of the world index, EFW) decomposes economic freedom into five dimensions: Size of government (EFW1), legal structure and security of property rights (EFW2), access to sound money (EFW3), freedom to exchange with foreigners (EFW4), and regulation of credit, labor and business (EFW5). Using several indicators in each dimension, the five dimensions are weighed together in a composite index where 0 indicates the lowest and 10 the highest degree of economic freedom.³ Since the subcomponents of this index are not completely identical over time, these results should be interpreted with particular care.

The KOF-index measures economic globalization (measured by trade flows and trade restrictions), social globalization (measured by for example tourism and outgoing telephone calls), and political globalization (measured by for example number of embassies and membership in international organizations). The index (developed by Dreher 2006) can be use both as a composite index and disaggregated. The KOF-

³ The economic freedom index has received some critique for being ideologically biased (cf. the critical discussion in De Haan et al. (2006)), but it has been used successfully in research as a descriptive device. In our view, any ideological bias only makes it more interesting to examine if increases in the index are related to inequality.

index takes values between 0 and 100, where a higher value represents more globalization.⁴

Income inequality is measured by the Gini coefficient; one of the most commonly used proxies of economic inequality. For completely egalitarian income distributions in which the whole population has the same income, the Gini takes a value of 0, while a value of 1 indicates that all incomes are concentrated to one person. The Gini coefficient satisfies the generally accepted inequality axioms and is highly correlated with other well established income inequality indexes (Clarke, 1995). Inequality data is taken from the World Income Inequality Data base (WIID2b) that provides information on income distributions over time in more than 150 countries.

Rather than cross-sectional variation in inequality levels our study focuses on the factors affecting change in inequality between 1980 and 2000. Accordingly, the dependent variable in the analysis is the arithmetic difference between the 1980 and the 2000 Gini coefficient in county i , $\Delta INEQ_i = INEQ00_i - INEQ80_i$. For countries where inequality data is not available for these years, information from nearby years is used. It bears noting that our data points are well-matched in the manner that if the first Gini observation in time is determined by expenditure data, then the second observation in time is also an expenditure Gini. The same holds for Gini coefficients calculated on disposable and gross income respectively, and for households as well as individuals as the unit of analysis. With this approach we minimize the problem that different types of Gini coefficients are not comparable. Moreover, we use only inequality measures determined from national surveys, as income inequality of urban areas might change disproportionately to national inequality. For more information on the income inequality data, see table 4 in appendix.

Our empirical specification is

$$\Delta INEQ_i = \beta * X_i + \phi * \Delta LIB_i + \varepsilon_i$$

⁴ The areas and components of the indices used in this examination are described in more detail in the appendix.

where X is a matrix containing county specific control variables and the vector LIB corresponds to the difference in the above discussed measures of economic liberalization, either composite or disaggregated. They are computed as the index in 2000 minus the level in 1980, i.e. $\Delta LIB_i = LIB_{00_i} - LIB_{80_i}$.

Since the Gini coefficient has an upper limit at 1, income inequality will increase at a slower pace in countries that are already highly unequal. To control for this ceiling effect, we control for the initial level of economic inequality in country i ($INEQ_{80}$). Moreover, the matrix X contains a constant and the initial value of the particular policy index (EFW_{j_80} or KOF_{k_80} , where $j=1,2,3,4,5$ and $k=1, 2,3$).

To control for the influence of initial wealth we include the natural log of real GDP per capita in 1980 ($\ln GDP_{PC_80}$). The matrix X also contains three geographical dummies capturing regional differences in Latin America ($LAAM$), East Asia ($EASIA$) and sub-Saharan Africa (SSA). These variables are taken from World Development Indicators 2007 (World Bank, 2007).

To the baseline specification two more control variables are added: HUM_{80} measures the stock of human capital in the adult population in 1980 using illiteracy rates, and $URBAN_{80}$ captures the level of urbanization in 1980. These additional indicators are included to control for various characteristics that might influence the income distribution. Finally, ε is the unobservable component of the regression. White's heteroscedastic-consistent covariance matrices are used through all estimations. The appendix contains a detailed description of all variables and sources.

Our sample covers 54 countries. Since the composite EFW and KOF indexes are not available for all countries in the first time period, 1980, the number of observations differ somewhat between the various models estimated. The varying number of observations is also a result of lacking data on real GDP per capita in 1980 and illiteracy rates for a few observations.

Analysis

The Economic Freedom Index

Table 1 shows an OLS regression explaining the increase in inequality from 1980 to 2000. In column 1, we only control for the initial level of inequality and the initial level of economic freedom. We see that increases in economic freedom over this period are significantly associated with increasing inequality. Controlling for the level of GDP in 1980, the degree of urbanization, human capital and including various regional dummies does not change the size of the effect very much and lowers significance only slightly. This main result confirms the findings of Carter rather than the findings in previous studies.⁵

Columns 4 to 18 examine the five sub-components of economic freedom. Each component is examined using three regressions, adding an increasing amount of control variables. The results suggest that the increase in inequality is related to reforms towards trade openness and deregulation of product and labor markets (area four and five of the index). We conclude that in general increased economic freedom has been associated with increasing inequality, and that this effect most likely comes from deregulations and increased trade openness. Reforms of the monetary system, legal system and smaller government size are not significantly related to higher inequality in any of our regressions.

It may seem somewhat surprising that decreases in government size as measured by the index do not increase inequality. The size dimension of the index has the following components:

- General government consumption spending as a percentage of total consumption.
- Transfers and subsidies as a percentage of GDP.
- Government enterprises and investment as a percentage of GDP.
- Top marginal tax rate (and income threshold to which it applies).

⁵ We do not specifically test Carter's hypothesis of a non-linear relationship between economic freedom and inequality. Carter himself notes that "for all but three observations the EFW index is high enough that an increase in freedom is estimated to raise inequality" (p.171).

Theoretically, it is indeed possible to lower marginal tax rates and to sell government enterprises without affecting those parts of the welfare state that are most important for keeping inequality low. Government consumption includes for example both expenditure on both defense and primary schooling. We return to the relation between the welfare state and economic freedom in section four.

The KOF-index

We now turn to the KOF-index of globalization, analyzed in table 2. Columns 1 to 3 tests the composite index, first controlling only for the initial level of inequality and then with more control variables. Columns 4 to 12 repeat the analysis for economic, social and political globalization separately. The results here are slightly weaker than for the EFW index. While the composite KOF-index is positively related to inequality, the significance becomes much lower when regional dummies are included. The separate indexes for social and political are never significant. Economic globalization has a positive effect, but again significance decreases when control variables are included.

Turning briefly to the control variables included in our specifications, the coefficient of GINI_80 is negative and generally significant through our specifications, regardless if examining the EFW or the KOF index. Consequently, *ceteris paribus*, on average countries with higher levels of income inequality in 1980 experienced increased economic equality. Concerning the influence of initial material wealth, the coefficient of the variable lnGDPC_80 is not significant in any of the models. This is not in line with the reasoning in Berggren (1999) or Ashby and Sobel (2007) that find the initial level of GDP to be significantly negatively related to inequality.

The regional dummies included are often positive and significant which implies that countries in these regions experienced increased inequality during the time period. Finally, we do not find that countries with more urbanization experienced increasing inequality or that the initial human capital stock influenced the change in the income distribution in the countries studied.

Sensitivity analysis

One cause of concern is that our findings are driven by outliers. Ten countries in the sample experienced an increase in inequality of more than 20% between 1980 and 2000. Moreover, a couple of observations experienced an increase in the EFW or the KOF-index of more than 75 % over the time period.⁶ However, removing any of the countries that experienced a major change in income inequality or a major increase in economic freedom only marginally affects the coefficients. Consequently, it seems that no particular outlier is driving the above findings on the link between economic liberalization and increased inequality.

To test for the presence of a perfect linear relationship among the predictors, which would imply that the regression model cannot be uniquely computed, we check the variance inflation factor. We do not find any problem of multicollinearity in the estimated models. Neither does there seem to exist any model specification error that substantially affects the estimate of the regression coefficients. Employing a reset test we cannot reject the null hypothesis that the model has no omitted variables.

As a final robustness check we replace HUM_80 with the average years of schooling in the adult population taken from Barro and Lee (2000). Using this alternative variable does not change our main results: Changes in the composite EFW and KOF indexes are still linked to increasing income inequality, and the coefficients on changes in EFW4, EFW5 and KOF1 are still significant and positive.

⁶ In ascending order these countries are (Gini): China, Sweden, Hong Kong, Belgium, Nigeria, United Kingdom, Hungary, Finland, Bangladesh and New Zealand; (EFW) Ghana, Jamaica, Israel and Bangladesh; (KOF) China, Thailand, Bangladesh, Turkey, Indonesia, Philippines, Nigeria, Romania, Pakistan and Madagacar

Table 1 Explaining increasing inequality using change in economic freedom (EFW-index)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Constant	-2.776 [0.36]	2.61 [0.36]	-0.697 [0.06]	8.618 [2.90]***	9.358 [1.25]	11.353 [1.02]	-2.812 [0.46]	2.166 [0.28]	0.746 [0.07]	5.392 [1.18]	9.919 [1.51]	12.884 [1.18]	-1.857 [0.31]	7.967 [1.03]	1.292 [0.11]	0.276 [0.04]	5.246 [0.83]	2.084 [0.16]
GINI_80	-0.129 [1.69]*	-0.374 [3.54]***	-0.375 [3.29]***	-0.191 [2.48]**	-0.424 [4.48]***	-0.394 [3.77]***	-0.007 [0.08]	-0.217 [1.62]	-0.219 [1.67]	-0.155 [2.23]**	-0.388 [3.41]***	-0.347 [2.60]**	-0.121 [1.67]	-0.388 [3.52]***	-0.374 [3.24]***	-0.072 [1.01]	-0.304 [3.08]***	-0.301 [2.98]***
lnGDPC_80		-0.178 [0.25]	-0.576 [0.40]		0.752 [1.34]	-0.252 [0.19]		0.06 [0.07]	-0.396 [0.30]		0.232 [0.38]	-1.399 [0.87]		-0.527 [0.52]	-1.053 [0.79]		-0.214 [0.34]	-0.375 [0.24]
LAMER		8.289 [3.19]***	8.372 [2.70]**		9.516 [3.55]***	8.905 [2.74]***		6.667 [2.70]**	6.545 [2.34]**		8.446 [3.20]***	7.373 [2.08]**		8.925 [3.65]***	8.776 [3.07]***		8.454 [3.34]***	8.545 [2.42]**
EASIA		5.198 [2.12]**	5.76 [2.08]**		6.28 [2.31]**	6.399 [2.15]**		3.662 [1.53]	3.754 [1.50]		4.95 [1.94]*	4.341 [1.48]		3.589 [1.61]	3.679 [1.73]*		4.628 [2.23]**	5.025 [2.08]**
SSA		5.698 [2.01]*	5.632 [1.96]*		6.614 [2.26]**	6.356 [2.12]**		5.834 [1.47]	5.172 [1.26]		5.657 [1.98]*	5.164 [1.68]		5.237 [1.90]*	4.659 [1.81]*		4.955 [1.89]*	4.813 [1.86]*
HUM_80			0.06 [0.93]			0.017 [0.27]			0.054 [0.87]			0.002 [0.03]			0.078 [1.18]			0.055 [0.69]
URBAN_80			0.07 [1.60]			0.089 [2.04]**			0.072 [1.90]*			0.099 [2.00]*			0.076 [1.81]*			0.051 [0.98]
EFW_80_00	2.151 [2.10]**	2.685 [2.37]**	3.108 [2.99]***															
EFW_80	1.23 [1.51]	1.562 [1.65]	1.696 [2.28]**															
EFW1_80_00				0.132 [0.25]	0.594 [1.06]	0.654 [1.22]												
EFW1_80				0.179 [0.27]	-0.215 [0.33]	-0.303 [0.50]												
EFW2_80_00							0.515 [1.04]	0.818 [1.46]	0.682 [1.25]									
EFW2_80							0.819 [1.69]*	0.837 [1.20]	0.872 [1.32]									
EFW3_80_00										0.114 [0.28]	0.296 [0.70]	0.685 [1.29]						
EFW3_80										0.426 [1.11]	0.323 [0.79]	0.728 [1.49]						
EFW4_80_00													1.497 [2.16]**	1.209 [1.29]	2.04 [2.00]*			
EFW4_80													1.097 [1.96]*	1.507 [1.51]	2.088 [2.34]**			
EFW5_80_00																2.229 [2.51]**	2.65 [2.53]**	2.747 [2.16]**
EFW5_80																0.529 [0.66]	0.99 [1.08]	1.033 [1.14]
R ²	0.19	0.4	0.45	0.14	0.36	0.41	0.13	0.27	0.33	0.16	0.33	0.39	0.18	0.36	0.43	0.23	0.4	0.43
# of observations	52	51	51	54	52	51	47	46	46	54	52	51	52	51	51	53	51	50

* denotes significance at 10% level, ** denotes significance at 5% level, *** denotes significance at 1% level, t-values in squared brackets

All regressions use White's correction for heteroscedasticity.

Table 2 Explaining increasing inequality using change in globalization (KOF-index)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	3.965 [0.87]	10.964 [1.69]*	11.38 [0.95]	3.758 [0.88]	12.816 [1.84]*	10.076 [0.81]	6.293 [1.51]	13.53 [2.11]**	12.601 [1.08]	7.237 [1.44]	10.919 [1.68]	17.122 [1.53]
GINI_80	-0.133 [1.78]*	-0.35 [3.56]***	-0.326 [3.06]***	-0.132 [1.80]*	-0.364 [3.35]***	-0.316 [2.67]**	-0.151 [2.14]**	-0.372 [3.68]***	-0.348 [3.19]***	-0.159 [1.79]*	-0.388 [3.37]***	-0.365 [2.88]***
lnGDPC_80		-0.607 [0.68]	-1.197 [0.83]		-0.553 [0.63]	-1.371 [1.00]		-0.497 [0.58]	-1.042 [0.74]		0.304 [0.48]	-0.994 [0.69]
LAMER		8.724 [3.72]***	8.008 [2.52]**		8.028 [3.10]***	7.175 [2.34]**		8.575 [3.48]***	8.029 [2.33]**		8.716 [3.01]***	7.678 [2.27]**
EASIA		3.463 [1.67]	3.481 [1.45]		3.472 [1.60]	3.837 [1.55]		3.709 [1.81]*	3.878 [1.54]		3.884 [1.59]	3.358 [1.25]
SSA		5.668 [2.10]**	5.536 [1.91]*		4.672 [1.85]*	4.043 [1.70]*		6.021 [2.10]**	6.254 [1.88]*		5.594 [1.81]*	5.2 [1.63]
HUM_80			0.014 [0.19]			0.048 [0.60]			0.024 [0.28]			-0.022 [0.31]
URBAN_80			0.071 [1.65]			0.081 [1.96]*			0.073 [1.58]			0.08 [2.00]*
KOF_80_00	0.117 [1.46]	0.127 [1.82]*	0.139 [1.62]									
KOF_80	0.025 [0.60]	0.099 [1.46]	0.078 [1.19]									
KOF1_80_00				0.13 [2.46]**	0.1 [1.53]	0.157 [2.05]**						
KOF1_80				0.019 [0.63]	0.07 [1.48]	0.091 [1.99]*						
KOF2_80_00							0.052 [0.75]	0.082 [1.21]	0.103 [1.24]			
KOF2_80							0.014 [0.37]	0.066 [1.37]	0.048 [0.87]			
KOF3_80_00										-0.011 [0.26]	0.021 [0.44]	0.022 [0.47]
KOF3_80										0.02 [0.61]	0.012 [0.38]	0.006 [0.17]
R ²	0.19	0.36	0.38	0.22	0.36	0.4	0.17	0.35	0.37	0.17	0.33	0.35
# of observations	52	51	50	52	51	50	52	51	50	52	51	50

* denotes significance at 10% level, ** denotes significance at 5% level, *** denotes significance at 1% level, t-values in squared brackets

All regressions use White's correction for heteroscedasticity.

Welfare states, economic liberalizations and inequality

While it may seem natural to think of the welfare state as an obstacle for economic liberalization, there are in fact reasons to expect the opposite. Social safety nets may for example increase voter's acceptance of trade openness, because the private economic consequences of becoming unemployed are more bearable in welfare states, as suggested by for example Katzenstein (1985). Iversen (2005) suggests that because labor-intensive, low-productivity jobs do not thrive in big welfare states, these need international trade to be able to specialize in high value-added services. To test if these ideas are compatible with our data, we use welfare state categories to examine if different types of welfare states differ systematically when it comes to the KOF and EFW indexes and the development of inequality.

While different authors use different number of categories, and some countries are not easily categorized, we follow Bradley et al. (2003) who stay close to Esping-Andersen's (1990) classification by using three categories, containing the following countries: **Scandinavian** (Sweden, Norway, Finland, Denmark), **Continental** (Belgium, Netherlands, Germany, France, Italy, Switzerland) and **Anglo-Saxon** (Australia, Canada, United Kingdom, United States). Due to data limitations, Germany and Switzerland must be excluded. As can be seen from table 3, there is no systematic difference between different types of welfare states. The Scandinavian welfare states have on average had substantial increases in economic freedom and globalization during the past decades, but they have also experienced bigger increases in inequality. Columns 4 and 6 relate the increase in index value to the increase in income inequality, but no clear pattern is revealed. Two countries have experienced very small inequality increases (Canada and France), and there are big differences within the three types of welfare states, with for example Norway increasing globalization much less than the other Scandinavian countries.

To conclude, there are clear signs that the Scandinavian welfare states have increased economic freedom and globalization more than other countries between 1980 and 2000, but they have also experienced increasing inequality at least as much as in comparable countries. The fact that inequality in the Scandinavian welfare states is

still low by international standards must be explained by the fact that inequality in these countries fell more than in other countries before 1980, as indicated for Sweden in for example Roine and Waldenström (2006).

Table 3 The development of inequality and policy indexes for different types of welfare states

Country	Gini increase	EFW- increase	ratio ΔEFW/Gini	KOF- increase	ratio ΔKOF/Gini
Sweden	6.5	1.8	0.28	24.0	3.69
Denmark	3.0	1.7	0.57	25.8	8.61
Finland	5.1	1.3	0.25	29.8	5.85
Norway	4.5	1.4	0.31	16.6	3.69
<i>Avg. Scand</i>	<i>4.8</i>	<i>1.6</i>	<i>0.35</i>	<i>24.1</i>	<i>5.46</i>
Belgium	7.5	0.7	0.09	16.3	2.18
Netherlands	2.7	1.2	0.44	13.0	4.81
Italy	3.3	1.9	0.58	28.7	8.70
France	0.9	1.3	1.44	25.3	28.12
<i>Avg. Cont</i>	<i>3.6</i>	<i>1.3</i>	<i>0.6</i>	<i>20.8</i>	<i>10.95</i>
Australia	2.6	1.6	0.62	27.1	10.43
Canada	0.9	1.1	1.22	10.3	11.39
United Kingdom	4.5	2.1	0.47	22.0	4.90
United States	7.5	1.2	0.16	18.9	2.52
<i>Avg. Anglo.</i>	<i>3.9</i>	<i>1.5</i>	<i>0.6</i>	<i>19.6</i>	<i>7.31</i>

Conclusions

The research regarding economic freedom and inequality was initially slightly confusing with some conflicting results. Our findings, together with those of Carter (2006), change this picture: There seems to be a link between certain types of economic liberalizations and increased inequality. To describe the size of the effect, note that the average increase in EFW4 and EFW5 (trade and regulations) is about one index unit in our sample. According to our estimates, this will *ceteris paribus* increase the Gini coefficient by 1-2 units for EFW4 and 2-3 units for EFW5. For a country like Sweden, who increased EFW4 and EFW5 by 1.4 and 1.6 units respectively, this would imply a Gini increase in the interval 4.6 to 6.4 units, which is a substantial part of the actual increase at 7 units during the studied period. The estimates based on the KOF-index suggest very similar conclusions regarding the size of the effect of economic globalization on inequality.

Of course, the empirical evidence presented here does not settle the issue of causality. Theoretically, however, the link from liberalizations to inequality is more plausible than the opposite, and it also fits well with our analysis of different types of economic freedom and globalization: Increases in inequality are linked to trade liberalizations and deregulations of product and labor markets, as quantified by the EFW-index, and to economic globalization as quantified by the KOF-index.

Several remarks should be added to these conclusions though. First of all, there are three dimensions of the economic freedom index that are unrelated to inequality: Government size (EFW1), legal structure and property rights (EFW2) and access to sound money (EFW3). This is interesting in relation to a result found by Berggren and Jordahl (2005) who show that the most robust component of the EFW-index in explaining economic growth is EFW2, i.e. legal structure and security of property rights. This suggests that well functioning legal institutions and secure property rights may be a way to promote growth without negative distributive consequences.

Secondly, some may say that economic globalization increases inequality but that political globalization is a factor with the opposite effect. We find no support for this

idea though; the political dimension of the KOF-globalization index seems unrelated to inequality, and the same goes for social globalization.

Finally, it should be noted that adding several control variables and regional dummy variables often decreases the significance of the index coefficients. This suggests that country specific circumstances are of high importance. This is also illustrated by our finding that countries in traditional welfare state are categories not particularly similar, and the universal welfare states in Scandinavia have experienced large increases in inequality over the studied time period. Thus, big welfare states, economic freedom and globalization are in fact compatible – but most likely at the price of increased income inequality.

Appendix:

The Areas and Components of the Economic Freedom of the World Index

Source: Gwartney and Lawson (2003)

1: Size of Government: Expenditures, Taxes, and Enterprises

- A. General government consumption spending as a percentage of total consumption.
- B. Transfers and subsidies as a percentage of GDP.
- C. Government enterprises and investment as a percentage of GDP.
- D. Top marginal tax rate (and income threshold to which it applies).
 - i. Top marginal income tax rate (and income threshold at which it applies)
 - ii. Top marginal income and payroll tax rate (and income threshold at which it applies)

2: Legal Structure and Security of Property Rights

- A. Judicial independence: the judiciary is independent and not subject to interference by the government or parties in disputes.
- B. Impartial courts: A trusted legal framework exists for private businesses to challenge the legality of government actions or regulation.
- C. Protection of intellectual property.
- D. Military interference in rule of law and the political process.
- E. Integrity of the legal system.

3: Access to Sound Money

- A. Average annual growth of the money supply in the last five years minus average annual growth of real GDP in the last ten years
- B. Standard inflation variability in the last five years.
- C. Recent inflation rate.
- D. Freedom to own foreign currency bank accounts domestically and abroad.

4: Freedom to Trade Internationally

- A. Taxes on international trade.
 - i. Revenue from taxes on international trade as a percentage of exports plus imports.
 - ii. Mean tariff rate.
 - iii. Standard deviation of tariff rates.
- B. Regulatory trade barriers.
 - i. Hidden import barriers: No barriers other than published tariffs and quotas.
 - ii. Costs of importing: the combined effect of import tariffs, licence fees, bank fees, and the time required for administrative red-tape raises costs of importing equipment by (10 = 10% or less; 0 = more than 50%).
- C. Actual size of trade sector compared to expected size.
- D. Difference between official exchange rate and black market rate.
- E. International capital market controls
 - i. Access of citizens to foreign capital markets and foreign access to domestic capital markets.
 - ii. Restrictions on the freedom of citizens to engage in capital market exchange with foreigners—index of capital controls among 13 IMF categories.

5: Regulation of Credit, Labor, and Business

A. Credit Market Regulations

- i. Ownership of banks: percentage of deposits held in privately owned banks.
- ii. Competition: domestic banks face competition from foreign banks.
- iii. Extension of credit: percentage of credit extended to private sector.
- iv. Avoidance of interest rate controls and regulations that lead to negative real interest rates.
- v. Interest rate controls: interest rate controls on bank deposits and/or loans are freely determined by the market.

B. Labor Market Regulations

- i. Impact of minimum wage: the minimum wage, set by law, has little impact on wages because it is too low or not obeyed.

- ii. Hiring and firing practices: hiring and firing practices of companies are determined by private contract.
 - iii. Share of labor force whose wages are set by centralized collective bargaining.
 - iv. Unemployment Benefits: the unemployment benefits system preserves the incentive to work.
 - v. Use of conscripts to obtain military personnel
- C. Business Regulations
 - i. Price controls: extent to which businesses are free to set their own prices.
 - ii. Administrative conditions and new businesses: administrative procedures are an important obstacle to starting a new business.
 - iii. Time with government bureaucracy: senior management spends a substantial amount of time dealing with government bureaucracy.
 - iv. Starting a new business: starting a new business is generally easy.
 - v. Irregular payments: irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare.

The KOF Index of Globalization

Source: Dreher (2006)

A.Economic Globalization

- i) Actual Flows
 - Trade (percent of GDP)
 - Foreign Direct Investment, flows (percent of GDP)
 - Foreign Direct Investment, stocks (percent of GDP)
 - Portfolio Investment (percent of GDP)
 - Income Payments to Foreign Nationals (percent of GDP)
- ii) Restrictions
 - Hidden Import Barriers
 - Mean Tariff Rate
 - Taxes on International Trade (percent of current revenue)
 - Capital Account Restrictions

B.Social Globalization

- i) Data on Personal Contact
 - Outgoing Telephone Traffic
 - Transfers (percent of GDP)
 - International Tourism
 - Foreign Population (percent of total population)
 - International letters (per capita)
- ii) Data on Information Flows
 - Internet Hosts (per 1000 people)
 - Internet Users (per 1000 people)
 - Cable Television (per 1000 people)
 - Trade in Newspapers (percent of GDP)
 - Radios (per 1000 people)
- iii) Data on Cultural Proximity
 - Number of McDonald's Restaurants (per capita)
 - Number of Ikea (per capita)
 - Trade in books (percent of GDP)

C.Political Globalization

- Embassies in Country
- Membership in International Organizations
- Participation in U.N. Security Council Missions

Table 4 Income inequality data

Country	ca. 1980			ca. 2000		
	Gini	Type		Gini	Type	
Algeria	39.90	1988	a, c	35.40	1995	a, c
Australia	36.40	1986	c	39.00	1998	c
Bangladesh	25.90	1983	a	31.70	2000	a
Belgium	24.70	1985		32.20	2000	
Botswana	55.60	1986		53.70	1994	
Brazil	57.40	1981	b	61.20	2001	b
Cameroon	49.00	1983	a	44.20	2001	a
Canada	31.50	1987		32.40	2000	
Chile	54.00	1987		56.90	2000	
China	22.37	1985	c	39.03	2000	c
Costa Rica	47.90	1989	b	50.10	2000	b
Cote d'Ivoire	50.60	1985	a	44.40	1998	a
Denmark	31.60	1976	c	34.60	2002	c
Dominican Rep.	50.20	1989		47.78	1998	
Egypt	37.40	1975	a	37.80	2000	a
Finland	20.50	1981		25.60	2003	
France	31.40	1981		32.30	1994	
Ghana	42.90	1987	a	40.70	1999	a
Guatemala	56.00	1987		59.80	2000	
Hong Kong	39.40	1980	b, c	51.40	1996	b, c
Hungary	20.90	1982		26.70	2002	
India	31.40	1983	a	36.00	1999	a
Indonesia	35.70	1984	a	30.80	1999	a
Ireland	36.00	1987		34.10	2000	
Israel	34.70	1986		38.90	2001	
Italy	32.50	1986		35.80	2000	
Jamaica	43.00	1988	a	38.60	2000	a
Japan	29.25	1986	c	31.88	1998	c
Luxembourg	26.40	1985	c	30.30	2000	c
Madagascar	46.70	1980	a	47.40	2001	a
Malaysia	51.50	1984	b	49.93	1997	b
Mexico	46.90	1984		51.10	2002	
Morocco	39.70	1985	a	39.50	1995	a
Netherlands	29.80	1981	c	32.50	2000	c
New Zealand	28.30	1982		34.10	1996	
Nigeria	38.70	1985	a	50.20	1997	a
Norway	32.50	1982	c	37.00	2002	c
Pakistan	33.20	1987	a	31.00	1996	a
Panama	57.10	1989		57.80	2000	
Philippines	41.00	1985	a	46.10	1997	a
Poland	25.60	1987		35.30	2002	
Portugal	34.10	1980		34.70	2000	
Romania	23.70	1989	c	31.00	2000	c
Singapore	43.00	1980	b	47.00	1998	b
Spain	34.40	1980		34.40	1980	
Sri Lanka	35.80	1986	a	27.60	2000	a
Sweden	20.70	1981		27.20	2000	
Taiwan	30.10	1981		31.20	2000	
Thailand	42.60	1981	a	44.60	1999	a
Tunisia	43.30	1985	a, c	40.60	2000	a, c
Turkey	43.30	1987	a	39.80	2000	a
United Kingdom	28.90	1979		37.00	1999	
United States	35.90	1974		40.10	2000	
Zambia	55.60	1976	b	66.60	1998	b

Source: Wiid2b (2007)

The column termed Type includes information on the year from which the value was taken and additional characteristics of data

a - Gini coefficient determined by expenditure data (default is income data)

b - Gross of taxes (default is net of taxes - disposable income)

c - Unit of analysis is household (default is person)

All Gini coefficients are determined from national surveys.

Table 5 Summary statistics and description of variables

Variable	Description	Min	Max	Mean	sd	Source
GINI_80_00	change in Gini coefficient	-8.20	16.659	2.177	4.850	WIID2b
GINI_80	initial value of Gini coefficient	20.50	57.40	38.22	10.16	WIID2b
EFW_80_00	change in composite economic freedom of the world index	0.10	3.60	1.58	0.76	Gwartney& Lawson, 2003
EFW1_80_00	change in index on size of government	-2.30	5.30	1.38	1.42	Gwartney& Lawson, 2003
EFW2_80_00	change in index on legal structure and property rights	-2.10	4.50	0.94	1.45	Gwartney& Lawson, 2003
EFW3_80_00	change in index on access to sound money	-1.00	7.00	1.91	1.80	Gwartney& Lawson, 2003
EFW4_80_00	change in index on freedom to exchange with foreigners	-1.10	5.50	1.33	1.28	Gwartney& Lawson, 2003
EFW5_80_00	change in index on regulations of credit, labor and business	-1.40	3.20	0.89	0.88	Gwartney& Lawson, 2003
EFW_80	initial value of composite economic freedom of the world index	2.30	8.50	5.29	1.25	Gwartney& Lawson, 2003
EFW1_80	initial value of index on size of government	1.90	9.70	4.57	1.58	Gwartney& Lawson, 2003
EFW2_80	initial value of index on legal structure and property rights	2.20	8.30	5.71	1.92	Gwartney& Lawson, 2003
EFW3_80	initial value of index on access to sound money	0.50	9.50	6.24	2.09	Gwartney& Lawson, 2003
EFW4_80	initial value of index on freedom to exchange with foreigners	1.70	9.60	6.07	1.83	Gwartney& Lawson, 2003
EFW5_80	initial value of index on regulations of credit, labor and business	3.00	7.20	5.47	0.97	Gwartney& Lawson, 2003
KOF_80_00	change in composite KOF index of globalization	3.38	34.16	18.69	7.75	Dreher, 2006
KOF1_80_00	change in index of economic globalization	-1.49	45.76	19.85	10.71	Dreher, 2006
KOF2_80_00	change in index of social globalization	0.86	45.01	22.78	11.11	Dreher, 2006
KOF3_80_00	change in index of political globalization	-24.19	41.34	11.06	14.39	Dreher, 2006
KOF_80	initial value of composite KOF index of globalization	14.12	79.00	44.20	17.04	Dreher, 2006
KOF1_80	initial value of index of economic globalization	8.88	92.79	46.87	20.92	Dreher, 2006
KOF2_80	initial value of index of social globalization	5.85	77.38	33.49	18.72	Dreher, 2006
KOF3_80	initial value of index of political globalization	15.87	90.98	56.26	21.35	Dreher, 2006
lnGDPC_80	natural log of real GDP per capita in 1980	5.15	10.08	7.99	1.55	World Bank, 2005
URBAN_80	urban population (% of total)	14.88	100.00	54.41	24.97	World Bank, 2005
LAMER	regional dummy variable, =1 if country is in Latin America, =0 otherwise	0	1	0.13	0.34	World Bank, 2005
EASIA	regional dummy variable, =1 if country in east Asia, =0 otherwise	0	1	0.17	0.38	World Bank, 2005
SSA	regional dummy variable, =1 if country is in sub-Saharan Africa, =0 otherwise	0	1	0.15	0.36	World Bank, 2005
HUM_80	adult illiteracy (%)	2.50	70.00	21.34	21.08	World Bank, 1985, 1991
AYS_80	average years of schooling in the total population over 15 years in 1980	1.90	11.87	5.93	2.72	Barro and Lee, 2000

Values are for full sample (54 observations)

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