

Income inequality and economic freedom in the U.S. states

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Abstract This paper examines the impact of economic freedom on income inequality using cross-sectional data for U.S. states. While previous research has explored this relationship internationally, the results have been conflicting. In addition, while it seems obvious that the large institutional differences across countries will impact income inequality, it isn't so obvious that the smaller variation in policies among U.S. states can have a measurable impact. Can improvements in income inequality be used as a justification for marginal pro-market policy reforms at the state level, or is this argument applicable only to national-level institutional reforms?

Keywords Inequality · Economic freedom · Institutions

JEL Classification H11

1 Introduction

Decades ago, economic research generally considered capitalism and socialism as alternative and discrete forms of economic organization. In reality economies tend to lie somewhere on a continuum between these two extremes. What differs on this continuum is the degree to which governments tend to use command and control policies to intervene into the private sector. Some socialist economies like North Korea are closer to pure socialism, while others like China have considerably more market aspects. Others which used to be more like North Korea have even moved to the other side of the continuum, like the former Soviet Republics of Estonia, Latvia, and Slovenia that have adopted radical pro-market reforms. On the other hand, most market-based economies have a much larger degree of government control and intervention than is envisioned under pure *laissez-faire* capitalism.

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Approximately a decade ago, a significant advance in our understanding of this continuum was the publication of the *Economic Freedom of the World* index (2005) by James Gwartney and Robert Lawson¹ (first published in 1996, now updated annually). In this publication, Gwartney and Lawson derive a single index number for each country that places them on a continuum from zero to ten, where ten represents the highest degree of reliance on laissez-faire capitalism. In effect the index condenses the degree of ‘economic freedom’ individuals have in a geographic area in five key categories: the size of government, property rights and legal system, sound money, trade freedom, and freedom from excessive regulation.

Studies using these indices, such as Farr et al. (1998), Gwartney et al. (1999), Cole (2003), and Powell (2003), have consistently shown that countries with higher economic freedom scores not only have larger per capita incomes, but also tend to have higher rates of economic growth. Other studies have examined how this index correlates with everything from human self-perceived well-being to health indicators, human migration, the productivity of investment, the level of entrepreneurship, and the degree of income inequality (Esposto and Zaleski 1999; Norton 1998; Melkumian 2004; Ayal and Karras 1998; Dawson 1998; Ovaska and Sobel 2005; Berggren 1999; Grubel 1998; Scully 2002).

More recently, Amela Karabegovic and Fred McMahon (2005) released their *Economic Freedom of North America* ranking U.S. states with respect to each other in terms of their degree of free-market orientation.² The differences among states occurs because state and local policies also impact the degree of ‘economic freedom’ individuals enjoy. The variance across states, however, is obviously much less than the difference among countries. The international index differs among countries in more categories, such as monetary stability, tariff policy, and conscription. These categories simply are not relevant when making comparisons among sub-regions within a single country. The degree of economic freedom in each state is, however, impacted by the federal government’s level of involvement in that state (e.g., in government employment measures in each state).

The empirical literature using the North American freedom index has mirrored the previous literature using the international freedom index. Explanations for observed variations in the rates of economic growth, entrepreneurship, and migration, for example, have for the most part carried over to cross-state analysis with equally significant results (Karabegovic et al. 2003; Kreft and Sobel 2005; Ashby 2007).³ In this paper we conduct the first analysis of how differences in economic freedom among U.S. states impacts income inequality.

There are two main reasons why our analysis of income inequality using U.S. state-level data is worthwhile. First, the two main studies on this subject using the international freedom index, both of which appeared in *Public Choice*, have found strikingly opposite results, and our analysis helps to clarify the mixed results. Berggren (1999), for example, finds that higher levels of economic freedom are associated with greater income inequality, while Scully (2002) finds that higher levels of economic freedom are associated with lesser income inequality (although changes in freedom are found to work in the opposite direction).⁴

¹The first publication of the index was also coauthored by Walter Block.

²The index also includes rankings for Canadian provinces.

³With regard to migration, the outcomes are not fully comparable. Internationally, Melkumian (2004) finds that higher economic freedom in the source country increases migration flows to the United States, but does not analyze whether individuals move to locations with higher economic freedom. At the state level, Ashby (2007) demonstrates that individuals do migrate into states with relatively higher levels of economic freedom.

⁴Adding to the complexity, Berggren (1999) also includes a measure of the change in economic freedom, and finds it to be associated with lower income inequality.

Second, while it seems obvious that the huge differences in institutions across countries will impact income inequality, it isn't so clear that the smaller variation in policies among U.S. states can have a measurable impact.

We begin our paper with a brief review of the previous research examining income inequality at the international level using the Economic Freedom of the World Index (EFW). We then perform similar regressions using the Economic Freedom of North America Index (EFNA), and discuss how the results compare. Additionally, we perform an analysis of how economic freedom not only impacts relative measures of income inequality, but also the absolute mean income levels within the lowest, middle, and highest income quintiles. We end with concluding remarks.

2 Literature review

Despite myriad studies that analyze international economic freedom and its relationship to income levels and economic growth, only a few studies analyze the impact on income inequality.⁵ Berggren (2003) provides a recent overview of the benefits of economic freedom and discusses the cross-national studies of the impact of economic freedom on inequality.

In the first study on this issue, Berggren (1999) finds that countries with a positive change in economic freedom between 1975 and 1985 experienced a reduction in income inequality as a result. Specifically, the share of income held by the lowest quintile rose while the share held by the highest quintile fell. In addition, Berggren (1999) finds a somewhat counterintuitive result—that while *changes* (increases) in economic freedom were associated with less income inequality, the *levels* of economic freedom in 1985 (at the end of the sample period) were associated with more income inequality. Berggren (2003) offers an explanation for his result that changes in economic freedom lessen inequality, while higher levels of economic freedom increase inequality based on an argument regarding the extent of redistributive government policies.

Scully (2002), however, finds that higher levels of economic freedom result in less inequality, opposite of the finding of Berggren (for the level of freedom). Scully finds that the share of income held by the lowest two quintiles is positively impacted whereas the share held by the highest two quintiles is lowered.⁶ Scully argues that his results differ from Berggren's because Berggren fails to adjust for differences in the unit or basis of the sample upon which the inequality is measured.⁷

Thus, we have two major papers examining how greater reliance on free-market institutions impacts the income distribution, and they find conflicting results. Why the difference?

⁵Results are mixed for studies which analyze the impact of economic growth on inequality. Most recently, Forbes (2000) and Scully (2002) find that higher economic growth of market income increases inequality. Others find the relationship between the two to be negative (Alesina and Perotti 1994; Alesina and Rodrik 1994; Persson and Tabellini 1994; Birdsall et al. 1995; and Clark 1995).

⁶Grubel (1998) turns the equation around, asking whether levels of income inequality in a country can explain a country's level of economic freedom and economic growth. He concludes that higher inequality is associated with higher economic freedom. And while Grubel reverses the causal direction, his results would seem to be more consistent with Berggren's results. However, Grubel's study includes only countries with income levels above \$17,000, significantly reducing the sample to only 17 countries. Thus it is unclear to what extent Grubel's results can be generalized to the rest of the world.

⁷Scully (2002) explains that different countries calculate income distribution measures differently, and he adjusts for this by including dummy variables to account for which technique the country uses to construct its index, while Berggren (1999) does not.

One possibility is simply that the economic freedom index used in these studies suffers from measurement error and does not necessarily measure the presence of free-market institutions. While the index has been used in dozens of published articles, it is not without critics. Heckelman (2005) provides the best summary and overview of the debate surrounding the validity of the several different indices of economic freedom used in the literature. Each of these indices, for example, uses a list of proxy variables to construct the index. Thus, it is possible that these proxies cannot, or do not, fully measure the institutional environment, or that some of the individual components might suffer from problems of endogeneity or reverse causality. Because of this, Heckelman and Stroup (2000) argue that any summary index may result in a misspecification bias, and suggest also performing the analysis using the actual individual components (a suggestion we follow in this paper).

Arguments have also been made that because these indices are published mostly by libertarian-leaning organizations, that they are likely to suffer from an ideological bias. However, the counterargument has been that this effect, if it exists at all, actually helps to ensure that the indices do measure the presence of exactly what is trying to be measured in the first place. Finally, there have been some cases where the economic freedom index variable had not performed as expected in published regressions, and the conflicting results in the two previous papers that we attempt to update might simply be additional examples that add fuel to this debate.

While some controversy exists regarding the use of these indices of economic freedom, and this potentially could account for the differing results found in the previous papers, we put this issue aside for the moment. Future work, however, might productively explore a different way of formulating the problem to get at this issue. For now, we assume that the index approach and current data are valid, and note that regardless of any potential problems with the index itself, there is clearly a controversy between these two previously published papers in *Public Choice* that examine how the economic freedom index correlates with the levels and changes in the income distribution within geographic areas.

3 Data and methodology

We now turn to our analysis of how state-level economic freedom impacts state-level income inequality within the United States. Our analysis is made possible by the release of new income inequality study by Bernstein et al. (2006) of the Economic Policy Institute. Their study provides data on the absolute levels of income by quintile for three time periods: 1980–82, 1990–92, and 2001–03 (each of the three observations is an average over the three-year window listed). Bernstein et al.'s data is derived from the Bureau of the Census' March *Current Population Survey* (CPS). By the government's definition, family income includes not only wages and salaries, but also other sources of cash income, such as interest income and cash benefits, including veterans' assistance, welfare payments, and child support. Other Census Bureau data on tax liabilities and credits, realized capital gains and losses, and the market value of near-cash benefits are then used to construct a measure of post-tax and transfer income on which Bernstein et al.'s study is based.⁸

There are both advantages and disadvantages to the fact that the underlying data already include the value of transfer benefits. The economic freedom index includes the size of transfers in the index, thus we know that states with larger transfer benefits receive lower freedom

⁸They exclude only the value of public health care benefits (e.g. Medicare and Medicaid) because of the lack of a generally accepted method for imputing the values.

scores. As a state becomes more economically free, lower income individuals might have larger non-transfer income from their private economic opportunities, but if their transfer benefits decline by enough, their total income could fall rather than increase. Thus, one could argue that if we used data that *excluded* transfers it would be meaningless. While private incomes might increase with economic freedom, lower income individuals might still be worse off because the corresponding reductions in transfers more than offset the gains in private income. Thus, to better measure the impact of freedom on the overall well-being of those with lower incomes it is important to include not only the gains from private opportunities that result from more freedom, but also to adjust for the fact that government transfer benefits decline.

The disadvantage of this data is that we are unable to obtain the components of income individually, so cannot perform the analysis necessary to isolate these impacts separately. However, because we know how transfers correlate with freedom, we can surmise how our estimates would change had the data not included the value of transfers. Data excluding these transfers would likely have a slope coefficient that was larger (more positive). In other words, the inclusion of the transfer income results in it being less likely that we will find a positive impact of economic freedom on lower incomes because it already includes the losses in transfer benefits individuals face with smaller government transfer sectors.

As was discussed in the introduction, we use the *Economic Freedom of North America* index from Karabegovic and McMahon (2005). Because the income data are a three-year average, a similar computation is done with the freedom index.⁹ This index is made up of three major components: size of government spending and redistribution, takings and discriminatory taxation, and labor market regulation. While we generally use the overall index in our analysis, we will also explore the component area scores individually.

For control variables we adopt similar measures as the previous studies, and include in our regressions the percentage of individuals with a high school education, the percentage living in a metropolitan area, and median income. Finally, we include dummy variables for geographic regions within the United States (South, Northeast, West, and individual state dummies for Alaska, and Hawaii). Our analysis examines how economic freedom impacts income and inequality, holding these other factors constant. All variables, their sources, and descriptive statistics are provided in the Appendix.

The specific measures of income and income inequality we use as dependent variables are: the absolute mean income levels within the lowest, middle, and highest quintiles; the cumulative 20-year percentage income growth for each of these quintiles; the shares of income held by the lowest and highest quintiles; and the ratio of the highest to lowest quintile's income shares. All data are in constant 2002 dollars.

A quick examination of the raw data suggests some interesting correlations. The most visually interesting relationships visible in the raw data are in the scatter plots of quintile income growth rates when compared with *changes* in economic freedom scores. Figure 1 shows this for all three of the income groups we consider here. There is a fairly strong positive relationship in all three plots, even before controlling for other variables. On the other hand, similar plots (not shown) using the levels of economic freedom don't reveal obvious patterns. Thus, it appears that of the results from previous literature, Berggren's result (that changes in freedom are positively related to income growth) might be the most likely to be confirmed. We now turn to regression methodology to uncover these relationships more precisely, after controlling for the other factors.

⁹With the exception of the 1980–82 measure, for which we use 1981 and 1982 because 1981 is the first year for which the economic freedom score is available.

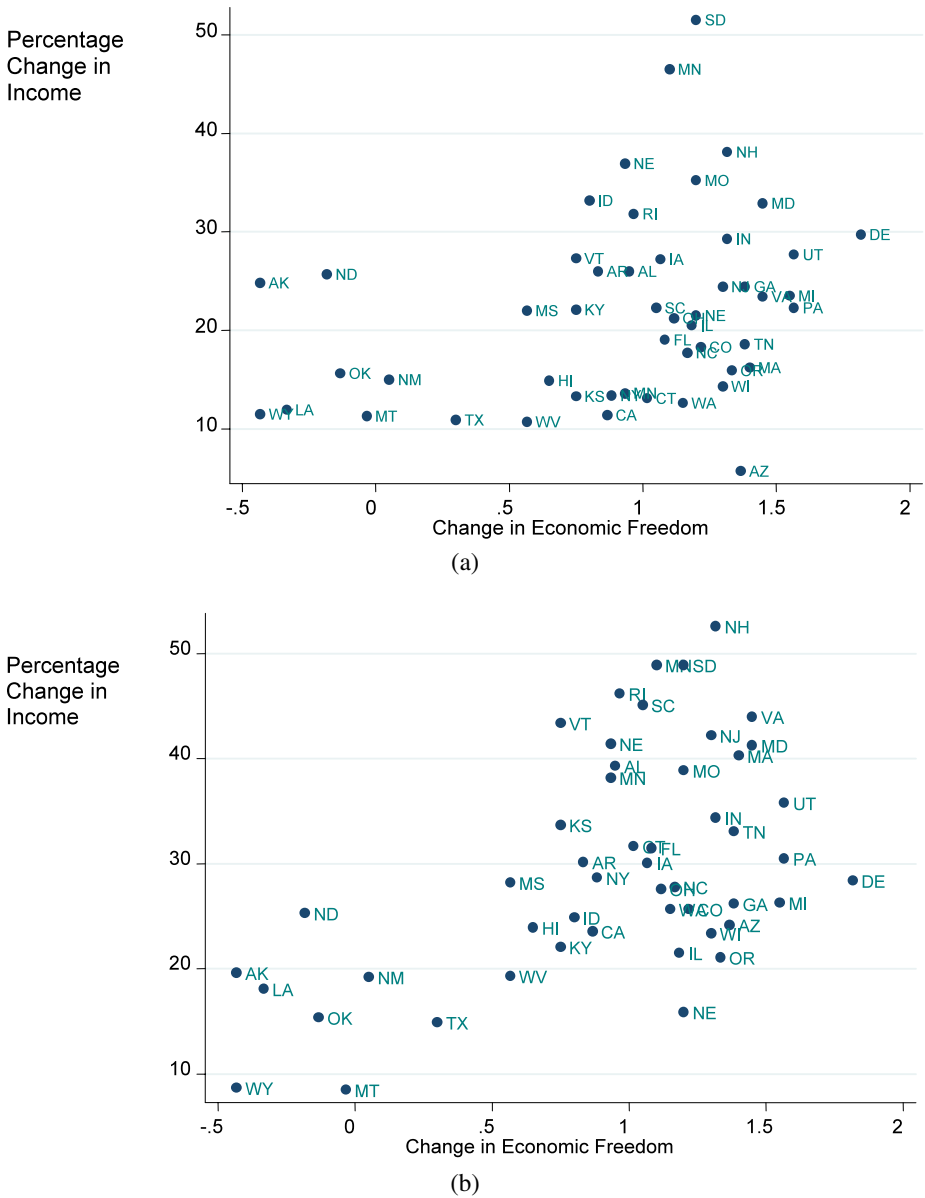


Fig. 1 The change in economic freedom and income growth in the lowest, middle, and highest income quintiles (1980–2003) Panel (a): Lowest quintile. Panel (b): Middle quintile. Panel (c): Highest quintile

Prior to running our regressions, various diagnostic tests were performed. First, the Hadi method (1992) was used to test for the presence of outliers. It was determined that there are no significant outliers in our sample. Second, the correlations between our variables were examined for potential problems with multicollinearity. All were below 0.60 in absolute value, and most were substantially lower than this level. In addition, the variance inflation factor (VIF) was calculated for the explanatory variables and all were well below the critical

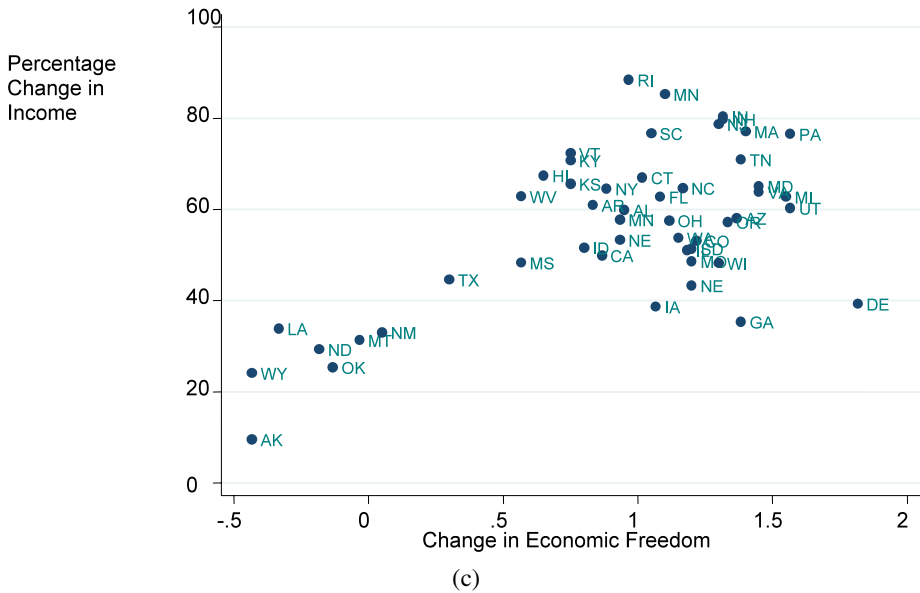


Fig. 1 (Continued)

value of 10 (the highest is approximately 6). Finally, robust standard errors were used to deal with possible heteroskedasticity issues.

4 Regression results

While it is typical in studies of income inequality to examine the percentages or shares of income held by different groups, a frequent criticism is that all individuals would prefer a society where the poorest had an income level of \$3,000 and the richest have \$10,000 over a society where everyone had \$1,000. In fact, without knowledge of the changes in the underlying absolute income levels it is hard to interpret the implications of changing income shares. Thus, while we will examine income shares, it is worthwhile to also examine the changes in both the absolute income levels and growth rates of income. However, both absolute and relative incomes are interesting to examine. For instance, Bartels (2005) finds that income inequality results in political inequality, resulting in a magnification of relative differences in living standards.

Table 1 displays the results for our regressions which analyze the impact of economic freedom on individuals belonging to the lowest income quintile using three separate dependent variables: the cumulative percentage change in the mean income within the lowest quintile between 1980 and 2003; the average quintile income level at the end of the period (2001–03); and the share of total income held by the lowest quintile. For each dependent variable we run three specifications: one using only the level of economic freedom; one using only the change in economic freedom; and one including both variables.¹⁰

¹⁰For a discussion of the current debate as to whether it is better to use levels or changes in economic freedom in empirical studies see Cole and Lawson (2007) and De Haan and Sturm (2007). Scully (2002) uses

Table 1 The impact of economic freedom (level and changes) on the lowest income quintile

Independent variables	Dependent variable								
	Cumulative percentage change in income for the lowest quintile (1980 to 2003)	Absolute income level of lowest quintile (2001–03)	Absolute income level of lowest quintile (2001–03)	Lowest quintile share of total income (2001–03)					
Constant	15.853 (0.70)	20.305 (0.93)	18.6149 0.7	-4275.7 (1.18)	-3445.1 (1.08)	-3747.2 (0.86)	0.046*** (4.86)	0.051*** (5.92)	0.047*** (4.29)
Change in economic freedom 1981–82 to 2001–03	9.882*** (3.57)	9.206*** (4.55)	-	1891.23*** (5.06)	1765.12*** (7.08)	-	0.00326 (3.13)	0.003*** (2.95)	-
Economic freedom level 1981–82 (avg.)	1.391 (0.42)	-	-2.82 (0.94)	259.484 (0.60)	-	-546.27 (1.23)	0.001 (1.58)	-	0.000 (0.06)
Percentage with high school degree in 1980	0.248 (0.67)	0.276 (0.78)	0.602 (1.43)	134.393*** (2.49)	139.732** (2.62)	202.137*** (2.92)	0.0002 (1.21)	0.0002 (1.43)	0.0003* (1.85)
Percentage living in metropolitan area in 1980	-0.144** (2.31)	-0.141** (2.29)	-0.046 (0.64)	-26.697** (2.68)	-26.2** (2.69)	-7.893 (0.63)	-0.0002*** (5.81)	-0.0002*** (5.63)	-0.0001*** (4.95)
Median income in 1980	-0.0004 (0.70)	-0.0003 (0.70)	-0.0003 (0.61)	0.329*** (4.74)	0.34*** (5.47)	0.334*** (4.05)	0.000 (0.87)	0.000 (1.14)	0.000 (0.92)
South	-5.844 (1.19)	-5.411 (1.23)	-2.28 (0.45)	-695.59 (1.02)	-614.96 (0.96)	-13.576 (0.02)	-0.005*** (3.13)	-0.005*** (2.73)	-0.004*** (2.06)
Northeast	-4.833 (1.01)	-5.448 (1.21)	-5.685 (1.11)	-130.1 (0.18)	-244.96 (0.36)	-293.2 (0.36)	-0.004** (2.52)	-0.004*** (3.05)	-0.004*** (2.52)
West	-11.736** (2.22)	-12.077** (2.42)	-15.377*** (2.76)	-2262.1*** (3.83)	-2325.7*** (4.07)	-2958.6*** (4.20)	-0.003 (1.65)	-0.004** (1.91)	-0.004*** (2.30)
Alaska	6.384 (0.79)	5.7682 (0.80)	-7.159 (1.03)	-823.55 (0.83)	-938.44 (1.04)	-3415.2*** (3.60)	-0.003 (1.06)	-0.003 (1.30)	-0.007*** (2.84)
Hawaii	-5.489 (0.76)	-6.965 (1.42)	-14.189** (2.58)	-1320.2 (1.48)	-1595.6** (2.61)	-2985.2*** (4.51)	-0.00448** (2.41)	-0.006*** (3.97)	-0.007*** (4.28)
R-squared	0.433	0.429	0.274	0.826	0.828	0.744	0.706	0.694	0.651

Notes: Absolute *t*-ratios in parenthesis. Statistical significance as follows: * = 1%, ** = 5%, *** = 10%. All regressions employ robust standard errors

The change in economic freedom is positive and significant in all specifications in which it is included. Positive changes in economic freedom increase the level of income, the rate of growth of income and income share for the lowest income quintile. The level of economic freedom, however, is significant in only one regression. It is positive and significant in explaining the share of income held by the lowest income quintile, but only when the change in freedom is also included in the regression. Overall, our results in Table 1 confirm Berggren's result that changes matter, but not his result that the levels are negative and significant.¹¹

We now turn our attention to similar regressions for the middle income quintile. Table 2 shows the regression results for the middle quintile's average income cumulative percentage growth over the period, the middle quintile's absolute average income level, and the share of income held by the middle quintile. The change in economic freedom is positive and significant in all but one of the specifications in which it is included. The level of economic freedom is negative and significant, but only when changes are excluded.

Turning our attention to the highest income quintile, Table 3 shows our regression results. Similar to our analysis of the lowest and middle quintiles, we analyze the impact in nine regressions. The impact of changes in economic freedom on income growth in the highest quintile is again positive and significant. However, the change in the economic freedom variable is insignificant in the regressions for both absolute income levels and the share of income held by the highest quintile. Interestingly, the level of economic freedom is statistically significant in one specification (income growth), and it is negative. This would imply that higher levels of freedom are associated with slightly lower cumulative growth rates of income, but this result only holds when the change in economic freedom is excluded from the regression, so the result is not robust.

For all three income quintiles we examine, the change in economic freedom is consistently associated with higher average incomes and higher income growth—for the lowest, middle, and highest income quintiles. Examining our coefficient estimates across all specifications suggests that policy reform increasing the economic freedom score by one unit, which is roughly the same as comparing the 10th ranked state with the 43rd ranked state, has a significant impact. These impacts are illustrated in Fig. 2.

As Fig. 2 shows, a one unit change in economic freedom increases the mean incomes in all three groups: in the lowest quintile by roughly \$1,900 (relative to the mean of \$17,521 represents an 10.8 percent increase); in the middle quintile by roughly \$3,100 (relative to the mean of \$47,030 represents a 6.5 percent increase); and in the highest quintile by roughly \$4,200 (relative to the mean of \$115,487 represents a 3.8 percent increase). This same one-unit change in economic freedom also increases the cumulative mean income growth over the 23-year period by roughly 10 percent for the lowest quintile (relative to the mean growth of 22 percent); by roughly 9 percent for the middle quintile (relative to the mean growth of 30 percent); and by roughly 12 percent for the highest quintile (relative to the mean growth

the log-odds ratio of economic freedom levels. We try this as well, but find results qualitatively identical to those presented here using the actual values of the index. We use the actual values because the coefficient interpretations are direct and more intuitive. In addition, like most studies using the freedom index to explain growth over subsequent periods, we use the initial value. Berggren uses the ending value, but because his model includes the change in freedom, and because the ending value is simply the initial value plus the change (a linear combination), in the specifications where we include both the change and the level, the results would be unchanged if we used the ending value.

¹¹ Another indication that economic freedom changes have more explanatory power than economic freedom levels can be seen by comparing the *R*-squares across the regressions. When changes are regressed without levels, the *R*-squared value is 0.433, larger than the 0.274 value when levels are regressed without changes.

Table 2 The impact of economic freedom (level and changes) on the middle income quintile

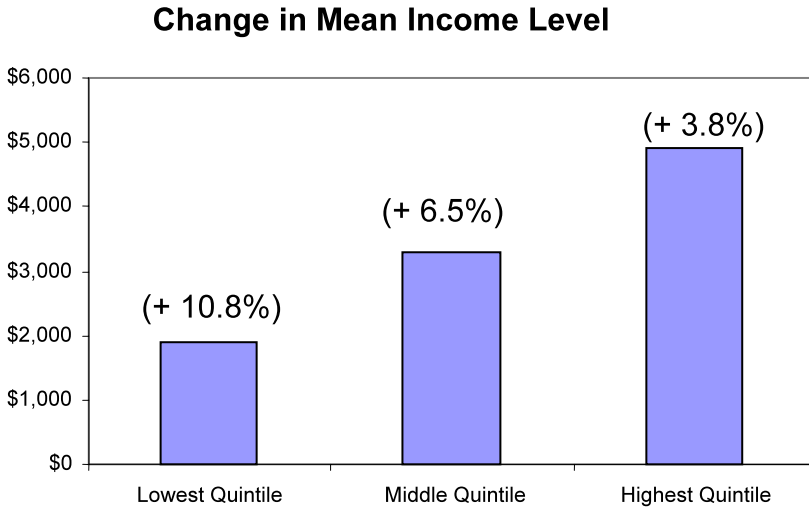
Independent variables	Dependent variable			
	Cumulative percentage change in income for the middle quintile (1980 to 2003)	Absolute income level of middle quintile (2001–03)	Middle quintile level of middle quintile (1980–03)	Middle quintile share of total income (1980–03)
Constant	21.333 (0.85)	-3584.9 (0.40)	-2724 (0.29)	0.1539*** (11.65)
Change in economic freedom 1981–82 to 2001–03	15.665 (0.66)	3080.33*** (3.19)	-	0.002* (1.75)
Economic freedom level 1981–82 (avg.)	23.923 (0.90)	-871.29 (0.79)	-2183.6** (2.02)	-0.001 (0.97)
Percentage with high school degree in 1980	0.74** (2.17)	276.913** (2.14)	387.25** (2.54)	0.0002 (1.05)
Percentage living in metropolitan area in 1980	-0.011 (0.17)	-1.449 (0.06)	29.178 (1.08)	-0.0002*** (4.01)
Median income in 1980	-0.001** (2.07)	0.964*** (5.21)	0.927*** (5.44)	0.000* (1.77)
South	0.412 (0.20)	690.114 (0.39)	1800.94 (0.96)	-0.005** (2.18)
Northeast	3.752 (0.89)	1429.43 (0.87)	1163.8 (0.68)	-0.004** (2.46)
West	-15.026*** (4.17)	-18.441*** (4.07)	-6672.8*** (4.41)	-0.007*** (3.08)
Alaska	0.092 (0.11)	-13.398** (0.70)	-5816.7*** (2.88)	-0.003 (0.68)
Hawaii	-2.917 (0.53)	-11.08** (0.93)	-4654.4*** (2.76)	0.015** (2.41)
R-squared	0.577	0.85	0.817	0.646

Notes: Absolute *t*-ratios in parenthesis. Statistical significance as follows: *** = 1%, ** = 5%, * = 10%. All regressions employ robust standard errors

Table 3 The impact of economic freedom (level and changes) on the highest income quintile

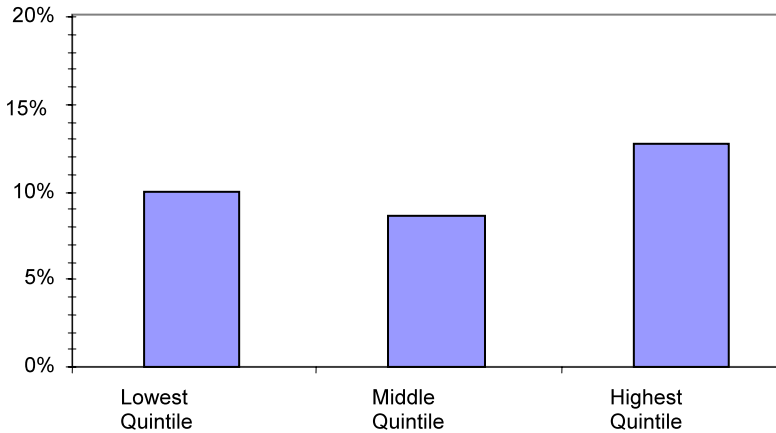
Independent variables	Dependent variable								
	Cumulative percentage change in income for the highest quintile (1980 to 2003)	Absolute income level of highest quintile (2001–03)	Absolute income level of highest quintile (1980–03)	Highest quintile share of total income (1980–03)					
Constant	91.989** (2.46)	74.576** (2.02)	95.22*** (2.93)	13855.3 (0.59)	5386.68** (2.57)	15133.5 (0.70)	0.464*** (13.11)	0.464*** (11.10)	0.464*** (11.10)
Change in economic freedom 1981–82 to 2001–03	11.565** (2.51)	14.208*** (3.81)	–	4573.69 (1.57)	342.96 (1.01)	–	–0.005 (1.18)	–0.005 (1.33)	–
Economic freedom level 1981–82 (avg.)	–5.439 (1.54)	–	–10.366*** (3.22)	–1672.8 (0.51)	–	–3621.4 (1.37)	0.000 (0.00)	–	0.002 (0.66)
Percentage with high school degree in 1980	0.105 (0.17)	–0.007 (0.01)	0.519 (0.88)	377.38 (1.09)	249.617*** (4.20)	541.214 (1.59)	–0.0004 (0.72)	–0.0005 (0.99)	–0.0006 (0.99)
Percentage living in metropolitan area in 1980	0.129 (1.31)	0.119 (1.23)	0.244 (2.61)	252.82 (4.14)	1.657 (3.37)	298.296 (4.60)	0.0006*** (5.18)	0.0006*** (5.27)	0.0005*** (5.09)
Median income in 1980	–0.0009 (1.49)	–0.001 (1.75)	–0.0009 (1.28)	1.729*** (3.27)	7465.23 (1.62)	1.742*** (3.32)	–0.000* (1.93)	–0.000* (1.98)	–0.000* (1.85)
South	1.462 (0.22)	–0.228 (0.03)	5.633 (0.76)	7985* (1.76)	9762.2** (2.66)	9634.44** (2.23)	0.013** (2.16)	0.013** (2.08)	0.011* (1.70)
Northeast	12.473* (1.91)	14.88** (2.43)	11.476 (1.67)	9021.78** (2.03)	–4107.8 (0.99)	8627.36* (1.94)	0.012** (2.62)	0.012*** (2.72)	0.012*** (2.75)
West	–5.853 (0.80)	–4.519 (0.63)	–10.112 (1.38)	–4518.1 (1.02)	–1416.6 (0.23)	–6202.7 (1.40)	0.015** (2.28)	0.015** (2.36)	0.017*** (2.80)
Alaska	–15.282 (1.46)	–12.874 (1.25)	–31.13*** (3.58)	–2157.3 (0.32)	3909.83 (0.96)	–8425 (1.49)	0.008 (0.70)	0.008 (0.71)	0.015 (1.63)
Hawaii	18.366** (2.49)	24.14*** (3.74)	8.185 (1.24)	2134.34 (0.34)	8500.39 (0.36)	–1892.2 (0.38)	0.015** (2.33)	0.015*** (2.79)	0.02*** (3.61)
R-squared	0.628	0.611	0.562	0.81	0.808	0.798	0.646	0.646	0.632

Notes: Absolute *t*-ratios in parenthesis. Statistical significance as follows: * = 1%, ** = 5%, *** = 10%. All regressions employ robust standard errors



(a)

Percentage Point Change in Cumulative Income Growth (1980-2003)



(b)

Fig. 2 The impact of a one-unit increase in economic freedom on income levels and growth for the lowest, middle, and highest income quintiles. Panel (a): Mean absolute income levels. Panel (b): Cumulative income growth 1980–2003 (%)

of 56 percent). Clearly, the impact of changes in economic freedom is both statistically and economically significant.

We have already seen that economic freedom changes are associated with a statistically significant increase in the income shares of the lowest and middle quintiles. If economic freedom changes reduce relative income inequality, the lowest quintile should have a positive coefficient (which it did), while the highest quintile should have a negative coefficient.

Table 4 Economic freedom and income inequality: the ratio of the share of income held by the highest quintile to the share of income held by the lowest income quintile

Independent variables	Dependent variable: Share of income held by the highest quintile divided by the share of income held by the lowest quintile (2001–03)		
Constant	8.84*** (5.72)	0.592*** (6.19)	8.72*** (4.94)
Change in economic freedom 1981–82 to 2001–03	−0.431** (2.47)	−0.3744** (2.61)	–
Economic freedom level 1981–82 (avg.)	−0.116 (0.85)	–	0.067 (0.52)
Percentage with high school degree in 1980	−0.025 (1.03)	−0.027 (1.13)	−0.04 (1.52)
Percentage living in metropolitan area in 1980	0.025*** (5.93)	0.025*** (5.97)	0.021*** (5.28)
Median income in 1980	−0.000 (1.40)	−0.000 (1.54)	−0.000 (1.36)
South	0.754*** (3.16)	0.718*** (2.82)	0.599** (2.06)
Northeast	0.568*** (2.81)	0.619*** (3.13)	0.604*** (2.82)
West	0.563** (2.05)	0.382** (2.24)	0.722*** (2.73)
Alaska	0.331 (0.78)	0.783 (0.91)	0.921** (2.33)
Hawaii	0.66** (2.55)	8.469*** (3.63)	1.039*** (4.51)
<i>R</i> -squared	0.704	0.70	0.66

Notes: Absolute *t*-ratios in parenthesis. Statistical significance as follows: *** = 1%, ** = 5%, * = 10%. All regressions employ robust standard errors

The coefficient for the middle quintile would be ambiguous, and we find it to be significant in only one of the two specifications, where it was small and positive. In Table 3 we see that the coefficient is negative for the highest quintile; however, it is statically insignificant.

We examine this share issue more directly in Table 4 where we present the results of regression analysis for the impact of economic freedom changes and levels on the ratio of the highest quintile's income share to the lowest quintile's income share. In both regressions in which it is included, the coefficient on the change in economic freedom is negative and significant, implying that economic freedom changes between 1980 and 2003 have reduced income inequality. Again, the level of economic freedom seems to explain little, as it is insignificant in both regressions in which it is included.

A summary of our findings so far would be that increases in overall economic freedom are associated with significantly higher levels of income, and higher income growth, for all, while also reducing relative inequality. This index, however, is comprised of several component areas. In the next section we examine these component areas in more detail.

Table 5 Economic freedom component areas (summarized coefficient results)

Dependent variable:		EFAI	EFAII	EFAIII	EFBI	EFBII	EFCI	EFCII	EFCIII
Cumulative percentage growth (1980 to 2003)	Lowest quintile	(+)***	(+)*	(+)***	(+)***		(+)***	(+)***	(-)**
	Middle quintile	(+)***	(+)*	(+)***	(+)**		(+)***	(+)***	(-)**
	Highest quintile	(+)**	(+)***	(+)***			(+)***		
Absolute mean income in quintile (2001–03 avg.)	Lowest quintile	(+)***	(+)**	(+)***	(+)***		(+)***	(+)***	(-)**
	Middle quintile	(+)***	(+)**	(+)***			(+)***	(+)***	(-)**
	Highest quintile	(+)***	(+)*	(+)***			(+)***		
Share of income held by quintile (2001–03)	Lowest quintile		(+)*	(+)**	(+)***		(+)**	(+)**	
	Highest quintile				(-)**			(-)**	
Highest quintile share / lowest quintile share (2001–03)		(-)*		(-)*	(-)***		(-)**	(-)**	
Significance share (% of regressions)		77.8%	77.8%	88.9%	66.7%	0%	88.9%	77.8%	44.4%

Notes: Shown are the sign (in parenthesis) of each component when statistically significant and ***, **, and * demonstrate significance at the 1, 5, and 10 percent level respectively. Significance share denotes the share of regressions in which each component showed up significant

Component areas of economic freedom of North America Index

Source: Karabegovic and McMahon (2005)

Area 1: Size of government

EFAI: Govt. consumption expenditures as a percentage of GSP

EFAII: Transfers and subsidies as a percentage of GSP

EFAIII: Employment insurance, workers compensation, and other pensions as a percentage of GSP

Area 2: Takings and discriminatory taxation

EFBI: Total Tax Burden as a Percentage of GSP: Includes income taxes, consumption taxes, property and sales taxes, contributions to Social Security plans, and other taxes

EFBII: Top marginal income tax rate and the income threshold at which it applies

Area 3: Labor market freedom

EFCI: Minimum wage legislation: Annual income earned by a minimum-wage worker divided by per-capita GSP

EFCII: Government employment as a percentage of total employment

EFCIII: Union density

5 Freedom components

The *Economic Freedom of North America* index is based on ten component area scores. Regression analyses, however, generally do not include all of them simultaneously in a regression because of the significant problems of multicollinearity. Nations (or states) with free-market policies in some areas also tend have them in other areas as well. After careful correlation analysis, we exclude two of the component areas because they appear to be redundant and have high correlation with the remaining components. In addition, due to the limited degrees of freedom and the fact that the level of economic freedom seems to be less important empirically, we only include the changes in our regressions. We run these regressions on all of the dependent variables that were analyzed in the previous section.

Table 5 summarizes the results for these regressions. Following Berggren (1999), to con-

serve space we simply show which component areas had a significant coefficient estimate in each specification, and in these cases indicate whether the coefficient was positive or negative. The components are as follows: total government consumption expenditures as a percentage of GSP (EFAI), total transfers and subsidies as a percentage of GSP (EFAII), and total social security payments (employment insurance, workers compensation, and other pensions) as a percentage of GSP (EFAIII), total tax burden as a percentage of GSP (EFBI), the top marginal tax rate and income threshold (EFBII), indirect tax revenue as a percentage of GSP (EFBIII), and total sales tax revenue as a percentage of GSP (EFBIV), the annual minimum wage as a percentage of income per capita (EFCI), total government employment as a percentage of total employment (EFCII), and union density (EFCIII). These component areas are also listed at the bottom of the table. Only one of the eight components is insignificant in all of the regressions. The other four are significant in at least four of the nine regressions. The components with the highest frequency of significance (8 of the 9 regressions) were EFCI (minimum wage laws) and EFAIII (employment insurance).¹²

Lower state minimum wages are associated with significantly improved growth rates and levels of income for the highest and middle income quintiles and a higher level of income for the lowest quintile. While few would argue for the elimination of minimum wages to reduce their negative impact on the levels and growth of income in the middle and highest quintiles, we find evidence that minimum wages also hurt the average level of income in the lowest quintile (and remember this measure includes transfer benefits). This is consistent with the findings in the extensive analysis of how minimum wages impact the nominal earnings of minimum wage workers by Sobel (1999). He also finds that higher minimum wages above their current levels lead to reductions in the total earnings of all minimum wage workers (incorporating both reduced employment and higher wages among those who retain their jobs).

The components with the next highest frequency of statistical significance were EFAI, EFAII, and EFCII indicating that lower government expenditures and transfers as a percentage of GSP, and lower government employment as a percentage of total employment, seem to benefit all three income groups. They are significant in seven of the nine regressions. EFBI, an index based on small total tax revenues as a percentage of GSP, was significant in six of the nine regressions. States with lower tax burdens actually have slower income growth in the highest quintile and less income inequality (there is a positive impact on both the low income share, and share relative to high income, and a negative impact on the high income share). Interestingly, EFCIII was negative and significant in four of the nine regressions indicating that higher union membership tends to benefit the lowest income quintile.

While we would caution the reader about the results in this section based on our simultaneous inclusion of so many different measures of policy, that are all correlated, taken at face value they suggest that elimination or reduction of minimum wages, and lower tax burdens, are the two most likely policy reforms that would promote income equality and income growth for the lowest quintile.

6 Conclusion

While previous literature has examined the impact of economic freedom on income inequality at the international level, we are the first to examine this relationship at the U.S.

¹²EFBIII and EFBIV are not considered in the analysis of components since these are also included in the calculation of EFBI and are therefore redundant. These components were also excluded in the component analysis conducted by Ashby (2007).

state level. This was an interesting exercise for two reasons. First, the two main studies at the international level find conflicting results, and ours adds to this ongoing debate. Second, while it seems obvious that the huge differences in institutions across countries will impact income inequality, it isn't so clear that the smaller variation in policies among U.S. states can have a measurable impact.

Our finding that changes in economic freedom are associated with higher income and higher rates of income growth (across the board), and with reductions in relative income inequality are identical to the results of Berggren. We do not find support, however, for his result that the level of economic freedom is, contrarily, negatively related to income inequality. In our results this variable is generally insignificant.

We also attempted to uncover which specific policy areas that are most important in promoting income growth and equality. While our analysis has some unavoidable multicollinearity problems, the findings suggest that reductions in both state minimum wages and tax burdens would be most helpful in promoting higher incomes, higher income growth rates and larger shares of income for the lowest quintile.

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Appendix 1: Variable sources and descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Cumulative Percentage Growth (1980 to 2003) in the Lowest Quintile's Average Absolute Income ($\times 100$) ^a	22.05	9.48	5.7	51.5
Cumulative Percentage Growth (1980 to 2003) in the Middle Quintile's Average Absolute Income ($\times 100$) ^a	29.92	10.55	8.5	52.6
Cumulative Percentage Growth (1980 to 2003) in the Highest Quintile's Average Absolute Income ($\times 100$) ^a	56.25	17.19	9.56	88.5
Lowest Quintile's Average Absolute Income (2001–03) ^a	17,521.4	2,478.2	13,208	23,128
Middle Quintile's Average Absolute Income (2001–03) ^a	47,030.5	6,445.23	36,090	60,400
Highest Quintile's Average Absolute Income (2001–03) ^a	115,487	15,963.5	87,230	154,614
Share of Income held by the Lowest Quintile (2001–03) ^a	0.063	0.005	0.05	0.074
Share of Income held by the Middle Quintile (2001–03) ^a	0.17	0.006	0.156	0.182
Share of Income held by the Highest Quintile (2001–03) ^a	0.417	0.017	0.382	0.453
Ratio of Quintile's Income Share to Lowest Quintile's Income Share (2001–03)	6.64	0.79	5.16	8.11
Change in State's Economic Freedom Score (avg. 1981–83 to avg. 2001–03) ^b	0.925	0.552	−0.433	1.817
State's Economic Freedom Score (avg. 1981–83) ^b	5.74	0.538	4.6	7.1

(Continued)

Variable	Mean	Standard deviation	Minimum	Maximum
Percentage with High School Degree in 1980 ^c	67.47	7.57	53.1	82.5
Percentage Living in Metropolitan Area in 1980 ^c	61.368	22.85	15.3	94.9
Median Income in 1980 ^c	36,227.7	4,209.22	28,125	44,982
South Regional Dummy	0.3	0.46	0	1
West Regional Dummy	0.22	0.42	0	1
North Regional Dummy	0.22	0.42	0	1
Alaska Dummy	0.02	0.142	0	1
Hawaii Dummy	0.02	0.142	0	1

Sources: ^a Bernstein et al. (2006); ^b Karabegovic and McMahon (2005); ^c U.S. Census Bureau (1990)

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