The Journal of
Regional
Analysis
& Policy

JRAP 44(1): 58-70.

A Longitudinal Analysis of the Impact of State Economic Freedom on Individual Wages

Jeffrey J. Yankow
Furman University – USA

Abstract. Matching panel data drawn from the National Longitudinal Survey of Youth 1979 to the state-level index of economic freedom published in *Economic Freedom of North America 2010*, this study establishes an empirical relationship between wages at the individual level and the degree of state economic freedom. In OLS models, a one standard deviation improvement in the state economic freedom score is found to increase wages by 2.5 percent. Models that control for both person-specific and state-level fixed effects reveal a wage increase of more than 8 percent. Significant variation in wage gains is found across the different areas used to construct the economic freedom measure as well as across broad worker characteristics like race and schooling level.

1. Introduction

Perhaps the most famous and persuasive expositor of the idea of limited government as an economic policy position was Adam Smith. From his seminal analysis of political economy in the *Wealth of Nations* comes the rudimental idea that an excessive degree of government intervention in an economy would negatively impact its performance. This general policy prescription stemmed from his belief that the "natural effort of every individual to better his own condition," the key behavioral *sine qua non* supporting his analytical conclusions, would operate to its greatest positive societal effect when individuals are left to pursue their own economic interests within what he termed a "system of natural liberty." Smith's ideal would offer only limited scope for government intervention in economic affairs.[1] In his own words:

> "All systems either of preference or of restraint, therefore, being thus completely taken away, the obvious and simple system of natural liberty establishes itself of its own accord. Every man, as long as he does not violate the laws of justice, is left perfectly free to pursue his own interest his own way, and to bring both his industry and capital into competition with those of any other man, or order of men. The sovereign is completely discharged from a duty, in the attempting to perform which he must always be exposed to innumerable delusions, and for the proper performance of which no human wisdom or knowledge could ever be sufficient; the duty of superintending the industry of private people, and of directing it towards the employments most suitable to the interest of the society" (Smith, 1981, p.687 [IV.ix.51]).

Within such a system the self-interested behavior of individuals, motivated by a desire to better their own condition and channeled through competitive markets, would tend to produce a socially-desirable

[1] To be sure, Smith was no champion of pure *laissez-faire*, but rather he advocated for a minimally involved state which would serve primarily to protect private property, dispense fair and impartial justice, enforce contracts, maintain the rule of law, ensure the national defense, and provide public goods and services that otherwise would not be forthcoming from private markets.

outcome: maximum output of the goods and services desired by consumers and economic growth over time. More to the point, the system would operate most effectively when markets are freed from state interventions that alter their natural workings and lessen their competitive properties. Consequently, a general policy of secure property rights and limited government intervention in markets (i.e., greater economic freedom) would best position societies to take advantage of the economic potential of market-channeled self-interested behavior by safeguarding the freedom of resources to move readily to their most highly valued uses.

There is a growing literature that explores the relationship between economic freedom and prosperity across countries. Cross-country studies have typically focused attention on aggregate variables of economic performance such as rates of economic growth. For example, Sturm and De Haan (2001), Cole (2003), and Gwartney (2009) have offered empirical evidence showing that countries with greater economic freedom have greater rates of economic growth than countries with lower levels of economic freedom. More recently, Cebula and Clark (2012) show that, for OECD nations over the period 2004-2008, growth in per capita real GDP is an increasing function of at least seven of the ten indicators of economic freedom computed annually by the Heritage Foundation's Index of Economic Freedom.

The federal system of the United States, which divides the powers of government between the national (federal) government and state and local governments, creates an alternative "laboratory" for testing various aspects of Smith's thesis at the micro level. In this system, individual states and municipalities are sovereign in many fiscal and regulatory areas and thus retain significant latitude in crafting unique economic policies. Thus, to the extent that there is variation in state economic policies, one might naturally expect a corresponding variance in state economic performance. There is a voluminous literature examining the impact of sundry state economic policies in isolation, such as the level of taxation, government expenditures, and business regulation, on a variety of economic outcomes.[2] However, because states are constantly and continuously making numerous tweaks along a variety of policy dimensions, the idea of isolating the impact of just one single policy variable is daunting. It is not altogether surprising, then, that researchers have begun to turn their attention to more comprehensive measures of a state's overall economic and political "institutional environment" in an effort to determine how the policy milieu as a whole affects economic performance. Indeed, researchers have already explored how state-level measures of economic freedom correlate with many important economic outcomes, such as employment growth (Garrett and Rhine, 2010), migration (Ashby, 2007; Cebula and Clark, 2011), income inequality (Ashby and Sobel, 2008), investment (Dawson, 1998), and entrepreneurship (Kreft and Sobel, 2005).

One important relationship that has received little scrutiny to date is that between individual wage outcomes and the degree of economic freedom within a state. Obtaining a better understanding of this relationship is important for at least two reasons. First, to the extent that wages are representative of labor productivity levels, economists and policymakers alike have a keen interest in ascertaining which policy environments best leverage the productive capacities of scarce resources in order to maximize growth and living standards over time. Second, from a micro-distributional perspective, high and growing wages are a key quality-of-life ingredient for the vast majority of a state's citizenry.

Why might we expect a relationship between individual wages and state-level economic freedom? With mobile capital and labor, equilibrium wage differentials among similar workers can only arise to the extent that there are significant differences in the productivity of workers across states. Interestingly, McPhail, Orazem, and Singh (2010) present evidence that state tax policies do in fact have a significant impact on labor productivity. In particular, they find that higher levels of taxation (whether on capital income, capital ownership, or consumption) adversely affect state-level productivity, and that significant variation in the tax burden across states allows productivity differentials to persist over time and space.[3] Of course, tax decisions are not made in a vacuum; state expenditure, transfer, and regulatory policies may also affect the productivity of work-

[2] For example, Tomljanovich (2004) shows that higher state tax rates reduce state economic growth over time. Both Crain and Lee (1999) and Garrett, Wagner, and Wheelock (2007) present evidence that states with a smaller government share of gross state product show greater rates of income growth, while Conway (1997) demonstrates that greater public sector spending generates a significant reduction in labor supply by workers within the state. McPhail, Orazem, and Singh (2010) find that state tax policies have a meaningful impact on state-level labor productivity.

[3] McPhail, Orazem, and Singh (2010) also find that the level of taxation is much more important than the structure of the taxes. Higher marginal rates, in general, lower labor productivity.

ers in meaningful ways. For example, less restrictive labor markets may make it easier for employers and workers to negotiate mutually-beneficial employment arrangements, increasing the scope for efficient job matching. Greater economic freedom may spur employment growth by reducing the financial and regulatory burdens of firms within a state, encouraging the expansion of existing businesses as well as greater entrepreneurial activity and new business formation (Garrett and Rhine, 2010). There is also evidence that states with greater economic freedom are more attractive to internal migrants (Cebula and Clark, 2011; Ashby, 2007). If such states attract the most highly able and skilled workers, then we may find better-paid workers concentrating in those states with higher degrees of economic freedom. Thus, both theory and evidence would appear to support a non-trivial relationship between the wages of workers and the degree of economic freedom within a state.

Using an extended panel of data drawn primarily from the National Longitudinal Survey of Youth 1979 (NLSY79) and matched to the state economic freedom indices contained in the Fraser Institute's *Economic Freedom of North America 2010* (Ashby et al., 2010), this study examines how state economic freedom affects the wages of young workers. Because workers in the NLSY79 can be tracked over more than two decades, this study also examines the relevance of changes in state-level public policy over time. The longitudinal aspect of the NLSY79 is exploited to control for issues of simultaneity and selection that may plague earlier studies on the relationship between government policy and employment outcomes at the state level. In order to investigate which aspects of state policy have the most important influences on wages, three distinct areas of state-level economic freedom are analyzed: the size of government, taxation, and labor market freedom. In addition, the impact of economic freedom on wages is also explored across broad racial categories and worker skill levels.

The rest of the paper is organized as follows. Section 2 explains the data and the construction of the key variables used in the analysis. Section 3 discusses the empirical strategy and results. Section 4 concludes.

2. Data

The National Longitudinal Survey of Youth 1979 provides a comprehensive data set well suited for the study of wages and earnings across time and space. Beginning with a cohort of 12,686 men and women who were born between 1957 and 1964, the survey has collected information on an annual basis from 1979 through 1994 and biennially thereafter. The work-history files contain information detailing the employment history of each respondent, including wage information on all jobs associated with productive market work. In order to construct a sample suitable for spatial analysis, the work-history files must be matched to the confidential NLSY79 geocode files which are made available to researchers with permission from the Bureau of Labor Statistics (BLS). The geocode files allow one to identify the state of residence for each respondent at the time of each annual or biennial survey. With the FIPS state code in hand, the data can then be linked to state-level information on economic freedom.

One of the more convenient and useful measures of a state's institutional environment is the index of economic freedom for U.S. states (and Canadian provinces) found in the *Economic Freedom of North America* report published regularly by the Fraser Institute, an independent Canadian public policy and educational organization.[4] The sub-national economic freedom index attempts to evaluate the degree to which individual state and local governments protect private property and allow markets to operate with minimal government interference.

The measures of state economic freedom utilized in this study are drawn from the set of indices published in *Economic Freedom of North America 2010* (Ashby et al., 2010). These indices are constructed on a 10-point scale, with higher values denoting greater economic freedom. Measures are available for all 50 states across two levels of government – the total government level, which takes into account economic policies operating across national, state, and local levels of government, and the subnational level, which only considers policies at the state and local level. I use the subnational economic freedom index as the primary measure of state economic freedom (SEF) throughout the ensuing analysis.

[4] Similar measures have begun to proliferate in recent years, though these have yet to find their way into many peer-reviewed research outlets. For example, the Kauffman Foundation's "State New Economy Index" examines the degree to which state economies are knowledge-based, globalized, entrepreneurial, IT-driven, and innovation-based. Political scientists William Ruger and Jason Sorens have developed an index of personal and economic freedom published by the Mercatus Center at George Mason University under the title "Freedom in the 50 States." Arthur Laffer and Stephen Moore have compiled the "ALEC-Laffer State Economic Competitiveness Index," which ranks states according to recent economic performance and economic outlook.

This SEF index evaluates state economic policy and institutions across three general areas: the "size of government" (Area 1), "takings and discriminatory taxation" (Area 2), and "labor market freedom" (Area 3).[5] Each area also has its own freedom index, and the overall SEF index is an equally-weighted average of the three areas. Each economic freedom index score for a particular state is relative to that of all other states by construction. The SEF indices cover the years 1981 through 2007 and are consistent over time. In this case, the temporal length of the index is important because the level of economic freedom in each state tends to be similar in proximal years but often exhibits large within-state differences over longer periods of time.

The empirical analysis covers the two-decade period beginning in 1981 (the first available SEF index data point) through the 2000 survey year. Table 1 shows the subnational index scores for each of the 50 states for three select years at the beginning (1981), middle (1990), and end (2000) of the sample period. Some 25 states saw their SEF scores improve between 1981 and 2000, while 23 states witnessed a decline; two states found their scores unchanged at the end of the sample period. The general trend was a slight increase in mean SEF score between 1981 and 1990, but then a reduction between 1990 and 2000. The 50-state average score was 7.032 in 1981, 7.058 in 1990, and 7.000 in 2000. The most interesting trend was the significant reduction in variance between 1981 and 1990. From 1990 to 2000, the standard deviation remained almost unchanged.

In order to generate a sample suitable for analysis, several selection criteria were introduced to the base NLSY79 data set. The first set of restrictions includes limiting the sample to men and deleting respondents from the economically-disadvantaged ("poor white") supplemental sample.[6] The second set of selection criteria affects the contribution of "person-year" observations to the sample and, for the most part, pertains to missing data.[7] Table 2 shows how each set of deletions changes the sample across race, the Armed Forces Qualification Test (AFQT) score (normalized to mean zero and adjusted for the age at which the respondent took the test), and the highest grade of schooling completed by the respondent's mother. After making the initial sample deletions, I find the percentage of black and Hispanic respondents in the sample rising by 3.3 and 2.1 percentage points, respectively. The age-adjusted AFQT score falls only trivially (the standard deviation is 28.8) while the mother's highest grade completed rises from 10.94 to 10.98 years, on average. The second set of restrictions has only a negligible impact on the sample composition, primarily increasing the proportion of Hispanic respondents, though only slightly, and bringing both the AFQT and mother's highest grade completed back closer to the original sample means. The final sample consists of 5,120 men contributing a total of 39,542 person-year observations for empirical study.

Summary statistics for each of the variables used in the model specifications are provided in Table 3. All of the means and standard deviations are calculated over person-years. The average age of an observation contributor is 29.3 years. Black and Hispanic respondents contribute about 28 and 20 percent of the observations, respectively. The mean highest grade completed, a proxy for education level, is 12.7 years.

3. Estimation Strategy and Results

A major issue in the study of state-level effects on individual outcomes is the fact that individuals have choice as to their state of residence and employment. Complicating matters, this choice is often affected by unobservable characteristics of both states and workers. The econometrician has two fundamental approaches to dealing with this problem. First, one could identify an exogenous source of variation affecting location choice and then use appropriate instrumental variables techniques in the estimation procedure. Alternatively, one could begin with "contaminated" data and introduce appropriate heterogeneity controls into the analysis. Given the absence of convincing instruments for location choice and the efficacy of fixed-effect regression techniques, I have chosen to use the latter approach.

[5] See Appendix Table A1 for additional information on the components of each specific area of the subnational index.

[6] I restrict the analysis to men in order to avoid issues related to intermittent labor force participation. I delete all respondents coming from the economically-disadvantaged ("poor white") supplemental sample of the NLSY79, since those individuals were dropped from the survey in the early 1990s.

[7] In turn, I delete person-year observations for which the respondent had missing wage data (reported hourly wages less than $1 or greater than $100 in 1990 dollars were treated as outlying observations), a missing state FIPS code, was serving in the active military, reported working part-time (less than 35 hours per week), reported being self-employed, or was missing other pertinent information (highest grade completed, marital status, job tenure) necessary for the empirical analysis.

Table 1. State Economic Freedom Score, Sub-National Index, Selective Years.

State	1981	1990	2000	State	1981	1990	2000
Alabama	7.9	7.9	7.3	Montana	7.2	5.7	6.1
Alaska	7.2	6.7	5.9	Nebraska	7.6	7.5	7.3
Arizona	8.1	7.4	7.9	Nevada	7.3	7.4	7.6
Arkansas	7.3	7.3	7.0	New Hampshire	7.6	7.9	8.0
California	6.0	6.5	6.4	New Jersey	6.2	7.0	6.8
Colorado	7.9	7.3	7.8	New Mexico	7.2	6.5	6.2
Connecticut	7.0	7.3	7.0	New York	5.0	5.7	6.0
Delaware	7.0	7.9	8.2	North Carolina	7.4	7.7	7.5
Florida	8.5	8.0	7.9	North Dakota	7.8	6.2	6.5
Georgia	7.2	7.5	7.7	Ohio	6.5	6.5	6.5
Hawaii	5.9	6.7	6.0	Oklahoma	7.7	6.9	6.9
Idaho	7.1	6.9	6.7	Oregon	5.8	6.3	6.5
Illinois	6.8	7.2	7.3	Pennsylvania	6.0	6.9	6.9
Indiana	7.4	7.5	7.5	Rhode Island	5.5	6.3	5.9
Iowa	7.8	6.7	6.9	South Carolina	8.0	7.9	7.5
Kansas	7.3	7.2	7.2	South Dakota	7.2	7.6	7.7
Kentucky	7.1	7.2	6.8	Tennessee	8.3	8.3	8.2
Louisiana	8.6	7.9	7.4	Texas	8.9	8.0	8.0
Maine	5.7	6.1	5.8	Utah	7.1	7.1	7.2
Maryland	6.6	7.3	7.1	Vermont	5.8	6.8	6.3
Massachusetts	6.2	7.0	7.4	Virginia	7.6	8.0	7.8
Michigan	5.2	5.9	6.8	Washington	6.6	6.3	6.5
Minnesota	6.0	6.3	6.6	West Virginia	5.7	5.8	5.5
Mississippi	7.8	7.5	6.9	Wisconsin	6.2	6.3	6.5
Missouri	7.3	7.7	7.4	Wyoming	8.5	7.4	7.2
50 State Average (Standard Deviation)					7.032 (0.937)	7.058 (0.684)	7.000 (0.682)

Data Source: *Economic Freedom of North America 2010* (Ashby et al., 2010).

Table 2. Sample Composition across Selection Criteria.

Reason for deletion from sample	N	White	Black	Hispanic	Age-adjusted AFQT score	Mother's highest grade completed
Male respondents in NLSY1979	6,403	0.592	0.252	0.156	-0.000 (28.80) N = 5,951	10.94 (3.18) N = 5,934
After deletion of poor white oversample	5,661	0.538	0.285	0.177	-0.149 (28.77) N = 5,262	10.98 (3.20) N = 5,245
After deletion because of missing data	5,120	0.533	0.284	0.183	-0.088 (28.80) N = 4,812	10.95 (3.23) N = 4,754

Notes: Data source is the National Longitudinal Survey of Youth 1979. The AFQT score is age adjusted and normalized to mean zero. The standard deviation for the AFQT and mother's highest grade completed are in parentheses.

Table 3. Summary Statistics.

	Mean	Standard Deviation
Age (years)	29.34	5.907
Black	0.277	0.447
Hispanic	0.201	0.401
Highest grade completed	12.71	2.341
Normalized AFQT score	0.085	28.25
AFQT missing	0.047	0.211
Mother's HGC	10.89	3.178
Mother's HGC missing	0.069	0.254
Married, spouse present	0.460	0.498
Number of children present	0.783	1.128
Job tenure (years)	3.531	4.065
Public sector employment status	0.113	0.316
Public sector employment status missing	0.005	0.069
Union status	0.157	0.364
Union status missing	0.103	0.304
Weekly hours worked	44.07	8.266
Resides in non-rural area	0.807	0.395
State unemployment rate	6.568	2.131
State economic freedom, sub-national index	6.924	0.878
Ln hourly wage (1990 dollars)	2.213	0.522
Observations (Individuals)	39,542 (5,120)	

Note: The unit of observation is a "person-year" contribution to the sample.

Consider the following model:

$$lnW_{ijt} = SEF_{jt}\delta + X_{ijt}\beta + a_i + \eta_j + \varphi_t + \varepsilon_{ijt} \quad (1)$$

where lnW_{ijt} is the natural logarithm of the hourly wage for individual i residing in state j in year t. SEF_{jt} is the measure of state economic freedom for state j at time t. The individual's observable characteristics at time t are given by X_{ijt}. The error term is assumed to consist of a time-invariant person-specific component (α_i), a state-specific component (η_j), an economy-wide time effect (φ_t), and a purely random element (ε_{ijt}).

In order to assess the relevance of the various controls employed in the ensuing analysis, I begin with specifications with relatively weak heterogeneity controls and then introduce more thorough controls. The analysis essentially progresses through three alternative estimation techniques. The first models establish baseline OLS estimates that control only for observable characteristics. Unfortunately, endogenous location choice is likely to generate a correlation between various components of the error term and the measure of state economic freedom, resulting in biased OLS coefficient estimates. The second specification evaluates the importance of unobserved individual heterogeneity by accounting for person-specific fixed effects. Assuming that α_i is the only component of the error term correlated with the SEF measure, purging the model of this term results in unbiased parameter estimates. The final specification examines the importance of unobserved state-level heterogeneity by accounting for both individual and state fixed effects. If additional correlation was operating via the state-specific component of the error term beyond that captured by observable location characteristics, then controlling directly for η_j as a time-invariant fixed effect produces the appropriate estimate of the impact of state economic freedom on wages. In order to account for unobserved macroeconomic factors affecting wages and mobility (φ_t), every model specification includes controls for the calendar year.

3.1. Baseline Estimates

Table 4 reports the main estimation results. Column (1) of the table refers to the most basic OLS regression that includes controls for age, race (Black,

Hispanic), schooling (highest grade completed), family background (AFQT, mother's highest grade completed), household composition (married with spouse present, number of children present in the household), and location attributes (non-rural residency, state unemployment rate, Census Division dummies). The coefficient estimate on the state economic freedom variable is 0.026 and is statistically significant at the 1 percent level. This baseline estimate suggests that a one standard deviation increase in a state's economic freedom index score is associated with a 2.3 percent increase in wages.

The specification in column (1) does not include any controls for the job characteristics. This is inadequate to the extent that the distribution of industries and occupations differs systematically across states in a way related to economic freedom scores. For example, all else equal, those states with higher rates of unionization will have lower economic freedom scores.[8] Column (2) shows the results from an augmented regression that includes more detailed controls for job characteristics, including job tenure, public sector employment, whether wages are set through collective bargaining, and a complete set of 1-digit industry and occupation dummies. The coefficient on the state economic freedom index rises, but only slightly, to 0.028. In this case, a one standard deviation increase in the state economic freedom score increases wages by 2.5 percent.

The results presented in the first two columns of Table 4 suggest a distinct positive relationship between the degree of state economic freedom and a worker's wage. One plausible explanation for this observed relationship is that states with high degrees of economic freedom attract and retain higher-quality workers than do employers in states with less economic freedom, and these skills and abilities are not reflected fully in measured variables. For example, naturally-motivated workers may be drawn to states with high degrees of economic freedom because the rewards to hard work are higher (since they will get to keep more of what they make). In this case, economic freedom doesn't actually raise labor productivity directly but rather "dynamic selection" concentrates workers with exogenously high labor earnings in those states with high economic freedom scores. One way to deal with this potentiality is to introduce appropriate controls for time-invariant person-specific heterogeneity into the model specification. If dynamic positive selection of high-ability workers into high economic freedom states is driving this result, then we would expect to see a significant reduction in the coefficient estimate on state economic freedom when controlling for individual fixed effects in estimation.

The third column of Table 4 presents results obtained from a model that now accounts for a time-invariant person-specific component of the error term (individual fixed effects). The point estimate on the state economic freedom measure rises to 0.066, a magnitude more than twice as large as that found in column (2), implying that a one standard deviation increase in SEF score increases wages by 5.8 percent. Perhaps more importantly, the rise in the point estimate indicates a negative correlation between the individual fixed effect and state economic freedom in the wage equation, casting grave doubt on the hypothesis of positive dynamic selection into high economic freedom states. If anything, this result suggests that workers in states with high degrees of economic freedom tend to have below-average unmeasured capabilities.

At this point, the specification accounts for geographic heterogeneity through only three variables: the state economic freedom index, the state unemployment rate, and the Census Division dummy variables. However, there are myriad other state attributes, both observable and unobservable, that may affect wages. For example, state amenities (such as climate, proximity to oceans, deep water ports, land fertility, etc.) are known to affect the spatial distribution of wages (Greenwood et al., 1991). Other states may have experienced certain historical "accidents" resulting in competitive business advantages (or disadvantages) that have persisted through time. Deeply-ingrained political or social attitudes may also affect the degree of economic freedom achieved through the state political process. Whatever the cause, it is important to account for these differences across states in estimation. Assuming that these state-specific natural, historical, and cultural differences are relatively fixed over the time period under study, inclusion of state fixed effects allows one to account for state factors that may confound an observed association between state-level economic policies and individual-level employment behavior.

[8] Union density accounts for one-third of the Labor Market Freedom (Area 3) score. Since the overall SEF index is calculated from an equal weighting of each Area score, union density accounts for about 11 percent of the overall SEF index score.

Table 4. Effect of State Economic Freedom on Ln Hourly Wage.

	(1)	(2)	(4)	(5)
State economic freedom, sub-national index	0.026** (0.008)	0.028** (0.007)	0.066** (0.009)	0.097** (0.011)
Black	-0.081** (0.012)	-0.059** (0.010)		
Hispanic	-0.011 (0.015)	-0.007 (0.013)		
Highest grade completed	0.044** (0.003)	0.037** (0.002)	0.067** (0.006)	0.065** (0.006)
Age	0.100** (0.007)	0.060** (0.006)	0.063** (0.010)	0.063** (0.010)
Age^2 (×10)	-0.012** (0.001)	-0.007** (0.001)	-0.009** (0.001)	-0.009** (0.001)
AFQT	0.003** (0.000)	0.003** (0.000)		
AFQT missing	-0.035 (0.022)	-0.026 (0.018)		
Mother's HGC	0.007** (0.002)	0.006** (0.002)		
Mother's HGC missing	-0.027 (0.017)	-0.007 (0.014)		
Married, spouse present	0.164** (0.009)	0.107** (0.008)	0.066** (0.007)	0.065** (0.007)
No. of children present	0.008 (0.004)	0.006 (0.004)	0.008* (0.003)	0.008* (0.003)
Job Tenure		0.051** (0.002)	0.040** (0.002)	0.040** (0.002)
Job Tenure^2 (×10)		-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Public sector		-0.102** (0.014)	-0.042** (0.014)	-0.040** (0.014)
Public missing		-0.042 (0.035)	-0.041 (0.029)	-0.041 (0.029)
Union		0.186** (0.008)	0.133** (0.007)	0.132** (0.007)
Union missing		0.090** (0.009)	0.055** (0.007)	0.052** (0.007)
Non-rural	0.078** (0.010)	0.070** (0.008)	0.014 (0.007)	0.013 (0.007)
State unemp. rate	-0.003 (0.003)	-0.001 (0.002)	0.001 (0.003)	0.004 (0.003)
Census Division	Yes	Yes	Yes	No
Year	Yes	Yes	Yes	Yes
Industry & occupation	No	Yes	Yes	Yes
Individual fixed effects	No	No	Yes	Yes
State fixed effects	No	No	No	Yes
Adj. R^2 ["within" R^2]	0.331	0.455	[0.301]	[0.306]

Notes: Robust standard errors in parentheses. ** 1 percent significance level; * 5 percent significance level.

The specification in column (4) replaces the Census Division dummies with a set of 49 state dummy variables (California omitted). Accounting for state fixed effects (in addition to individual fixed effects) causes the point estimate on the SEF variable to increase further to 0.097. In this case, a one standard

deviation increase in the state economic freedom score increases wages by 8.6 percent. Notice that this estimate also implies a negative correlation between the state fixed effect and the SEF index score. That is, those states with the most "attractive" unobserved attributes tend to be associated with lower state economic freedom scores (less economic freedom). One interpretation is that those states faced with certain natural or historical disadvantages have attempted to overcome these obstacles by creating more attractive business climates. Moreover, since this result cannot be explained by workers with exogenously high productivity selectively locating in states with high economic freedom scores, the idea that greater state economic freedom raises worker productivity remains as a plausible hypothesis.

3.2. SEF Area Analysis

Recall that the SEF index evaluates state economic freedom across three general areas of government intervention: the size of government (Area 1), takings and discriminatory taxation (Area 2), and labor market freedom (Area 3). If state economic freedom does in fact raise worker productivity, it is also reasonable to hypothesize that the three areas of economic freedom used to construct the SEF index do not exert equal influences on wages. For example, Garrett and Rhine (2010) suggest that labor market freedom (Area 3) has had a greater impact on state employment growth than does the size of government and taxation in more recent years. McPhail, Orazem, and Singh (2010) find that state tax policies have the most important impact on labor productivity, with those states increasing marginal tax rates over the observation period doing the most damage to labor productivity. At the same time, they find that government expenditure policies explain little of the variation in labor productivity across states over time.

In order to investigate which aspects of state policy are most important, I analyze the impact of each area on wages separately. The results from this analysis are presented in Table 5. For each area, I present the results obtained from three specifications: a specification that accounts for neither state fixed effects nor individual fixed effects (column (1)), a specification that includes individual fixed effects but no state fixed effects (column (2)), and a specification that accounts for both individual and state fixed effects (column (3)). Since the latter specification controlling for both individual and state fixed effects produces the preferred estimates for this study, I will limit specific discussion of point estimates to the results presented in column (3).

Table 5. Effects of SEF Areas on Ln Hourly Wage.

	(1)	(2)	(3)
SEF Area 1, sub-national index	0.028**	0.049**	0.054**
"Size of Government"	(0.006)	(0.007)	(0.008)
	{0.025}	{0.043}	{0.048}
Adj. R^2 ["within" R^2]	0.456	[0.301]	[0.305]
SEF Area 2, sub-national index	0.011*	0.035**	0.042**
"Takings and Discriminatory	(0.006)	(0.007)	(0.008)
Taxation"	{0.010}	{0.031}	{0.037}
Adj. R^2 ["within" R^2]	0.455	[0.300]	[0.305]
SEF Area 3, sub-national index	0.019**	0.040**	0.077**
"Labor Market Freedom"	(0.005)	(0.007)	(0.010)
	{0.017}	{0.035}	{0.069}
Adj. R^2 ["within" R^2]	0.464	[0.300]	[0.306]
Individual fixed effects	No	Yes	Yes
State fixed effects	No	No	Yes

Notes: Robust standard errors in parentheses. Implied effects of a one standard deviation change in brackets.
** 1 percent significance level; * 5 percent significance level.

The first row of Table 5 shows the impact of the "size of government" area (Area 1) on wages. The size of government area itself is evaluated across three dimensions: general consumption expenditures by government as a percentage of gross state product (GSP), transfers and subsidies as a percentage of GSP, and social security payments as a percentage of GSP. For each specification, the coefficient estimate is positive and significant, indicating that wages are higher in states with smaller state

and local governments as a share of total output. The point estimate in column (3) implies that a one standard deviation improvement in the Area 1 index score leads to a 4.8 percent increase in wages.

The second row of the table shows the influence of "takings and discriminatory taxation" (Area 2) on wages. This area index is developed from a composite of four related dimensions: total government revenue from own source as a percentage of GSP, the top marginal income tax rate and the income threshold at which it applies, indirect tax revenues as a percentage of GSP, and sales taxes collected as a percentage of GSP. Again, I find the point estimate to be positive across all three specifications, though of a lower magnitude than that found for the Area 1 index. In this instance, a one standard deviation improvement in the Area 2 index score generates a 3.7 percent increase in wages.

The final area relates the degree of "labor market freedom" (Area 3) to wages. The Area 3 index is produced from a composite of minimum wage legislation, government employment as a percentage of total state employment, and union density. The point estimate identified in column (3) is the largest of any of the three areas analyzed, nearly twice as large as that identified for Area 2 and more than 40 percent larger than the estimate for the Area 1 index. Indeed, the point estimate implies that a one standard deviation improvement in the Area 3 index score raises wages by nearly 6.9 percent, suggesting that labor market freedom has a greater relative impact on wages than the other two areas examined.

3.3. Interactions with Individual Characteristics

An important question still to be addressed is whether state economic freedom has a differential impact on minority groups. To the extent that certain labor market restrictions are meant to remedy or ameliorate past or current discrimination, greater economic freedom may serve to disadvantage particular groups.[9] Along a similar line of inquiry, it would also be useful to know whether the effects differ across skill levels, perhaps providing greater returns to higher skill levels and worsening income inequality.

Table 6 reports the results from fully-specified fixed-effects models that include interactions with individual characteristics. Model 1 reports interactions between SEF and race (Black, Hispanic) using the overall sub-national index as well as across each of the three area indices. When using the overall sub-national index the interaction with Black generates a positive but statistically insignificant coefficient term, while the interaction with Hispanic is positive and significant. In this case, the implied effect of a one standard deviation increase in the SEF index score adds an additional 2.5 percent to the wages of Hispanic men on top of the base 7.8 percent increase experienced by non-black, non-Hispanic workers. In other words, at this cursory level of analysis there is little evidence to suggest that either black or Hispanic workers are detrimentally influenced by greater degrees of state economic freedom in terms of reported wage levels.

Although on the surface it would appear that Hispanic men show greater sensitivity to the degree of economic activity than the black males in the sample, it turns out that the use of the overall index actually masks some rather heterogeneous responses to the individual area components. For example, when considering a model that uses the Area 1 sub-national index (Size of Government), the interaction term with Black now generates a positive and significant coefficient estimate. The same is also true for the interaction with Hispanic. Interestingly, the interaction with Black (0.033) is now larger than that for Hispanics (0.028), suggesting that the wages of black workers show greater sensitivity to the "size of government" aspect of state economic freedom. The same is also true when using the Area 2 index (Takings and Discriminatory Taxation). In fact, the magnitude of the Black interaction term is nearly double the main effect, implying that blacks actually gain the most from good state performance in the area of "takings and discriminatory taxation" policies. Yet if this is the case, why do black workers receive no differential effect when using the total SEF index?

The reason is to be found in the results for the Area 3 index (Labor Market Freedom). In this case, the interaction term with Black is negative and highly significant, suggesting that the wages of black workers are adversely affected with greater degrees of labor market freedom. Yet even here the loss is relative: black workers still receive a wage boost from greater economic freedom, but only half the size of non-black workers. So although black workers stand to benefit from smaller state and local government size (in terms of expenditures, transfers, and subsidies) and low tax rates, the relative wage gains appear to be in large part offset by state

[9] Another possibility is that better organized majorities use government to restrict competition from less influential minorities. See Walter E. Williams, *The State Against Blacks* (1982).

policies that reduce minimum wages, government employment, and union density.

In order to investigate whether the effects of greater economic freedom on wages vary across workers with different levels of skill, Model 2 includes interactions with years of schooling minus 12. For the total SEF index, the coefficient estimate for the education interaction term is not statistically significant. However, when looking at the area component indices, a different picture emerges. For both Areas 1 and 2, the education interaction term is negative and highly significant, suggesting the impact of greater economic freedom in these areas is actually higher for those workers with lower levels of education (highest grade completed – 12 < 0). In contrast, the interaction term is positive and significant for Area 3, which implies that greater labor market freedom results in greater wage gains for more highly educated workers (highest grade completed – 12 > 0). Thus, it would appear that both high- and low-skilled workers obtain benefits from greater economic freedom: highly educated workers receive the greatest benefits from greater labor market freedom, while less-educated workers receive the greatest gains from smaller state and local government size and lower takings and discriminatory taxation.

Table 6. State Economic Freedom Interacted with Individual Characteristics.

	Model 1			Model 2	
	Main Effect	Interaction with Black	Interaction w/Hispanic	Main Effect	Interaction with HGC
SEF , sub-national index	0.088** (0.013) {0.078}	0.012 (0.014) {0.011}	0.028 (0.014) {0.025}	0.097** (0.011) {0.086}	-0.003 (0.003) {-0.003}
F-stat / "within" R^2	25.55 / 0.301			36.76 / 0.307	
Area 1, sub-national index "Size of Government"	0.042** (0.009) {0.037}	0.033** (0.011) {0.029}	0.028** (0.011) {0.025}	0.059** (0.008) {0.053}	-0.007** (0.002) {-0.006}
F-stat / "within" R^2	21.08 / 0.301			31.62 / 0.306	
Area 2, sub-national index "Takings and Taxation"	0.023* (0.010) {0.020}	0.042** (0.014) {0.037}	0.040** (0.013) {0.036}	0.043** (0.008) {0.038}	-0.008** (0.002) {-0.007}
F-stat / "within" R^2	12.77 / 0.305			18.23 / 0.305	
Area 3, sub-national index "Labor Market Freedom"	0.088** (0.011) {0.078}	-0.045** (0.012) {-0.040}	0.010 (0.014) {0.009}	0.078** (0.010) {0.069}	0.007** (0.002) {0.006}
F-stat / "within" R^2	24.97 / 0.307			32.46 / 0.307	
Individual fixed effect	Yes			Yes	
State fixed effect	Yes			Yes	

Notes: Robust standard errors in parentheses. Implied effects of a 1 SD change in brackets. Reported F-statistics are for the joint significance of the appropriate SEF index and the interaction term(s). The critical values for an F-stat (3, ∞) at the 5% and 1% levels are 2.60 and 3.78, respectively. The critical values for an F-stat (2, ∞) at the 5% and 1% levels are 3.00 and 4.61, respectively.
** 1 percent significance level; * 5 percent significance level.

4. Conclusions

This research attempts to shed some light on the complex relationship between individual wages and state economic freedom. The regression analysis identifies a strong positive correlation between worker wages and indices measuring the degree of state economic freedom. In the OLS models, a one standard deviation increase in the state economic freedom score increases wages by 2.5 percent. Interestingly, models that accounted for both time-invariant individual and state-level fixed effects actually produced estimates of a larger positive magnitude. In this case, a one standard deviation increase in the state economic freedom score was found to increase wages by 8.6 percent.

Consequently, the higher wages associated with greater economic freedom cannot be explained by dynamic ability sorting in which workers with unobserved productive attributes are attracted to states with high degrees of economic freedom.

The analysis also addressed the relationship between wages and economic freedom across three general areas of government intervention (size of government, takings and discriminatory taxation, and labor market freedom) and across worker characteristics and skill levels. When examining the different areas of evaluation that comprise the state economic freedom index, greater labor market freedom (low minimum wages, less government employment, low union density) had the greatest impact on wages. Although black workers received outsized wage gains from greater freedom in the areas of state and local government size and taxation, wage boosts were less than half the size of those achieved by non-black workers in states with greater labor market freedom. In terms of worker skill levels, highly educated workers receive the greatest benefits from greater labor market freedom, while less educated workers receive the greatest gains from smaller state and local government size and lower takings and discriminatory taxation.

References

Ashby, N. 2007. Economic freedom and migration flows between U.S. states. *Southern Economic Journal* 73(3): 677-697.

Ashby, N., A. Karabegovic, F. McMahon, and A. Bueno. 2010. *Economic Freedom of North America: 2010 Annual Report*. Vancouver: The Fraser Institute.

Ashby, N.J., and R.S. Sobel. 2008. Income inequality and economic freedom in the U.S. states. *Public Choice* 134(3-4): 329-346.

Cebula, R.J., and J.R Clark. 2011. Migration, economic freedom, and personal freedom: An empirical analysis. *Journal of Private Enterprise* 27(1): 43-62.

Cebula, R.J., and J.R. Clark. 2012. Lessons from the experience of OECD nations on macroeconomic growth and economic freedom, 2004-2008. *International Review of Economics* 59(3): 231-243.

Cole, J.H. 2003. The contribution of economic freedom to world economic growth, 1980-99. *Cato Journal* 23(2): 189-198.

Conway, K.S. 1997. Labor supply, taxes and government spending: A microeconometric analysis. *Review of Economics and Statistics* 79(1): 50-67.

Crain, M.W., and K.J. Lee. 1999. Economic growth regressions for the American states: A sensitivity analysis. *Economic Inquiry* 37(2): 242-257.

Daveri, F., and G. Tabellini. 2000. Unemployment, growth, and taxation in industrial countries. *Economic Policy: A European Forum* 15(30): 47-88.

Dawson, J.W. 1998. Institutions, investment, and growth: New cross-country and panel data evidence. *Economic Inquiry* 36(4): 603-619.

Garrett, T.A., and R.M. Rhine. 2010. Economic freedom and employment growth in U.S. states. Working Paper Series 2010-006A, Research Division, Federal Reserve Bank of St. Louis.

Garrett, T.A., G.A. Wagner, and D.C. Wheelock. 2007. Regional disparities in the spatial correlation of state income growth, 1977-2002. *Annals of Regional Science* 41(3): 601-618.

Greenwood, M.J., G.L. Hunt, D.S. Rickman, and G.I. Treyz. 1991. Migration, regional equilibrium, and the estimation of compensating differentials. *American Economic Review* 81(5): 1382-1390.

Gwartney, J.D. 2009. Institutions, economic freedom, and cross-country differences in performance. *Southern Economic Journal* 75(4): 937-956.

Kreft, S., and R. Sobel. 2005. Public policy, entrepreneurship, and economic freedom. *Cato Journal* 25(3): 595-616.

McPhail, J.E., P. Orazem, and R. Singh. 2010. The poverty of states: Do state tax policies affect state labor productivity? Working paper 10010, Iowa State University.

Smith, A. 1981 (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*, R.H. Campbell, A.S. Skinner, and W.B Todd (eds.). Indianapolis: Liberty Fund.

Sturm, J.-E., and J. de Haan. 2001. How robust is the relationship between economic freedom and economic growth? *Applied Economics* 33(7): 839-844.

Tomljanovich, M. 2004. The role of state fiscal policy in state economic growth. *Contemporary Economic Policy* 22(3): 318-330.

Williams, W.E. 1982. *The State Against Blacks*. New York, N.Y.: McGraw-Hill.

Appendix

Table A1. Areas and Components of the Economic Freedom of North America Index.

Area 1. Size of Government
1A. General Consumption Expenditures by Government as a Percentage of GDP
1B. Transfers and Subsidies as a Percentage of GDP
1C: Social Security Payments as a Percentage of GDP

Area 2. Takings and Discriminatory Taxation
2A. Total Government Revenue from Own Source as a Percentage of GDP
2B. Top Marginal Income Tax Rate and the Income Threshold at Which It Applies
2C. Indirect Tax Revenue as a Percentage of GDP
2D. Sales Taxes Collected as a Percentage of GDP

Area 3. Labor Market Freedom
3A. Minimum Wage Legislation
3B. Government Employment as a Percentage of Total State Employment
3C: Union Density