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Including U.S. State Government Regulation in the Economic Freedom of North America Index

Noel D. Campbell
University of Central Arkansas

Alex Fayman
University of Central Arkansas

Kirk C. Heriot
Columbus State University

Abstract
The paper examines the Economic Freedom Index of North America (EFNA) and its ability to predict income in U.S. states. We show that including state government regulatory spending, using U.S. Census Bureau data on "Protective Inspection and Regulation, NEC" as the measure of regulation, improves the predictive power of our models. We conduct a number of robustness checks and construct a factor analysis model to show that the regulation spending variable contributes information that is currently not included in the EFNA. We argue that since regulation adds to the predictive power of EFNA, and is a theoretically essential component of economic freedom, it should be considered alongside the EFNA.

JEL Codes: H11, H70
Keywords: Economic freedom; Regulation; State government; Factor analysis

I. Introduction

Economic freedom, as defined by the Economic Freedom of North America Index (EFNA) (Karabegovic et al., 2003), is a measure of governmental impedance to economic activity. A high degree of economic freedom is necessary to insure and to help prolong robust economic activity and development (Karabegovic et al., 2003). The EFNA includes variables that measure the degree of protection for the property rights and whether individuals are coerced regarding economic transactions. The EFNA also measures the ability of individuals to make personal decisions. A high value of

the EFNA implies more economic freedom, which is to say, less governmental impedance to economic activity. The EFNA provides an index value for U.S. states and Canadian provinces that is comparable across time and location. Since its publication, the EFNA has sparked a small revolution in the academic literature and in public discussions of policy, similar to the larger revolution created by the indices measuring economic freedom across nations (e.g., Gwartney, Lawson and Block, 1996; Gwartney, Lawson and Norton, 2008). So long as a policy or academic institution continues to publish updated values of the EFNA, it will continue to have a substantial academic and public policy impact. We believe the EFNA to be the best established, most widely known, and most significant economic freedom index of U.S. states and Canadian provinces. Accordingly, in the remainder of this paper, we use the EFNA as our "straw man" to discuss economic freedom measures of the U.S. states in general. By doing so, we mean no particular criticism of the EFNA. Indeed, it was our appreciation of the significance and usefulness of the EFNA which motivated this paper.

Given the ongoing policy and academic significance of the EFNA, we believe the research community would benefit from periodic review of the components of any index measuring economic freedom. As researchers frequently use indices like the EFNA to explain various aspects of economies, such indices should include all *theoretically-justified* factors that influence the accuracy and robustness of the index. Any economic freedom index – international or sub-national – can always be improved by inclusion of pertinent variables that will expand its explanatory power (Gwartney, Lawson, and Park, 2001). Gwartney, Lawson and Clark (2002) suggest that as the usefulness of economic freedom indices expand, so does the necessity to improve them by incorporating other variables that may improve their functionality. The goal of this research is to investigate whether regulation, which is theoretically linked to economic freedom, could improve the predictive power of an economic freedom index for U.S. states. We argue that economic freedom indices could be improved by including an essential component of government intrusion into the economy, state regulation expenditure.

The impetus of both the EFNA and the international indices was Friedman's *Capitalism and Freedom* (1962), in which he argues that economic freedom is required for human development and serves as a channel to political freedom. Friedman goes on to discuss how

differences in nations' monetary policies and international trading and financial arrangements affect economic freedom. He also discusses topics such as occupational licensure, employment rules, and control of monopoly tendencies – in short, government regulation of business life. As the EFNA focuses on sub-national units in two closely-related, Federal systems of government, issues of monetary policy and international economic arrangements are inappropriate, and the EFNA focuses on the size of government, taxation, and the labor market.

Thus, Friedman (1962) suggests that government regulation of businesses may be detrimental to economic freedom. Furthermore, Gwartney, Lawson and Block (1996), summarizing a long process of theoretical development, state, "The central elements of economic freedom are personal choice, protection of private property, and freedom of exchange.…Thus, an index of economic freedom should measure the extent to which rightly acquired property is protected and individuals are free to engage in voluntary transactions." Some level of government activity is necessary to protect the rights of market participants in order to ensure economic freedom; however, government regulation of economic activity – whether petty or grand – diminishes private property rights and restricts individuals' ability to engage in voluntary transactions: regulation reduces economic freedom, in short.

Regulatory activity is a policy choice that impacts personal choice, market exchange, and the inviolability of property rights and contracts, just as do the variables included in the EFNA. The type and extent of regulatory activity is an outcome of the political choice process just as surely as is minimum wage regulation and the top income tax rate, variables currently included in the EFNA. Just as regulation of the labor market impedes economic activity, other regulatory activity will also impede economic activity. A state regulation that mandates the maximum and minimum opening sizes in the wire mesh that covers the exhaust fans in commercial chicken sheds may not create much of an impact. However, if one imagines the cumulative impact of tens of thousands of such regulations, it becomes much easier to imagine that state regulatory activity is detrimental to economic freedom.

This fact is recognized by the architects of the EFNA. Their measures of minimum wage legislation and union density capture government regulation of labor markets. We expand coverage of

regulation by including a variable that extends to regulatory activities outside of the labor market. As we explain below, we capture a broad swath of regulatory activity with a single variable collected by the U.S. Census Bureau. We measure state regulatory activity with state regulation expenditure, "Protective Inspection and Regulation, NEC" (U.S. Census). Using the Census Bureau's regulation expenditure series has the virtues of parsimony and ease of data collection and analysis.[1]

We conclude that regulation expenditure contains information not otherwise included in the EFNA, and the addition of regulatory spending to the EFNA adds to the explanatory power models describing income. Our results confirm the literature's general finding regarding income but also demonstrate that state and local regulatory activity help determine income levels and growth rates in the expected manner. To whit, states that engage in more regulatory activity experience slower income growth and lower income levels, *ceteris paribus*. Significantly, we also demonstrate that the EFNA and our regulation measure are statistically different variables. We conclude that including regulation would improve an index analogous to the EFNA. We construct an example of an improved economic freedom index for the U.S. states, and demonstrate how this logically-improved index performs similarly to the EFNA in statistical models of income determination. This research suggests that economic freedom indices of the U.S. states could be improved by including the regulation variable in the indices.

The most significant shortcoming of our work is fairly evident. Data incompatibility compels us to limit our attention to only U.S. states and sacrifice the Canadian provinces. Thus our work lacks the virtue of comparing individual states to individual Canadian

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[1] For comparison's sake, a well-known economic freedom index, the Pacific Research Institute's (PRI) U.S. Economic Freedom Index (USEF) (McQuillan et al., 2008) measures regulation by observing up to 53 regulation indicators. The USEF regulatory indicators are not observed annually and include potentially contentious regulation measures such as the percent of a state's land owned by the federal (not the state) government, the percentage of students in private schools, and the number of employees at public utilities commissions and insurance regulation organizations. The authors selected as the "best index" the one that maximizes the R-squared statistic in a regression model explaining interstate population migration. Though the authors vigorously defend their approach, it has been subject to criticism, which the authors explicitly recognize by devoting Appendix C to "Responses to Critics and Criticism."

provinces. Nevertheless, we believe this work may be of interest and use to economic freedom researchers.

II. Literature Review

Economic freedom indices of the world (of which the EFNA is an off-shoot) have been used in many papers to describe economic activity and development. Economic freedom indices have been shown to be related to many economic issues. For instance, Berggren and Jordahl (2003) show that economic freedom helps to explain foreign trade. Doucouliagos and Ulubasoglu (2006) and Cole (2003) demonstrate a relationship between economic freedom and economic growth.

Karabegovic et al. (2003) provide a similarly derived index featuring differences between U.S. states and Canadian provinces rather than the difference between nations. Karabegovic et al. choose to group ten variables – usually expressed as ratios of GDP – into three categories: size of government, takings and discriminatory taxation, and labor market freedom. Karabegovic et al. construct a scale from zero to 10 to represent the underlying distribution of the 10 variables in the index, with higher values indicating higher levels of economic freedom. Thus, the freedom index is a relative ranking of economic freedom across jurisdictions and across time. In the final construction each area was equally weighted and each variable within each area was equally weighted.

The EFNA has performed similarly to the world freedom indices, and has been similarly used by researchers: the freedom index is significantly, positively related to state levels of income and growth of economic activity. Others have expanded the use of the EFNA into other research topics. For instance, Kreft and Sobel (2005) demonstrate a relationship between the level of economic freedom and levels of entrepreneurship as measured by the flow of venture capital funds and patent originations. This research demonstrates the importance of continued examination of the freedom index and potential for its improvement by inclusion of other explanatory variables. Additionally, Campbell and Rogers (2007) demonstrate that there is a relationship between business formation and economic freedom; researchers find that states with greater degrees of economic freedom demonstrate higher rates of business formation.

III. Including Regulation in the EFNA

A cornerstone of states' public policy is the regulation of business enterprise and of economic activity in general. Therefore, government regulation is an important variable that helps to determine the level of economic freedom. Research has developed several inconsistent views of regulation, which can be generalized as: (a) regulation may be good for firms and economies, but it is incorrectly applied (e.g., Bork, 1993), (b) regulation is a conditionally efficient method of conflict resolution, and is (implicitly) good for firms (e.g., Mulligan and Shleifer, 2005), or (c) regulation is the outcome of a rent-seeking political process, whose primary aim is wealth redistribution (e.g., the public choice tradition of scholarship). Any way one looks at it, some measure of regulation should be included in any measure of economic freedom constructed along the lines of the EFNA. In this paper we include a direct measure of regulation, along with the EFNA, in estimates that re-test the primary result of the literature: that more economic freedom is associated with better economic outcomes. As a secondary aim, we test whether regulation positively or negatively impacts income. We hypothesize that the correct view of regulation is that it is wealth redistributing and has a negative impact on incomes.

Our measure of state and local regulatory expenditure is the U.S. Census Bureau's expenditure category, "Protective Inspection and Regulation, NEC," Census' function code 66. Protective Inspection and Regulation expenditure is a very broad and intuitively appealing measure of regulatory activity. Quoting extensively from the Census' *Classification Manual*:

> "DEFINITION: Regulation and inspection of private establishments for the protection of the public or to prevent hazardous conditions NOT classified under another major function.
> "EXAMPLES: Inspection of plans, permits, construction, or installations related to buildings, housing, plumbing, electrical systems, gas, air conditioning, boilers, elevators, electric power plant sites, nuclear facilities, weights and measures, etc.; regulation of financial institutions, taxicabs, public service corporations, insurance companies, private utilities (telephone, electric, etc.), and other corporations; licensing, examination, and regulation of professional occupations,

> including health-related ones like doctors, nurses, barbers, beauticians, etc.; inspection and regulation or working conditions and occupational hazards; motor vehicle inspection and weighing unless handled by a police agency; regulation and enforcement of liquor laws and sale of alcoholic beverages unless handled by a police department."
> "EXCLUSIONS: Distinctive license revenue collection activities…; regulatory or inspection activities related to food establishments or to environmental health…; motor vehicle inspection, liquor law enforcement, and other regulatory type activities of police agencies…; regulatory and inspection activities related to other major functions, such as fire inspections, health permits, water permits, and the like…." (http://www.census.gov/govs/www/classfunc66.html)

We assume that state and local regulations are directly and monotonically related to regulatory spending. We further assume that state and local regulatory expenditure, in general, is positively correlated with the Census' Protective Inspection and Regulation expenditure. This assumption allows us to proxy all state and local regulatory activity with the Census' Protective Inspection and Regulation data.

By using direct expenditure amounts to proxy for regulatory activity, we depart from a research tradition of measuring state regulation by the total word "volume" of a state's statutes, as exemplified by Mulligan and Shleifer (2005). Mulligan and Shleifer use the number of kilobytes of a state's unannotated statutes as their proxy for regulation activity.[2] The literature has argued that regulatory activity will be positively correlated with the word volume of a state's statutes. Despite the use of "kilobytes of law" in the literature, we believe our direct expenditure measure is superior. Regulatory expenditure is directly, demonstrably related to regulatory activity, and we believe the Census' "Protective Inspection and Regulation" to be sufficiently broad to capture much of what most people intuitively understand "regulation" to mean. In addition to regulatory activity, the language of statutes may reflect the relative verbosity of

[2] There also exists a tradition of proxying the Federal regulatory burden by counting the number of pages in the Federal Register. In this work, however, we are concerned with state-level regulatory activity.

lawmakers across states and across time, as well as implicit or explicit state-varying linguistic requirements for acceptable state law. Thus, using the Census Bureau's regulation expenditure series has the virtues of parsimony and ease of data collection and analysis.

IV. Data and Method

Table 1 presents the definitions for all the variables utilized in this research. The descriptive statistics for the data used in the study are in Table 2. For the sake of convenience, we have inverted and rescaled the EFNA so that the range is [0, 100] and smaller numbers indicate more economic freedom.

Table 1. Variable Definitions

Variable Name	Variable Definition
Agriculture:	Real (y2k) percentage of agriculture in state gross domestic product
Manufacturing:	Real (y2k) percentage of manufacturing in state gross domestic product
Population:	State population, in thousands
Pop Density:	State population density; persons per square mile
Pct Minority:	Percent of state population that is not Caucasian
Over 65:	Percent of state population that is aged 65 or older
Education:	Percent of state population with a Bachelor's degree
Loans:	Real C&I loans per capita
Unemployment:	State annual unemployment rate
Taxes:	Real taxes collected per capita as a percent of real income per capita
EFNA:	Economic Freedom of North America Index
GovSize:	The "Government size" sub-index of the EFNA
TaxIndx:	"Tax Index" sub-index of the EFNA
LbrMrkt:	"Labor Market Freedom" sub-index of the EFNA
Income:	Real personal income per capita

The goal of this paper is to evaluate a regulatory spending variable as it predicts real personal income per capita. We evaluate four two-way (state and year) fixed effects models predicting the independent variable. In the first model, we do not include EFNA or regulatory spending as independent variables. In the second, we include EFNA as an independent variable. In the third, we include our regulatory spending variable, and in the fourth model both EFNA and our regulatory spending variables are included. The goal

is to ascertain whether the regulatory spending variable contributes to the predictive power of the models and thus contributes information that is not included in the EFNA.

In order to measure the robustness of the results, we conduct three robustness checks. We lag all independent variables one year, allowing last year's conditions to determine this year's income level. Additionally, we average our data over every three consecutive years in our panel and transform the series into growth rates.[3] Finally, we construct a factor analysis model to once again measure whether EFNA and our measure of regulatory spending are indeed two separate variables.

Table 2. Full Data Set Descriptive Statistics

Variable	Mean	S.D.	Min	Max
Income	26533	4152	17907	41633
Agriculture	1.57	1.44	0.12	8.15
Manufacturing	14.58	6.26	1.88	30.16
Population	549.56	596.53	46.35	3545
Pop Density	179.53	242.58	1.03	1164
Pct Minority	15.86	11.97	1.32	74.34
Over 65	13.43	11.44	2.33	150.18
Education	23.74	4.67	11.4	38.7
Loans	2.64	4.6	0.07	54.53
Unemplymnt	5.05	1.34	2.2	11.1
Taxes	5.84	1.13	2.58	9.28
EFNA	30.87	7.2	16	50
Regulation	20.98	11.08	6.35	78.07
UnionPct	14.3	5.57	3.8	30.8
Gov Size	28.86	9.65	10	62
Tax Indx	31.14	7.96	9	52
Labr Mrkt	32.53	8.09	12	51

V. Results

A. Regression Analysis

Table 3 presents several sets of correlation coefficients. In the first panel, note that regulation appears to be rather differentiated from the EFNA and its constituent sub-indices, all of which are

[3] After each data transformation, we calculate the summary statistics and construct a correlation matrix, to check for multicollinearity problems. These tables are available upon request.

strongly correlated with each other. In the second panel, note that various "policy variables" which we expect might be related to income determination – tax burden, regulation, and the EFNA and its sub-indices – appear to be differentiated variables. The third panel

Table 3. Sets of Correlation Coefficients

	Regulation	EFNA	Gov Size	Tax Indx	Labr Mrkt
Regulation	1				
EFNA	0.02	1			
Gov Size	-0.01	0.88	1		
Tax Indx	-0.01	0.83	0.64	1	
Labr Mrkt	0.08	0.79	0.52	0.4739	1

	Income	Taxes
Income	1	
Taxes	0	1
Regulation	0	0.2
EFNA	-0.02	0.01
Gov Size	-0.03	-0.02
Tax Indx	-0.12	0.01
Labr Mrkt	0.11	0.05

	Ag	Mfg	Pop	Pop Den	Pct Min	Ovr 65	Ed	Loans	Unemp	Taxes
Ag	1									
Mfg	-0.06	1								
Pop	-0.27	0.06	1							
Pop Den	-0.43	-0.06	0.18	1						
Pct Min	-0.26	-0.16	0.15	0.12	1					
Ovr 65	0.12	-0.09	-0.01	0.02	-0.06	1				
Ed	-0.16	-0.08	0.16	-0.03	-0.01	-0.01	1			
Loans	-0.13	0.02	0.05	0.35	0.05	0.03	-0.1	1		
Unemp	-0.02	-0.01	0.01	-0.01	0.05	0	0.02	-0.06	1	
Taxes	-0.02	0	-0.02	0.02	-0.02	0.01	0.01	-0.07	0.13	1

consists of the correlation coefficients of the control variables we use in our income estimates.

Table 4 presents our first set of regression estimates. As the literature predicts, the less economically free is a state, the lower is its level of income. As we predict, states engaging in more regulatory activity also experience lower income levels. Furthermore, as

Table 4. Fixed-Effects Regression Estimates

Dep. Var.:	**Real Personal Income per Capita**			
	Model1	*Model 2*	*Model 3*	*Model 4*
Agriculture	167.96	266.37 ***	173.91	272.12 ***
	1.23	*3.11*	*1.28*	*3.18*
Manufacturing	57.95	45.84	59.46	47.34
	1.58	*1.24*	*1.63*	*1.3*
Population	-0.77	-1.28	-0.67	-1.19
	-0.46	-0.73	-0.41	-0.69
Pop Density	31.13 ***	23.86 ***	31.41 ***	24.15 ***
	3.58	*2.97*	*3.68*	*3.07*
Pct Minority	-173.78	-277.91 **	-170.49	-274.55 **
	-1.15	*-2.03*	*-1.16*	*-2.06*
Over 65	0.28	-4.3822 **	0.08	-4.57 **
	0.21	*-2.28*	*0.06*	*-2.4*
Education	41.06	14.47	43.47 *	16.88
	1.57	*0.64*	*1.66*	*0.74*
Loans	-24.16 **	-29.46 **	-24.69 **	-29.98 ***
	-2.14	*-2.6*	*-2.21*	*-2.68*
Unemplymnt	2.22	3.72	8.35	9.77
	0.07	*0.13*	*0.26*	*0.34*
Taxes	5.1	6.75	23.11	24.51
	0.17	*0.25*	*0.7*	*0.82*
EFNA		-161.64 ***		-161.44 ***
		-4.36		*-4.33*
Regulation			-7.38 ***	-7.27 ***
			-3.29	*-3.09*
Constant	20073.1 ***	29030.8 ***	19877.6 ***	28827.1 ***
	8.89	*9.26*	*8.88*	*9.24*
R-squared	0.88	0.9	0.8821	0.9
F Stat	691.79	345.84	640.01	354.48

Significant at 90 percent (*), 95 percent (**), and 99 percent (***).

suggested by the summary statistics, the EFNA and the regulation measure are independently significant in explaining income, e.g., we fail to find evidence of multicollinearity. Both the EFNA and regulation are significantly, negatively related to income per capita in a well-specified model.

Table 5. Lagged Data Set Regression Estimates

Dep. Var.:	**Real Personal Income per Capita**			
	Model 1	*Model 2*	*Model 3*	*Model 4*
Agriculture	-207.36	-107.7	-198.06	-97.87
	-1.58	*-0.96*	*-1.52*	*-0.87*
Manufacturing	42.54	32.29	44.87	34.69
	1.12	*0.83*	*1.18*	*0.89*
Population	-1.23	-1.89	-1.27	-1.94
	-0.64	*-0.96*	*-0.67*	*-0.99*
Pop Density	29.66 ***	22.92 ***	29.87 ***	23.13 ***
	3.7	*3.06*	*3.8*	*3.16*
Pct Minority	-80.08	-169.31	-80.46	-169.88
	-0.58	*-1.31*	*-0.59*	*-1.34*
Over 65	3.47 **	-0.37	3.43 **	-0.43
	2.24	*-0.17*	*2.28*	*-0.19*
Education	58.28 **	37.05	60.22 **	39.02
	2.17	*1.5*	*2.25*	*1.57*
Loans	-21.73 **	-25.63 **	-21.93 **	-25.84 **
	-2.05	*-2.43*	*-2.09*	*-2.48*
Unemplymnt	16.25	15.42	21.48	20.85
	0.53	*0.56*	*0.69*	*0.74*
Taxes	10.26	12.74	25.26	28.31
	0.32	*0.43*	*0.69*	*0.83*
EFNA		-143.38 ***		-143.65 ***
		-3.52		*-3.5*
Regulation			-5 *	-5.19 *
			-1.81	*-1.98*
Constant	19493.4 ***	27470 ***	19390 ***	27377 ***
	8.91	*8.41*	*8.85*	*8.35*
R-squared	0.88	0.89	0.88	0.89
F Stat	156.68	127.46	172.43	132.6

Significant at 90 percent (*), 95 percent (**), and 99 percent (***).

To test the robustness of our result, we reprocess our empirical program under different assumptions regarding the data. We transform the data set so that all independent variables have been lagged one year, allowing last year's conditions to determine this year's income level. Our regression estimates are in Table 5. The most significant conclusion from the second set of results is that they

Table 6. "Average Three" Data Set Regression Estimates

Dep. Var.:	**Real Personal Income per Capita**			
	Model 1	*Model 2*	*Model 3*	*Model 4*
Agriculture	-191.5	174.36	-140.07	236.78
	-0.72	*0.72*	*-0.54*	*1.1*
Manufacturing	45.24	41.18	56.59	53.36
	0.91	*0.79*	*1.16*	*1.08*
Population	-0.88	-1.53	-0.77	-1.43
	-0.5	*-0.83*	*-0.46*	*-0.83*
Pop Density	33.83 ***	25.47 ***	34.95 ***	26.52 ***
	3.47	*2.82*	*3.75*	*3.08*
Pct Minority	-218.1	-346.21 *	-206.37	-335.9 *
	-1.15	*-1.88*	*-1.15*	*-1.95*
Over 65	1.31	-5.63 *	0.71	-6.41 **
	0.74	*-1.86*	*0.42*	*-2.15*
Education	71.96	24.04	82.74 *	34.78
	1.54	*0.57*	*1.79*	*0.84*
Loans	-28.85 **	-33.22 **	-33.2 **	-38 ***
	-2.22	*-2.56*	*-2.62*	*-3*
Unemplymnt	3.46	18.4	8.08	23.66
	0.06	*0.34*	*0.14*	*0.45*
Taxes	25.85	32.29	41.41	49.22
	0.33	*0.48*	*0.52*	*0.73*
EFNA		-175.52 ***		-178.8 ***
		-3.49		*-3.59*
Regulation			-22.82 **	-24.64 ***
			-2.45	*-2.82*
Constant	20387	30199.1 ***	19937 ***	29897 ***
	7.22	*7.14*	*7.12*	*7.14*
R-Squared	0.9	0.91	0.9	0.92
F Stat	359.94	249.46	375.21	234.59

Significant at 90 percent (*), 95 percent (**), and 99 percent (***).

support the first set of results in all particulars. The second conclusion is that regulation and economic freedom have both contemporaneous and ongoing impacts on income levels. Therefore, researchers should allow for both these contemporaneous and persistent effects in their estimates.

To allow for the persistent impact of political institutions on economic outcomes, we transform our data set again. We average the data over every three consecutive years in our panel, reducing our observations to four time series observations of U.S. states. Table 6 presents the latest set of regression estimates. As expected, changes in regulation and economic freedom, as institutional or quasi-institutional changes, have a persistent impact on income levels. The important results for our present purpose are that regulation and the EFNA continue to be separate variables, both continue to be significant in explaining income levels, and there continues to be no evidence of multicollinearity when both variables are used in the same regression.

As a final check of our results, we transform our data set into the growth rates (difference in logged values) of all variables. Table 7 presents the growth rate data set regression estimates. Again, we confirm the major finding of the literature. In this case, the growth of economic freedom is associated with the growth of real income per capita. We find similar results for income growth as we found for income levels, although with generally larger standard errors and weaker models. However, we obtain the same basic results. The EFNA and regulatory spending are rather different variables. As states become less free or as their regulatory burden rises, income growth decreases. However, the evidence against multicollinearity between the EFNA and regulation is slightly weaker than in our previous estimates, and regulation is not as strong a predictive variable as previously.

To summarize, regulatory expenditure and the EFNA are separate variables, at least for U.S. states. The EFNA index does not capture all of the significant information found in a state's pattern of regulatory spending. Furthermore, higher levels or faster growth rates of regulatory spending are associated with lower levels of and slower growth in real income per capita. Theoretically, regulation is a governmental choice and activity that impinges on and impedes economic freedom. Therefore, a state's regulatory activity should be included in any economic freedom index. A convenient measure of

regulatory activity is available from U.S. Census data. Our evidence indicates that the EFNA and regulatory spending per capita are statistically differentiated series. Thus, the evidence supports the hypothesis that regulation is not part of the EFNA, but should be part of a complementary index.

Table 7. Growth Rates Data Set Regression Estimates

Dep. Var.:	**Income Growth**			
	Model 1	***Model 2***	***Model 3***	***Model 4***
Agriculture	0.017 ***	0.017 ***	0.017 ***	0.017 ***
	2.88	*3.09*	*2.85*	*3.06*
Manufacturing	-0.01	-0.012	-0.01	-0.012
	-0.64	*-0.78*	*-0.64*	*-0.78*
PopDen	0.186	0.149	0.204	0.161
	1.41	*1.06*	*1.53*	*1.14*
MinPct	0.027	0.028	0.026	0.027
	1.27	*1.4*	*1.23*	*1.37*
Ovr65	0	0.0003	-0.001	0.0002
	-0.17	*0.15*	*-0.24*	*0.07*
Educ	0	-0.001	0.001	-0.0002
	-0.04	*-0.1*	*0.07*	*-0.02*
Loans	0.005 *	0.005 *	0.005 *	0.005 *
	1.92	*1.99*	*1.93*	*1.99*
Unemp	-0.001	-0.001	-0.001	-0.0005
	-0.35	*-0.26*	*-0.26*	*-0.21*
TaxPct	-0.002	-0.002	-0.0001	-0.001
	-0.97	*-0.86*	*-0.04*	*-0.26*
EFNA		-0.08 ***		-0.078 ***
		-3.09		*-3.02*
Reglation			-0.002 *	-0.001
			-1.7	*-1.1*
Constant	-0.006 ***	-0.005 **	-0.006 **	-0.004 *
	-2.9	*-2.24*	*-2.52*	*-2*
R-Squared	0.581	0.6002	0.5822	0.6009
F Stat	102.73	102.75	118.52	113.37

Significant at 90 percent (*), 95 percent (**), and 99 percent (***).

B. Factor Analysis

We now turn to a second line of evidence, factor analysis. Factor analysis will provide us with a statistically determined basis for

reconstructing a freedom index for the U.S. states, rather than relying on *a priori* reasoning. Incidentally, factor analysis will also reinforce the separateness of regulation spending from the other component data of the EFNA. To perform our factor analysis, we use not the constructed EFNA index but rather the underlying component data, as provided by the Fraser Institute (www.freetheworld.com). Factor analysis is similar conceptually and empirically to the principal components analysis Huang, McCormick, and McQuillan (2004) use in constructing the U.S. Economic Freedom Index. We stress that reconstructing an economic freedom index from its components using factor analysis is neither data mining nor "cooking the books." With the exception of the regulatory expenditure data, we rely on the same indicators as Karabegovic et al. (2003).

In all of our factor analyses, independent of rotation, the ordering of variables, or the exclusion of variables, regulatory expenditure has a markedly high uniqueness value, ranging from 0.97 to 0.98. Researchers conventionally consider such high uniqueness values as indicative of a separate factor. Therefore, in addition to the regression analysis presented earlier, factor analysis also supports the hypothesis that regulatory expenditure is separate from the components of the EFNA. However, uniqueness values also indicate that the Fraser Institute's data series for "minimum wage" and "transfers" are also separate factors, despite their inclusion by Karabegovic et al. (2003) in the Labor Market Freedom and the Government Size sub-indices (respectively) of the EFNA.

Including or excluding union density makes little difference in the factor loadings. After excluding regulation, minimum wage, transfers, and union density, the remaining components of the EFNA load on

Table 8. Factor Loadings (Orthogonal Rotation)

Variable	Factor1	Factor2	Factor3	Factor4	Factor5
GovConsExp	0.480	0.700	0.121	-0.078	0.026
SocSec	0.625	0.248	0.166	-0.079	0.081
TaxRev	0.885	0.102	0.305	0.050	-0.001
TaxRate	0.191	0.011	0.758	-0.004	0.005
IndirectTax	0.732	0.146	-0.230	-0.464	-0.013
SalesTax	-0.066	0.090	-0.048	0.752	-0.006
GovEmp	0.003	0.752	-0.070	0.129	-0.014

five factors. The factor analyses strongly reject the hypothesis of complete independence, with chi-squared statistic of 2203.14. Table 8 presents the factor loadings after orthogonal rotation.

Note that Factor Five is generally insignificant, leaving four factors remaining. At this stage, factor analysis always requires a subjective judgment. Rather than refer to the first factor as simply Factor 1, researchers typically ascribe to the factor a descriptive name. Social Security payments as a percentage of GSP, total government revenue from own source as a percentage of GSP, and indirect tax revenue as a percentage of GSP all load onto the first factor. We choose to refer to this factor as "Government Misallocating Income." General consumption expenditures by government as a percentage of GSP and government employment as a percentage of total state employment load onto the second factor. We refer to this factor as "Government Misallocating Resources and Products." The top marginal income tax rate and the income threshold at which it applies load onto the third factor, which we refer to as "Labor Market Tax Distortion." Sales taxes collected as a percentage of GSP loads onto the fourth factor, which we refer to as "Product Market Tax Distortion."

These four factors form part of the basis for a reconstructed economic freedom index for U.S. states. The remaining factors are regulation expenditure per capita, the minimum wage data series, and transfers and subsidies as a percentage of GSP. Using these seven factors, we construct an economic freedom index of the U.S. states analogous to the three-factor EFNA. Each raw-value datum is converted into a score. The rating for this component is equal to:

$$(V_{max} - V_i) / (V_{max} - V_{min})$$

multiplied by 10. In the two elements of our index that have multiple components, we weight the components equally. The final index is constructed by weighting each of the seven components equally. We refer to the resulting index as the "New Index" to distinguish it from the EFNA.

Table 9. Comparing the Descriptive Statistics of Both Indices

Variable	Mean	S.D.	Min	Max
New Index	6.22	0.95	3.72	8.28
EFNA	6.91	0.72	5	8.4

Table 10. Shapiro-Wilkes Test for Normality

Variable	W	V	z	Prob>z
New Index	0.99	3.94	3.32	0.00045
EFNA	0.99	4.59	3.69	0.00011

Table 11. Correlation Coefficients for the New Index

	New Index	EFNA	Regulation
New Index	1		
EFNA	0.88	1	
Regulation	0.25	0.02	1

Table 9 compares the descriptive statistics of the New Index and the EFNA. The descriptive statistics reveal significant differences between the variables' means and standard deviations. Including regulatory spending and reformulating the economic freedom index as we have done reduces the measured value of average economic freedom in U.S. states. Further testing reveals that the New Index is slightly more skewed and more kurtotic. Figures 1 and 2 show the frequency distributions of the two indices. A Shapiro-Wilkes test (Table 10) verifies the normality of both indices. The correlation coefficients (Table 11) reveal strong relationships between the new index and the EFNA, and with the regulation spending series.

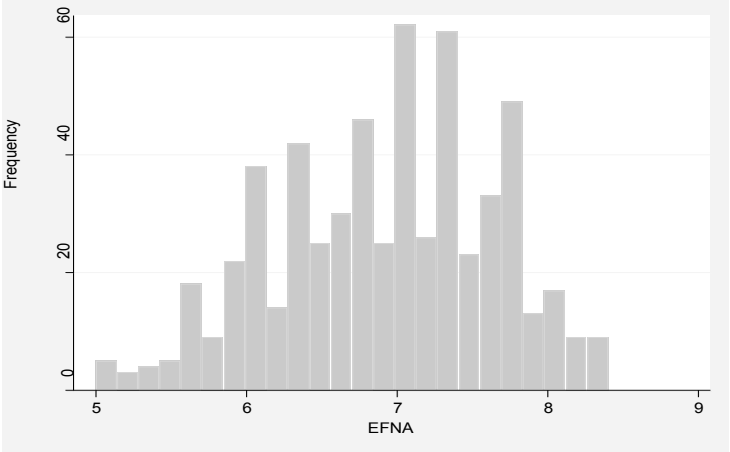

Figure 1. Frequency Distribution of the EFNA

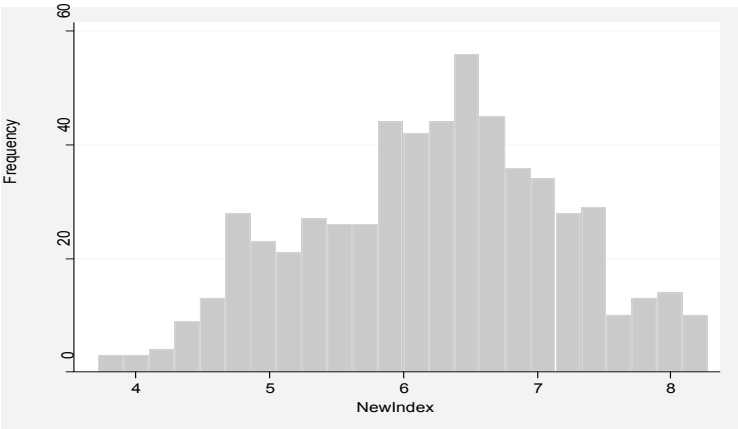

Figure 2. Frequency Distribution of the New Index

In Table 12 we present our regression estimates using the EFNA, regulation spending, and the New Index. Qualitatively, the new index performs similarly to both the EFNA and to regulatory spending per capita. However, when the EFNA, regulatory spending, and the new index are all included as regressors in the same model, we find evidence of multicollinearity, as we hoped. The insignificance of all three variables indicates that the new index "overlaps" the EFNA and regulation expenditure. The re-formulated index captures the information in the EFNA as well as the information in the regulation spending variable.

VI. Conclusion

Economic freedom indices are popular tools for researchers in explaining the variability of economic activity in a given state or country. Over time, the indices have been augmented to better describe economic freedom and to be more accurate and complete tools. They are works in progress and are never complete unless all factors that describe economic freedom are included in the indices. This research demonstrates that states' regulatory activity, as measured by regulatory spending, is a unique variable and that it could be included in an economic freedom index of U.S. states. Inclusion of the regulatory spending variable into the EFNA is theoretically justified and adds to the descriptive power of the index; it is a convenient measure that is readily available from U.S. Census data. Our evidence indicates that the EFNA and regulatory spending per capita are statistically differentiated series. In regressions that

include the economic freedom variable, our measure of regulation is a highly significant variable in predicting income per capita. Thus, the evidence supports the hypothesis that regulation is not part of the EFNA but could be part of a complementary index.

Table 12. Regression Estimates with EFNA and New Index

Dep. Var.:	**Real Personal Income per Capita**				
	Model1	***Model 2***	***Model 3***	***Model 4***	***Model 5***
Agriculture	266.37 ***	173.9	272.12 ***	258.65 **	289.17 ***
	3.11	*1.28*	*3.18*	*2.47*	*3.39*
Manufac	45.84	59.46	47.34	52.87	46.24
	1.24	*1.63*	*1.3*	*1.55*	*1.28*
Population	-1.28	-0.67	-1.19	-1.28	-1.52
	-0.73	*-0.41*	*-0.69*	*-0.83*	*-0.91*
Pop Density	23.86 ***	31.41 ***	24.15 ***	27.94 ***	24.45 **
	2.97	*3.68*	*3.07*	*3.71*	*3.21*
Pct Minority	-277.9 **	-170	-274.6 **	-237.2 *	-283.1 **
	-2.03	*-1.16*	*-2.06*	*-1.77*	*-2.08*
Over 65	-4.38 **	0.08	-4.57 **	-2.86 **	-4.61 **
	-2.28	*0.06*	*-2.4*	*-2.03*	*-2.46*
Education	14.47	43.47 *	16.88	29.18	15.45
	0.64	*1.66*	*0.74*	*1.21*	*0.66*
Loans	-29.46 **	-24.7 **	-29.98 ***	-26.16 **	-28.24 **
	-2.6	*-2.21*	*-2.68*	*-2.5*	*-2.51*
Unemp	3.72	8.35	9.77	18.08	11.21
	0.13	*0.26*	*0.34*	*0.6*	*0.39*
Taxes	6.75	23.11	24.51	40.08	20.8
	0.25	*0.7*	*0.82*	*1.36*	*0.75*
EFNA	-161.6 ***		-161.4 ***		-87.77
	-4.36		*-4.33*		*-1.33*
Regulation		-7.38 ***	-7.27 ***		5.31
		-3.29	*-3.09*		*0.55*
NewIndex				-78.31 ***	-62.2
				-5.13	*-1.24*
Constant	29030 ***	19877 ***	28827 ***	24891 ***	28904 ***
	9.26	*8.88*	*9.24*	*11.27*	*9.23*
R-squared	0.9	0.88	0.9	0.9	0.9
F Stat	345.84	640	354.48	423.62	250.3

Significant at 90 percent (*), 95 percent (**), and 99 percent (***).

The importance of the economic freedom index is reflected by the multitude of research articles that employ the index to explain various economic variables. For North America, the economic freedom index of researcher's choice is – and should continue to be – the EFNA. In this paper, we argue that regulatory activity could be more explicitly included in an economic freedom index of U.S. states. Government regulation is an important component of economic freedom, with freedom retreating as regulation increases. This argument gathers significance and urgency in times of economic crisis, such as today. Traditionally, governments' responses to poor economic conditions have been to increase regulation. However, as regulatory demands on business increase, the effect of the regulatory burden will impose a greater drag on states' economies at precisely the most inauspicious time. Therefore, it is important to increase the "presence" of regulation in indices of economic freedom in order to quantify its impact on economic outcomes.

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