New Interpretations of Indices of Economic Freedom

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I. Introduction

The *Heritage Foundation/Wall Street Journal Index of Economic* Freedom is the best known index documenting the factors affecting economic freedom and showing the relation between measures of economic well-being (Gross Domestic Product in Purchasing Power Parity - GDPPPP, hereafter) and economic freedom. Economic freedom as defined in their annual Index of Economic Freedom is "the absence of government coercion or constraint on the production, distribution, or consumption of goods and services beyond the extent necessary for citizens to protect and maintain liberty itself. In other words, people are free to produce, consume, and invest in the ways they feel are most productive." (Beach and Miles, [2005. p. 1])

The Index is the unweighted average of ten factors deemed to be equally important to determining the level of economic freedom in country. It includes measures of trade policy, the fiscal burden of government, government intervention in the economy, monetary policy, capital flows and foreign investment, banking and finance, wages and prices, property rights, regulation, and informal market activity. (Ibid., p.2) Each factor for each country in the survey is rated on a 1 to 5 scale, the number 1 representing the greatest degree of freedom and 5 the least. Usually a score of 1, 2, 3, 4, or 5 is assigned; although is some categories the scoring is finer, i.e., 1, 1.5, 2 etc.

The validity of the weighting system been examined by Richard Roll [2004] and Lewis Snider [2003 pp. 181-228]. Both employ principal components analysis (PCA) to measures of political and economic freedom. PCA is an effective technique for taking a set of indicators that relate to a concept such as economic freedom and determine how many independent dimensions exist. The n indicators are reduced to a set of $m<n$ orthogonal components that are linear combinations of the indicators. Roll argues that an equal weighting of the indicators in the Heritage measure is not refuted by PCA evidence. Snider finds that the high correlations allow for a reduction of the data to no more than three dimensions or components. Moreover, "*Both the correlation and the factor analyses clearly show how pervasively the attributes of secure property rights and reliable and impartial contract enforcement affect the role of government in society*." (p. 219)

While Roll's major concern in his paper is the correlation among the measures of economic freedom and whether the equal weighting scheme of the measures is the appropriate weighting scheme, Snider goes a step further and puts emphasis on the causal effects of economic freedom on economic performance. For example, in one place Snider writes "…secure property and reliable and impartial contract enforcement are essential for long-term investment of the sort that promotes economic growth." [Snider, p 185] In a second place, he emphasizes, *"that a low political risk, a favorable investment climate, and a minimum of government intervention in the economy contribute significantly to increased foreign direct investment per capita which, in turn, should promote economic growth."* [Snider, p.219]

Clearly, the role of economic freedom in affecting economic growth, while not the purpose of Roll's discussion, is recognized in Heritage Organization's publications. Beach and Driscoll [2003, p. 27] note "Properly constructed constitutions incorporate the concept of negative liberty, constraining governments to the protection of person and property. A system of private property fosters economic growth and wealth creation." Robert Pollock [2003] discusses the lack of progress in the Middle East. He first notes the importance economists Milton Friedman and Robert Lawson place on the role of the rule of law as more basic than property rights [p.31]. Subsequent to his discussion of the particulars in the area Pollock concludes:

> "After all, the Arabs do not lack the desire for freedom-according to the UNDP, about 50 percent of adolescents polled say they would like to emigrate. They do not lack for talent, as countless success stories of those who have already do so attest. And they do not lack an understanding of markets, as anyone who has ever ever visited an Arab souk would know.
>
> The problem is bureaucracy, corruption, and uncertainty make it difficult to build a business bigger than a market stall. If accountable government and the rule of law could be brought to the region, fortunes could grow rapidly." [p. 33]

Matt Laar's [2003] essay contrasts with Pollock's as he notes three key lessons that led to much different results in Estonia. First, the progress observed in Estonia relied on the recognition of the rule of law and that "There can be no market economy and democracy without laws, clear property rights, and a functioning justice system." [p.36] Secondly, adopt reforms and stick with them. For gain, there must be some pain. It is difficult to live with the pain, but it must be done. Finally, competition must be supported and individuals must be allowed to keep the income they earn. Estonia abolished tariffs, became a free-trade zone, dropped subsidies, and introduced a flat-tax. Corporate taxes were abolished on income reinvested domestically. [p.36]

Scandinavia's well-known social welfare systems have long been believed to have handicapped these countries because of their high incidence of taxation and generous social welfare programs. Their disincentive effects have resulted in lower economic growth than otherwise would have occurred. Sara Z. Fitzgerald [2003] has noted that in recent years the level of economic freedom in these countries has been improving.

> All of these countries have improved their overall scores since last year, with four out of five now ranked "free" on the *Index of Economic Freedom*. Notably, Sweden and Iceland have achieved the rank of "free" for the first time. Only Norway, which has adopted some market-orientated reforms, remains "mostly free." [p. 39]

The privatization taking place in the Scandinavian countries, according to Fitzgerald, that includes an open trade policy will increase foreign investment. Moreover, the strong rule of law will also fuel economic growth in these countries.

> As investors continue to abandon markets that are riddled with corruption, whether in Southeast Asia or Latin America, they will be more likely to look to the Nordic countries, where their investment would be buttressed by the rule of law. It is up to the governments in Scandinavia to continue to institute sound market-oriented policies to lift their economies to even greater heights of growth and prosperity. [p. 45]

II. Two issues

It seems clear that indices of economic freedom, particularly the one under of concern of this paper, provide an adequate and useful measure of the degree of economic freedom with countries. Nevertheless, some of the components of the overall index are more likely to be determinants of economic freedom, while others are expressions of the degree of economic freedom. For example, extensive government regulation, the presence of illegal markets, and corruption are the expression of the absence of property rights and, consequently, while associated with the absence of economic freedom and its accompanying prosperity, it is the absence of private property rights that are the causal factor in lesser economic prosperity. Moreover, high taxation and government spending are also expression of the degree of economic freedom and the lessening of property rights. It is difficult to imagine a free monetary regime without significant private property rights. On the other hand, there is the possibility of a significant degree of property rights even though there might be significant trade barriers having the effect of restraining foreign investment and imports, while encouraging exports. When looking at causal factors within the index of economic freedom, one might be encourage to look at the degree of property rights and the extent of free trade policy when looking at the major factors affecting economic growth.

Secondly, examinations of the relationship between economic prosperity and economic freedom usually take the form of plotting GDPPPP on the vertical axis and the degree of economic freedom on the horizontal axis. Fitting of a regression line between the two measures show that as economic freedom increases, so does economic welfare. Moreover, it appears that the relationship between the two measures is a smooth relationship. It seems plausible that this is case; although it also seems plausible that a country may have to reach some level of economic freedom before there can be significant economic progress.

Both issues were examines in our previous work (Banaian and Luksetich [2001]) on central bank independence and economic performance. The Cukerman index of central bank (CB) independence is an index comprising a set of factors indicative of the central bank's independence of the political sector. The components of the CB index are continuous numerical values and the index used in studies of the effects of central bank independence use either the CB index or some weighted average of the components of the CB index.

We dissected the CB index into its component parts and regressed inflation rates of 54 countries on each of the components. Our results showed that it was only the term of office of the governor(s) and the structure of conflict resolution that were associated with lower inflation rates. Moreover, we also found that it only the most wide-ranging powers to the central bank in resolving conflicts with the government lead to lower inflation rates. We concluded that with such powers, economic agents may be very skeptical of the ability of central banks to resists government pressure to deviate from the goal of price stability.

In this paper, we model the usual relationships between measures economic welfare and indices of economic freedom dichotomously. Our results are interpreted as showing that the relationship between the two are not continuously linear; rather they show that a minimum level of economic freedom must be attained before substantial improvements in economic welfare are attained. Moreover, most of the components of the economic freedom measure are irrelevant in affecting economic welfare. Indeed, it is only the presence of significant degrees of private property rights that are important in affecting economic welfare. We are able to use the linear measures to expand the results, though, to pinpoint other potential contributors to economic growth holding property rights constant.

III. Empirical results

The measurements in the Heritage Index are indicators of economic freedom, not necessarily causative. As noted earlier, countries most free receive a score of 1, least free a score of 5. For ease of interpretation, we reverse the scores, so that the least free receive a score of 1 and the most free a score of 5.

Table 1 contains the simple correlations between the overall country freedom scores and country scores in the various categories. Note the high correlations between the overall index and the property rights, regulation, and informal market scores. Moreover, note the high correlations between property rights, regulation, and informal markets scores.

TABLE 1. CORRELATION MATRIX OF VARIABLES

Overall ec. Freedom	1.00										
Trade	0.69	1.00									
Fiscal	0.21	0.14	1.00								
Gov't inter.	0.43	0.19	-0.01	1.00							
Mon. pol.	0.53	0.22	-0.03	0.07	1.00						
For. Inv.	0.78	0.46	0.04	0.33	0.32	1.00					
Banking	0.79	0.46	0.17	0.46	0.33	0.66	1.00				
Wage/price	0.72	0.40	-0.02	0.38	0.38	0.61	0.61	1.00			
Property rights	0.86	0.60	0.07	0.24	0.34	0.63	0.58	0.56	1.00		
Regulation	0.82	0.50	0.14	0.23	0.34	0.60	0.57	0.56	0.81	1.00	
Informal mkts	0.85	0.60	0.14	0.19	0.36	0.60	0.56	0.51	0.86	0.75	1.00
	Overal	Trade	Fiscal	Gov't i	Mon. p	For. In	Bankin	Wage/	Proper	Regula	Informa

Table 2 contains the simple regression results for the relation between per capita GDP in 1990 international dollars and the components of the economic freedom measure. With the exception of the fiscal policy and government intervention measures, all of the components are the overall index of economic freedom are positively and significantly related to per capita GDP. The fiscal policy measure is a weighted average of a country's top marginal income tax rate (25%), its top corporate marginal tax rate (50%), and the year-to-year change in government expenditures as a percent of GDP (25%). The government intervention measure is comprised of measure of state and federal ownership of production facilities and consumption of as a percent of GDP. Privatization factors are also taken into account. Not included in this measure are government regulation and the presence of wage and price controls.

Table 2. Living Standards and Aspects of Economic Freedom

Dependent variable is log of per capita GDP (1990 international dollars)

Component	Coefficient	std. error	R^2
Overall score	**1.757**	**0.139**	**0.51**
Trade	**0.839**	**0.099**	**0.32**
Fiscal policy	0.304	0.182	0.01
Government Intervention	0.212	0.153	0.01
Monetary Policy	**0.437**	**0.102**	**0.10**
Foreign Investment	**0.901**	**0.129**	**0.24**
Banking & Finance	**0.672**	**0.116**	**0.18**
Wage and price controls	**0.855**	**0.170**	**0.14**
Property Rights	**1.059**	**0.076**	**0.56**
Regulation	**1.326**	**0.112**	**0.48**
Informal Markets	**1.139**	**0.068**	**0.65**

Bold indicates significance at 1% level.
Italics indicates signficance at 5% level.
Results are simple regressions of per capita GDP on each measure.
No controls are used, 153 countries in sample.

Note the strong relation between GDP per capita and the property rights, regulation, and the presence of informal markets. Not surprisingly, the simple correlations between property rights and these two measures are .81 and .86, respectively.

The values assigned to most of the components of the overall index of economic freedom took on values from 1 to 5. We construct a set of dummy variables for each measure (taking on the value of 1 if in a specific category, zero otherwise) and regressed per capita GDP on these variables. The coefficients on these variables are relative to the omitted category, the least free measure (i.e., when a country takes on the value of 1). We do this in the attempt to ascertain if the relation between GDP per capita and the index or its component parts is a continuous or a step type of relation. The results reported in Table 3 show that the usual situation is one in which substantial economic freedom is required before there is a significant impact on GDP. Once again, the equations with property rights, regulation, and informal markets as right hand side measures have the greatest explanatory power.

Table 3. Regressions treating steps in freedom components as not equidistant

Component	Value is 2	Value is 3	Value is 4	Value is 5	std. Error	R^2
Trade	0.59155	0.54819	2.6545	3.5337	1.3181	0.39
	1.939	1.689	8.657	3.681		
Monetary Policy	-0.39291	0.31394	0.72469	1.3764	1.5998	0.10
	0.574	0.569	1.332	2.759		
Foreign Investment	-0.35198	0.24625	1.5536	2.6991	1.449	0.26
	0.503	0.367	2.254	3.454		
Banking & Finance	-0.05617	0.55104	1.064	2.7566	1.504	0.20
	0.103	1.061	2.019	4.547		
Wage and price controls	-0.71107	-0.99381	0.73973	2.5339	1.4656	0.24
	0.84	1.317	0.9818	1.546		
Property Rights	0.07594	0.88584	2.6703	3.5076	1.1553	0.59
	0.2145	2.439	6.343	9.019		
Regulation	0.30979	2.3052	3.2266	4.0034	1.3756	0.52
	0.871	6.35	7.558	5.329		

	Value is 1.5	Value is 2	Value is 2.5	Value is 3	Value is 3.5	Value is 4	Value is 4.5	Value is 5	std. error	R^2
Government Intervention	-0.01691	-1.7263	-1.0714	-0.75211	-0.80019	-0.03	-1.692	-1.9699	1.62	0.08
	0.017	1.928	1.207	0.86	0.928	0.04	1.557	1.088		
Informal Markets	-0.24546	0.12851	1.1103	1.6755	2.7203	3.22	3.4999	3.9056	0.92325	0.67
	0.592	0.518	3.919	5.625	5.226	10.09	7.946	11.71		

Table 4 shows the relation between per capita GDP and property rights followed by the relation between GDP and property rights paired with each of the other components of the overall index of economic freedom. While some of the other measures are statistically significant in these equations, none add any explanatory power to the estimates.

Table 4. Property Rights Plus Other Measurements

	Coefficient	Property Rights	std. error	R^2
Property rights alone		1.0591	1.2466	0.56
		13.96		
Trade	**0.27068**	0.90266	1.193	0.58
	2.789	9.706		
Fiscal policy	0.18752	1.051	1.2352	0.56
	1.546	13.89		
Government Intervention	-0.13259	1.0825	1.2416	0.56
	1.268	13.89		
Monetary Policy	0.11678	1.0171	1.235	0.56
	1.555	12.69		
Foreign Investment	0.05735	1.0311	1.2532	0.56
	0.452	10.51		
Banking & Finance	-0.02132	1.0702	1.2546	0.56
	0.205	11.44		
Wage and price controls	-0.14037	1.1081	1.2473	0.56
	0.956	12.1		
Regulation	**0.4679**	0.77889	1.1964	0.58
	2.708	6.114		
Informal Markets	**0.85888**	0.3255	0.9739	0.66
	6.58	2.502		

Finally, in Table 5 we pair property rights with the trade monetary policy and informal market components of the index. Only the informal market variable adds to the explanatory power of the equation, but this measure is a consequence of the loss of property rights or economic freedom, not a cause of the decrease in economic freedom. The property rights index may be picking up the presence of the lack of property rights while the informal market index and the regulation index may be picking extent of property rights.

Running the same regressions using the dummy variable approach yields the same results. However, these estimates add the information that the relation between the effects of property rights (or other measures) on GDP only take effect if there are substantial degrees of economic freedom.

Table 5. Property Rights, Trade and Other Elements of Freedom

Property Rights	**0.86359**	*0.27415*	**0.31929**
	8.996	*2.073*	**2.447**
Trade	**0.26797**	0.16038	
	2.773	1.805	
Monetary Policy	0.11306		0.05388
	1.539		0.8798
Informal Markets		**0.8105**	**0.84348**
		6.126	**6.385**
Standard error	1.1823	0.9594	0.9762
R^2	0.58	0.66	0.66

IV. Relation to other studies

Banaian and Luksetich [2003] employ principal components analysis (PCA) to determine the number of dimensions of central bank independence. Rather than seventeen measures as offered by the most popular index of central bank independence, that paper finds three dimensions. Caudill, Zanella and Mixon [2000] use PCA on both the Heritage and Fraser indices and find that the former has two dimensions and the latter four. The first principal component predicts growth better than the Fraser index itself.

Snider [2004] uses PCA on different measures of economic freedom, along with rankings on corruption and credit ratings to establish three dimensions:

- political risk;
- domestic investment climate; and
- government intervention in the economy.

Snider shows the same dimensionality for the Heritage measure we use and the popular alternative measure from the Fraser Institute's Economic Freedom in the World.[1]

Heckelman and Stroup [2000, 2004] argue that PCA is not an appropriate technique for arriving at a proper aggregation because it fails to provide for any conceptual link between the selection of components in the factors and economic theory. There is no reason *a priori* as well that the first factor acquired in PCA will be correlated with economic growth. And results tend to be sensitive to the choice of countries, years, or scaling of the variables. They use instead hedonic regression. Since they use the Fraser index and do not include measures of property rights (introduced to the Fraser index only after 1995), their results are not directly comparable.

Our data contains a newer set of observations than those in the above-cited studies, and to verify these results we conducted PCA on the ten components of the Heritage index. The results are in Table 6. Using a rule of thumb that we would retain only the those with eignevalues greater than one. Because PCA is sensitive to scaling and the scales of these

[1] For more on the measurement of the Fraser index, see Gwartney and Lawson [2001]..

variables are under question, the analysis is performed on the correlations of the variables rather than the values themselves. The factors are rotated using the Varimax rotation, to show more easily the loading of each variable on the factors.

Table 6. Principal Component Analysis of Heritage Economic Freedom Index

Variable	Factor 1	Factor 2	Factor 3	Factor 4
Trade	-0.762	-0.087	-0.121	-0.037
Fiscal	-0.087	-0.988	-0.000	-0.022
Government Intervention	-0.056	0.026	-0.907	-0.080
Monetary Policy	-0.185	0.016	-0.048	0.942
Foreign Investment	-0.620	0.013	-0.468	0.250
Banking & Finance	-0.506	-0.183	-0.628	0.263
Wage/Price Control	-0.480	0.099	-0.542	0.383
Property Rights	-0.904	0.018	-0.170	0.164
Regulation	-0.818	-0.073	-0.191	0.221
Informal Markets	-0.885	-0.071	-0.109	0.193
Eigenvalues	4.9556	1.1356	1.0168	0.80376
Cumulative%	0.496	0.609	0.711	0.791

Nearly half of the variance in the scores is found on one factor, which is heavily weighted in four variables – property rights, informal markets, government regulation, and international trade. The second factor loads almost only the fiscal variable. The third factor loads government intervention with foreign investment, banking and finance, and wage and price controls. Monetary policy or inflation control dominates the fourth factor, but it appears not to account for much variation in economic freedom between the countries.

These results differ substantially from previous studies. One may be tempted to dismiss PCA as being a rather arbitrary means to organize the data. And the negative weights on some measures might cause concern. To illustrate, we used the four principal components above regressed on GDP per capita.[2] The advantage of the procedure is that the four components are orthogonal and therefore remove the problem of multicollinearity that would arise if we had regressed the ten components together on GDP. The results are shown in Table 7. We then disentangle the components from the four factors back to see the effects.

[2] In the version of this paper presented to the Western Economics Association meetings we included a regression with foreign trade, measured in dollars, as a dependent variable. Further research showed the results are fragile with respect to the year chosen for study, or even for an average of years. We have deleted this part of the paper.

Table 7. Principal Components Regression (t-stats in parentheses)	
	Dependent variable is per capita GDP
Principal Component 1	-6.7196 (14.73)
Principal Component 2	-5.5386 (5.81)
Principal Component 3	3.5267 (3.50)
Principal Component 4	-3.0555 (2.70)
R^2	0.64
Standard error	1.0153

Transformed back to original freedom attributes	Dependent variable is per capita GDP
Trade	0.30144 (9.89)
Fiscal	0.05368 (0.50)
Government Intervention	-0.33244 (4.71)
Monetary Policy	0.01106 (0.18)
Foreign Investment	0.13912 (7.53)
Banking & Finance	0.00953 (0.32)
Wage/Price Control	0.02963 (0.77)
Property Rights	0.32399 (12.42)
Regulation	0.37615 (14.88)
Informal Markets	0.33352 (13.29)

In the GDP regression, government intervention has the wrong sign and is highly significant. Property rights continue to be highly significant, as do trade, regulation and informal markets as we found in Table 4.

We cannot be certain that this will be correct. There is no assurance, for example, that one of the principal components that we dropped for adding little to the variation of the matrix of economic freedom measures does not correlate with GDP growth, or that a later factor might not switch the full effect of government intervention to positive in the per capita GDP regression. Caudill, Zanella and Mixon find that the *sixth* principal component is helpful in predicting GDP growth. One must wonder what economic theory accounts for the first and the sixth being important, but not components two through five?

V. Conclusions

We agree with Heckelman and Stroup [2004, p. 15] that "any conclusions regarding the role of economic freedom in promoting growth based on studies relying on the aggregated {economic freedom index} may be premature," but some results appear to be available from looking at the total of the research. Aggregation creates a problem insofar as some of the elements of these indices of economic freedom may be prior to others; some may depend on the presence of others. The one at the base of many of these, in our view, is property rights. The property rights measure is a summary made by experts of "the degree to which a country's laws protect private property rights and the degree to which its government enforces those laws." (Beach and Miles, [2005, p. 8][3].) It seems only reasonable that those assessments are made on the basis of things like government intervention or wage and price controls. We found in Tables 4 and 5 that once property rights are included, only a few of the remaining nine measures add any explanation to differences in living standards. Even in these cases, we cannot be sure trade, regulation and informal markets are independent of property rights – as we saw in Table 1, they are highly correlated. The principal components regression in Table 7 suggests they might have independent effects, but as we stated before those results should be treated cautiously.

One should also be cautious about using the cardinal scales within these indices. We found that there is little effect of moving from 1 to 2 or even 2.5 for many of the measures within the Heritage index to lead to higher per capita GDP. This would suggest that researchers may want to reduce the number of points on the scales used. It also suggests that results in the later tables might be influenced by mismeasurement of the attributes of economic freedom. Moreover, it appears that changing the weighting scheme does not help matters greatly.[4]

What we hope the reader will take away from this paper is a stronger sense of caution generally about measures of economic freedom. We have argued here that results one would expect – that economic freedom improves living standards – have not held up to scrutiny when subjected to more rigorous testing. Our results on the Heritage index confirm results found previously for the Fraser Institute measure. We do not think the need is for a new index, though. We argue instead that we should try to be sure what we mean by economic freedom and to focus on fewer factors.

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[3] Heritage uses a combination of reports from the Economist Intelligence Unit, the Commercial Guides from the U.S. Department of Commerce, and the U.S. Department of State's reports on human rights practices. The Commerce Department guides are derived from embassy reports and the State Department.

[4] For example, we attempted to simply recode the property rights measure dichotomously, using the original lesser two categories as a zero and the upper three categories as a 1. We get

$$\log(\text{GDP per capita}) = 1.94 + 6.63 * \text{recoded property rights}, \ R^2 = 0.33$$

Both coefficients are highly significant. The results are somewhat worse than those for property rights provided in Table 3 but not at all implausible.

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