



---

*Department of Economics*

*Working Paper Series*

---

# An Ordinal Ranking of Economic Institutions

*Scott Beaulier, Robert Elder, Cheryl Han and Joshua Hall*

Working Paper No. 15-12

This paper can be found at the College of Business and Economics  
Working Paper Series homepage:

[http://be.wvu.edu/phd\\_economics/working-papers.htm](http://be.wvu.edu/phd_economics/working-papers.htm)

# An Ordinal Ranking of Economic Institutions

Scott Beaulier  
W.P. Carey School of Business  
Arizona State University  
Scott.Beaulier@asu.edu

Robert Elder  
Department of Economics  
Beloit College  
elder@beloit.edu

Cheryl Han  
Department of Economics  
Beloit College

Joshua C. Hall  
Associate Professor of Economics  
College of Business and Economics  
West Virginia University  
joshua.hall@mail.wvu.edu

## Abstract

We provide the first ranking of countries' economic institutions using an ordinal methodology. Using the five areas of the Fraser Institute's Economic Freedom of the World (EFW) Index, we find that final rankings of a country's institutions are sensitive to the importance-ordering of Area 1 (Size of Government). When Areas 2-5 are in the most important position, we find that there is no significant difference between the EFW rankings and our rankings. When Area 1 is placed in the most important position, however, a number of European countries with large welfare states but good governance do poorly.

JEL Codes: E02, 043

Keywords: economic freedom; ordinal; net dominance metric

Acknowledgements: We thank workshop participants in Suffolk University's Department of Economics for helpful comments and suggestions. Bob Elder and Cheryl Han benefited from the Sanger Summer Scholars program at Beloit College, and they sincerely thank Jim and Marge Sanger for financial support. The authors also thank Ann Davies, Robert Lawson, Dan Sutter, Charles Westerberg, and Rachael Wogsland for their helpful comments. The contents of the paper are the sole responsibility of the authors, and they do not reflect the views of Jim and Marge Sanger or those who administer the Sanger Summer Scholars program at Beloit College. Hall would like to acknowledge that a portion of this work occurred while he was a Big XII Fellow at Texas Tech University with the Free Market Institute.

# An Ordinal Ranking of Economic Institutions

## 1 Introduction

Each year, the Fraser Institute's *Economic Freedom of the World (EFW)* annual report (Gwartney et al. 2014) measures and ranks the economic freedom of 152 different countries around the world. The rank is based on a summary index with scores ranging from a value of 0 to 10, with higher scores reflecting more economic freedom. The index is determined by average scores earned in five areas: (1) Size of Government: Expenditures, Taxes, and Enterprises; (2) Legal Structure and Property Rights; (3) Access to Sound Money; (4) Freedom to Trade Internationally; and (5) Regulation of Credit, Labor, and Business. The EFW has been used as a measure of institutions in hundreds of scholarly papers (Hall and Lawson 2014).

The EFW report's index score for any particular country is the simple average of the cardinal scores in the five areas. In the EFW report, Gwartney et al. (2009, 9) reflect on how the five areas of economic freedom are weighted:

Theory provides us with direction regarding elements that should be included in the five areas and the summary index, but it does not indicate what weights should be attached to the components within the areas or among the areas in the construction of the index. It would be nice if these factors were independent of each other and a weight could be attached to them. During the past several years, we have investigated several methods of weighting the various components, including principle component analysis and a survey of economists. We have also invited others to use their own weighting structure if they believe that is preferable. In the final analysis, the summary index is not very sensitive to substantial variations in the weights.

We examine the index's sensitivity by using an alternative ranking methodology. Like previous attempts to generate alternative EFW aggregates (Sturm et al. 2002, Caudill et al. 2000, Heckelman and Stroup 2000), our approach produces a different

summary index, and this alternative index allows us to rank countries according to their relative levels of economic freedom. The main benefit of our approach is that we eschew cardinal weights across areas of the freedom index in favor of an ordinal approach. As pioneered by Cherchye and Vermeulen (2006) and adapted by Beaulier and Elder (2011), we employ a Net Dominance Metric (NDM), or “dominetric” that relies upon the importance-ordering of the five areas of the EFW. In this regard, our work is similar to Hall and Yu (2012) who use the dominetric approach to provide an alternative ranking of the institutions of US state governments.

Although Gwartney, Lawson, and Hall (2009, 9) note that “the summary index is not very sensitive to substantial variations in the weights,” our NDM approach produces economic freedom rankings that are sensitive to the importance-ordering of the five areas. In particular, our dominetrics reveal Area 1 (Size of Government: Expenditures, Taxes, and Enterprises) to be very different than Areas 2-5. While the NDM and the equally-weighted EFW Index can serve as substitutes when Areas 2, 3, 4, or 5 are ordered as most important, the EFW Index and NDM are not substitutable when Area 1 is deemed most important.

In the next section, we describe our methodology. A complete set of our rankings appears in the Appendix, and a discussion of the salient aspects of our results occurs in Section 3. Section 4 concludes and provides additional commentary on the Area 1 effect.

## 2 A Comparison between Cardinal and Ordinal Approaches

Before reporting on similarities and differences between the EFW and NDM rankings, we first contrast the Cherchye and Vermeulen (2006) ranking methodology with the

Gwartney et al. (2014) methodology. Consider two hypothetical countries, A and B, and let  $S_1^A$  denote Country A's EFW score in Area 1,  $S_1^B$  denote Country B's EFW score in Area 1,  $S_2^A$  denote Country A's EFW score in Area 2, and so on. Since the EFW summary index for any country equals its average score across the five dimensions of performance, its overall score emerges from a cardinal-weighting scheme. For example, Country A's EFW Summary Index =  $0.2S_1^A + 0.2S_2^A + 0.2S_3^A + 0.2S_4^A + 0.2S_5^A$ . Country A would have a higher EFW rank than Country B if  $0.2S_1^A + 0.2S_2^A + 0.2S_3^A + 0.2S_4^A + 0.2S_5^A > 0.2S_1^B + 0.2S_2^B + 0.2S_3^B + 0.2S_4^B + 0.2S_5^B$ .

A simple average is one way to combine the area scores to form a rating and then a ranking. The Cherchye and Vermeulen (2006) approach is another method, and it relies on an importance-ordering imposed upon the five areas of performance. Suppose someone deems Area 3 of the EFW report to be the most important dimension of economic freedom, Area 5 to be second most important, Area 2 to be third most important, Area 1 to be fourth most important, and Area 4 to be fifth most important. Let this person's importance-ordering be denoted by the 5-tuple (3,5,2,1,4). Country A "dominates" Country B if all the following criteria are satisfied:

$$\text{Criterion 1: } S_3^A \geq S_3^B;$$

$$\text{Criterion 2: } S_3^A + S_5^A \geq S_3^B + S_5^B;$$

$$\text{Criterion 3: } S_3^A + S_5^A + S_2^A \geq S_3^B + S_5^B + S_2^B;$$

$$\text{Criterion 4: } S_3^A + S_5^A + S_2^A + S_1^A \geq S_3^B + S_5^B + S_2^B + S_1^B;$$

$$\text{Criterion 5: } S_3^A + S_5^A + S_2^A + S_1^A + S_4^A \geq S_3^B + S_5^B + S_2^B + S_1^B + S_4^B.$$

The most important dimension of performance (here Area 3) affects all five criteria, the next most important (here Area 5) affects four of the criteria, and so on.

Domination can be achieved in the absence of Pareto-superiority. For Country A to be Pareto-superior to Country B, the following criteria would have to be satisfied, and at least one of the following weak inequalities would have to be replaced with a strong inequality.

$$\text{Criterion 1: } S_1^A \geq S_1^B;$$

$$\text{Criterion 2: } S_2^A \geq S_2^B;$$

$$\text{Criterion 3: } S_3^A \geq S_3^B;$$

$$\text{Criterion 4: } S_4^A \geq S_4^B;$$

$$\text{Criterion 5: } S_5^A \geq S_5^B.$$

Given the importance-ordering (3,5,2,1,4), Criterion 1 for domination and Criterion 3 for Pareto-superiority are the same:  $S_3^A \geq S_3^B$ . In addition, if Criterion 5 for Pareto-superiority ( $S_5^A \geq S_5^B$ ) is violated, Criterion 2 for domination ( $S_3^A + S_5^A \geq S_3^B + S_5^B$ ) still can be satisfied if  $S_3^A - S_3^B \geq S_5^B - S_5^A$ . Here we have an illustration of Cherchye and Vermeulen's compensation principle: even when two countries are Pareto-unrankable, one country still can dominate the other if its advantage in the more important dimension of performance is greater than or equal to its disadvantage in the less important dimension of performance.

Finally, a Net Dominance Metric is determined for any given country by taking the difference between the quantity of countries it dominates and the quantity of countries it is dominated by. Countries are then ranked by their dominetric totals, from highest to

lowest. The following short numerical example illustrates the ordinal methodology described above.

Consider the four countries in the Southern Common Market, or MERCOSUR. Suppose again that a hypothetical consumer of the EFW report has a preferred importance-ordering given by (3,5,2,1,4). The first column of Table 1 lists MERCOSUR's four member states alphabetically. The next five columns show EFW Area Scores  $S_i$  earned for the year 2007. In the final five columns of Table 2,  $\Sigma_j$  denotes the sum of scores earned by each country in the  $j$  most important areas.

Since  $S_3^{\text{Uruguay}} > S_3^{\text{Brazil}}$  and  $S_5^{\text{Uruguay}} > S_5^{\text{Brazil}}$  and  $S_2^{\text{Uruguay}} > S_2^{\text{Brazil}}$  and  $S_1^{\text{Uruguay}} > S_1^{\text{Brazil}}$  and  $S_4^{\text{Uruguay}} > S_4^{\text{Brazil}}$ , the first five columns of Table 2 reveal Uruguay's economic freedom to be Pareto-superior to Brazil's. Given the satisfaction of the preceding inequalities, the inequalities  $\Sigma_1^{\text{Uruguay}} > \Sigma_1^{\text{Brazil}}$ ,  $\Sigma_2^{\text{Uruguay}} > \Sigma_2^{\text{Brazil}}$ ,  $\Sigma_3^{\text{Uruguay}} > \Sigma_3^{\text{Brazil}}$ ,  $\Sigma_4^{\text{Uruguay}} > \Sigma_4^{\text{Brazil}}$ , and  $\Sigma_5^{\text{Uruguay}} > \Sigma_5^{\text{Brazil}}$  necessarily hold (as confirmed by the final five columns of data in Table 2). Therefore, by the Cherchye-Vermeulen criteria, Uruguay's economic freedom dominated Brazil's economic freedom in 2007.

If we compare Uruguay with Argentina, however, we note that although  $S_3^{\text{Uruguay}} > S_3^{\text{Argentina}}$ ,  $S_5^{\text{Uruguay}} > S_5^{\text{Argentina}}$ ,  $S_2^{\text{Uruguay}} > S_2^{\text{Argentina}}$ , and  $S_4^{\text{Uruguay}} > S_4^{\text{Argentina}}$ , the fact that  $S_1^{\text{Uruguay}} < S_1^{\text{Argentina}}$  makes Uruguay and Argentina Pareto-unrankable. Nevertheless, the inequalities  $\Sigma_1^{\text{Uruguay}} > \Sigma_1^{\text{Argentina}}$  and  $\Sigma_2^{\text{Uruguay}} > \Sigma_2^{\text{Argentina}}$  and  $\Sigma_3^{\text{Uruguay}} > \Sigma_3^{\text{Argentina}}$  and  $\Sigma_4^{\text{Uruguay}} > \Sigma_4^{\text{Argentina}}$  and  $\Sigma_5^{\text{Uruguay}} > \Sigma_5^{\text{Argentina}}$  are all satisfied, Uruguay's economic freedom dominated Argentina's economic freedom. From the Uruguay-Brazil example, a Pareto-relationship necessarily implies a dominance relationship; from the Uruguay-Argentina

example, a dominance relationship can exist in the absence of a Pareto relationship. And, to reiterate: Dominance relationships occur more frequently than Pareto relationships because of the compensation principle. In the case above, the amount by which Uruguay out-performs Argentina in the three most important areas (here, areas 3, 5, and 2) more than compensates for the amount by which Argentina out-performs Uruguay in the fourth most important area (here, area 1):

$$\Sigma_3^{\text{Uruguay}} - \Sigma_3^{\text{Argentina}} = 19.94 - 16.08 = 3.86 > 0.02 = 7.43 - 7.41 = S_1^{\text{Argentina}} - S_1^{\text{Uruguay}}$$

The compensation principle cannot always transform a Pareto-unrankable pair into a dominance-rankable pair. For instance, let us look at Uruguay and Paraguay. First we see  $S_3^{\text{Paraguay}} = 8.24 > 8.10 = S_3^{\text{Uruguay}}$  but  $S_5^{\text{Paraguay}} = 5.41 < 6.00 = S_5^{\text{Uruguay}}$ . Uruguay and Paraguay are, therefore, Pareto-unrankable. In addition, the amount ( $8.24 - 8.10 = 0.14$ ) by which Paraguay outperforms Uruguay in the most important area (here area 3) fails to compensate for the amount ( $6.00 - 5.41 = 0.59$ ) by which Uruguay outperforms Paraguay in the second most important area (here area 5). Therefore, Uruguay and Paraguay are also dominance-unrankable.

Finally, the Net Dominance Metric is simply the quantity of countries dominated minus the quantity of countries dominated by. Therefore, NDMs can be calculated through the construction of a matrix with 1, 0, or  $-1$  elements. As we can see in Table 2, for any cell with a 1, the row country dominates the column country. Uruguay dominates Brazil and Argentina, so the Uruguay row shows a 1 in the Brazil column as well as a 1 in the Argentina column. For any cell with a 0, no dominance relationship exists. Since Uruguay and Paraguay are dominance-unrankable, the Uruguay row shows a 0 in the Paraguay column, and the Paraguay row shows a 0 in the Uruguay column. For any cell



with a  $-1$ , the row country is dominated by the column country. Since Brazil and Argentina are each dominated by Uruguay, a  $-1$  appears in the Brazil row and Uruguay column, and a  $-1$  appears in the Argentina row and Uruguay column. In general, any (row  $x$ , column  $y$ ) element and any (row  $y$ , column  $x$ ) element must sum to zero. Finally, since any country's Net Dominance Metric equals countries dominated minus countries dominated by, the dominetric can be obtained simply by summing the 1s, 0s, and  $-1$ s across the country's row. The resulting dominetrics (NDM) for our 4-country MERCOSUR example are shown in the final column of Table.

### 3 Economic Freedom Country Rankings Generated through Ordinal Approaches

In the preceding example, Uruguay's Net Dominance Metric would earn it a 1<sup>st</sup> place economic freedom ranking in MERCOSUR; Brazil's and Paraguay's dominetrics of 0 would produce a tie for 2<sup>nd</sup> place; and Argentina's NDM of  $-2$  would yield a last place finish. The data we use to provide this 4-country example are part of the much larger EFW report. In the remainder of our analysis we use the chain-linked EFW data for 122 countries in 2007. Given a set of 122 countries, NDMs span the range from a maximum of 121 to a minimum of  $-121$ . (We also have calculated the same NDMs for the same set of countries in 2000 and have similar results as reported in the remainder of this paper.)

Given the existence of five dimensions of performance, there are 120 different importance-orderings (5-factorial different orderings) that can be used to obtain the NDMs upon which country rankings can be based. Any particular reader of the EFW report might have his or her own preferred importance-ordering. Subsequently, for each

year we group the 24 sets of NDM results when Area 1 is assumed most important, the 24 sets of NDM results when Area 2 is assumed most important, etc. Average NDM results over each set of 24 outcomes are then obtained for each of the five cases and are presented in Appendix Tables A1-A5.

To get a better sense of how our rankings compare to the EFW, Table 3 compares average summary rankings from Tables A1-A5 with the EFW ranking for the countries ranked 1-40 in 2007. The first (far left) column of Table 3 shows the EFW chain-linked ranking in 2007; the remaining columns show a country's NDM rank when EFW areas 1-5 are most important. As can be seen, while a country's EFW ranking and NDM ranking in Area 2-5 is close in most cases, Area 1 is a different matter. For example, Denmark, which never scores lower than 21 in any other ranking, is 72 when Area 1 is most important. Austria, which never ranks lower than 15, ranks 47 when Area 1 is most important. Finland, which never ranks lower than 29, ranks 63 when Area 1 is most important.

To explore the potential substitutability of EFW and NDM rankings, first consider a hypothetical reader of the EFW report who thinks Area 4, Freedom to Trade Internationally, is the more important dimension of economic freedom. Then, given a linear regression model of the form,

$$\text{NDM Rank (Area 4 Most Important)}_i = \beta_1 + \beta_2 \text{EFW Rank}_i + u_i,$$

the null hypothesis of no significant difference between the EFW ranking and the NDM ranking (Area 4 most important) can be tested by  $H_0: \beta_1 = 0$  and  $H_0: \beta_2 = 1$ . In other words, failure to reject the null hypotheses of a vertical intercept of zero and a slope of one is a failure to reject the null hypothesis that the 45° line best fits the relationship

between these two rankings. If we can infer that the 45° line is the line of best fit, we must also infer that NDM rankings, when Area 4 is most important, do not provide a significantly different product from the EFW rankings that already exist.

Table 4 highlights results from five such regressions estimated for the year 2007. In each regression, the EFW country rank provides the explanatory variable. The dependent variable in each set of five regressions is the NDM country rank when Area 1, 2, 3, 4, or 5 is most important. When Areas 2, 3, 4, or 5 were treated as most important,  $\beta_1 = 0$  resides inside each 99% confidence interval, and  $\beta_2 = 1$  resides inside each 99% confidence interval as well. Thus, we fail to reject the null hypothesis that the EFW rank can be used to fit the NDM rank with a 45° line in the year 2000 as well as the year 2007, and in both of these years we therefore infer that there is no significant difference between the EFW product and the NDM product for any consumer of economic freedom rankings whose subjective belief is that Area 2, 3, 4, or 5 is the most important dimension of economic freedom. Moreover, the EFW rank explains 86.2% to 93.6% of the variation in the NDM rank in these eight regressions.

When we treat Area 1 as the most important dimension, however, the EFW rank explains only 48.8% of the variation in the NDM rank in 2000 and 56.6% of the variation in the NDM rank in 2007. Given the 99% confidence intervals, we reject  $H_0: \beta_1 = 0$  and  $H_0: \beta_2 = 1$  in both 2000 and 2007, and therefore we also reject the null hypothesis that the fitted line is the 45° line in each of the two years mentioned above. Thus, we reject the null hypothesis of no significant difference between the EFW rankings and the NDM rankings when Area 1 is deemed most important.

Figure 1 illustrates a scenario where the dependent variable remains the Area 1 NDM rank. We see the regression line fitted through the scatter of 122 observations for the year 2007. Observations from the European Union are highlighted. In 2007, we find Cyprus, the Slovak Republic, Greece, U.K., Ireland, Estonia, and Lithuania below the fitted regression line. Twenty of the 27 E.U. countries maintain positive residuals, and many continue to reside along the upper periphery of the scatter. Given  $\hat{\beta}_1 = 15.232$  and  $\hat{\beta}_2 = 0.75233$ , the fitted regression line for 2007 intersects the 45° line at EFW rank = 61.5. Once again, therefore, the best-performing 50 percent of countries in the EFW rankings are fitted above the 45° line (and consequently are predicted to have worse Area 1 rankings), and once more the opposite remains true for the worst-performing 50 percent of countries.

To explore this further, Figure 2 displays NDM rankings from Tables A1 through A5 for the European countries that rank in the top 20 of world GDP per capita. A hockey stick pattern appears fairly clear for the year 2007. Countries with uniformly worse economic freedom rankings when Area 1 is deemed most important have steadfastly better economic freedom rankings when Areas 2, 3, 4, or 5 are deemed most important.

## 4 Concluding Discussion

Our analysis uses the ordinal ranking methodology from Cherchye and Vermeulen (2006) to rank the institutions of countries using the five areas of the EFW index. Our analysis could be pushed back one step further and be used to calculate NDMs using all 42 components of the EFW index, although this would become increasingly complex as our

current 5 Area approach generates 120 different rankings. This complexity highlights one of the primary benefits of the weighting approach of the EFW, namely that of simplicity and transparency (Lawson, 2008). In terms of trade-offs, we find little difference between NDM rankings generated when Areas 2-5 of the EFW are considered to be most important and the overall EFW rankings.

We do find, however, that NDMs are sensitive to the position of Area 1 in the importance ordering. Moreover, we find the resulting economic freedom rankings that emerge from NDMs, which assume Area 1 to be most important, to be significantly different from rankings generated from the cardinal-based EFW summary index. Finally, these significantly-different Area-1-Most-Important rankings display a tendency to attribute relatively poor economic freedom performance in relatively high real GDP per capita European countries. From our perspective, this finding confirms and highlights what individuals using the EFW index have long known – that Area 1 (Size of Government) is different than the other four areas of the EFW.

This should not be taken as a criticism of the inclusion of Area 1 and its components. This area and its' components are clearly consistent with the negative liberty definition of economic freedom Gwartney et al. (2014) have used since the beginning (Gwartney and Lawson 2000). Our results serve as a reminder of three important points. First, economic freedom is not 'good stuff' (Bologna and Hall, 2014). It is a definition, rigorously applied. It is not a sign of a bad measurement to have areas or components of economic freedom that do not correlate positively with growth or other positive outcomes. For some people, the whole point of measuring economic freedom is to find what trade-offs between economic freedom and other goods and values might

exist. Second, individuals vary in their preferences and for those individuals who strongly value a large government relative to other features of economic freedom, then equal weighting of areas is going to be an inappropriate measure for them as individuals. Third, Area 1 is unique among the five EFW areas in that it can help to support or retard the other areas of economic freedom (Bologna and Hall, 2014).

Our approach here helps to better understand the EFW measure of institutions and its limitations in a manner similar to the recent paper by Huskinson and Lawson (2015). While not directly addressing recent debates on how not to measure institutions (Voigt 2013; Shirley 2013; Robinson 2013), it does inform those debates. It could also be applied to other measures of institutions, such as the recent measure developed by Kunčič (2014).

Table 1  
 An Example of the Transformation of EFW Area Scores into Dominetrics

	$S_3$	$S_5$	$S_2$	$S_1$	$S_4$	$\Sigma_1$	$\Sigma_2$	$\Sigma_3$	$\Sigma_4$	$\Sigma_5$
Argentina	7.11	5.11	3.86	7.43	6.39	7.11	12.22	16.08	23.51	29.91
Brazil	7.51	5.50	4.74	6.01	6.36	7.51	13.01	17.75	23.76	30.12
Paraguay	8.24	5.41	2.13	7.44	7.42	8.24	13.65	15.78	23.21	30.63
Uruguay	8.10	6.00	5.84	7.41	7.05	8.10	14.10	19.94	27.35	34.40

Note: Given the importance-ordering (3,5,2,1,4),  $\Sigma_1 = S_3$ ,  $\Sigma_2 = S_3 + S_5$ ,  $\Sigma_3 = S_3 + S_5 + S_2$ ,  $\Sigma_4 = S_3 + S_5 + S_2 + S_1$ , and  $\Sigma_5 = S_3 + S_5 + S_2 + S_1 + S_4$ .

Table 2  
 An Example of Dominance Relationships to NDM

Country	Argentina	Brazil	Paraguay	Uruguay	NDM
Argentina	--	- 1	0	- 1	- 2
Brazil	1	--	0	- 1	0
Paraguay	0	0	--	0	0
Uruguay	1	1	0	--	2



Table 3  
A Comparison of Rankings for Top 40 EFW Countries, 2007

Country	EFW Rank	Rank When Area 1 Most Important	Rank When Area 2 Most Important	Rank When Area 3 Most Important	Rank When Area 4 Most Important	Rank When Area 5 Most Important
Hong Kong	1	1	2	3	1	2
Singapore	2	2	6	7	2	1
Switzerland	3	3	3	2	28	5
New Zealand	4	15	1	1	6	3
Chile	5	4	21	13	3	4
Ireland	6	19	7	5	4	12
United States	7	9	16	4	10	6
United Kingdom	8	18	11	11	12	9
Canada	9	21	8	8	25	10
Australia	10	17	5	9	34	14
Denmark	11	72	10	21	15	8
Austria	12	47	4	10	14	19
Estonia	13	16	22	15	5	11
Mauritius	14	5	18	19	16	21
Taiwan	15	13	30	6	9	15
Oman	16	59	19	31	21	7
Finland	17	63	9	17	29	22
Unit. Arab Em.	18	20	24	47	7	13
Netherlands	19	78	17	22	13	25
Germany	20	52	12	20	19	47
Cyprus	21	22	20	18	27	35
Luxembourg	22	74	14	25	17	40
Iceland	23	26	15	49	62	17
Costa Rica	24	10	25	36	20	48
Malta	25	48	23	14	24	37
Norway	26	53	13	35	51	34
Kuwait	27	35	26	39	47	16
Slovak Rep	28	30	37	27	8	31
Panama	29	7	52	26	11	38
El Salvador	30	6	67	30	35	20
Bahrain	31	37	38	38	18	23
Korea	32	33	33	12	42	32
Jordan	33	54	39	37	23	26
France	34	73	27	23	37	56
Japan	35	51	29	16	64	33
Guatemala	36	11	56	32	30	30
Hungary	37	65	34	40	22	41
Portugal	38	69	32	24	46	54
Lithuania	39	28	45	45	36	29
Sweden	40	91	28	41	39	49

Table 4

OLS Estimation of the Equation  $\text{NDM Rank}_i = \beta_1 + \beta_2 \text{EFW Rank}_i + u_i$ 

Dependent Variable	$\beta_1$ : 99% Confidence Interval	$\beta_2$ : 99% Confidence Interval	$R^2$
NDM Rank, Area 1 Most Important, 2007	[ 4.08, 26.39]	[0.59, 0.91]	0.566
NDM Rank, Area 2 Most Important, 2007	[- 2.28, 7.30]	[0.89, 1.03]	0.920
NDM Rank, Area 3 Most Important, 2007	[- 2.27, 7.49]	[0.89, 1.03]	0.917
NDM Rank, Area 4 Most Important, 2007	[- 2.03, 9.83]	[0.85, 1.02]	0.877
NDM Rank, Area 5 Most Important, 2007	[- 1.89, 10.70]	[0.84, 1.02]	0.862

Figure 1  
Regression Line Where NDM Rank Most Important, 2007

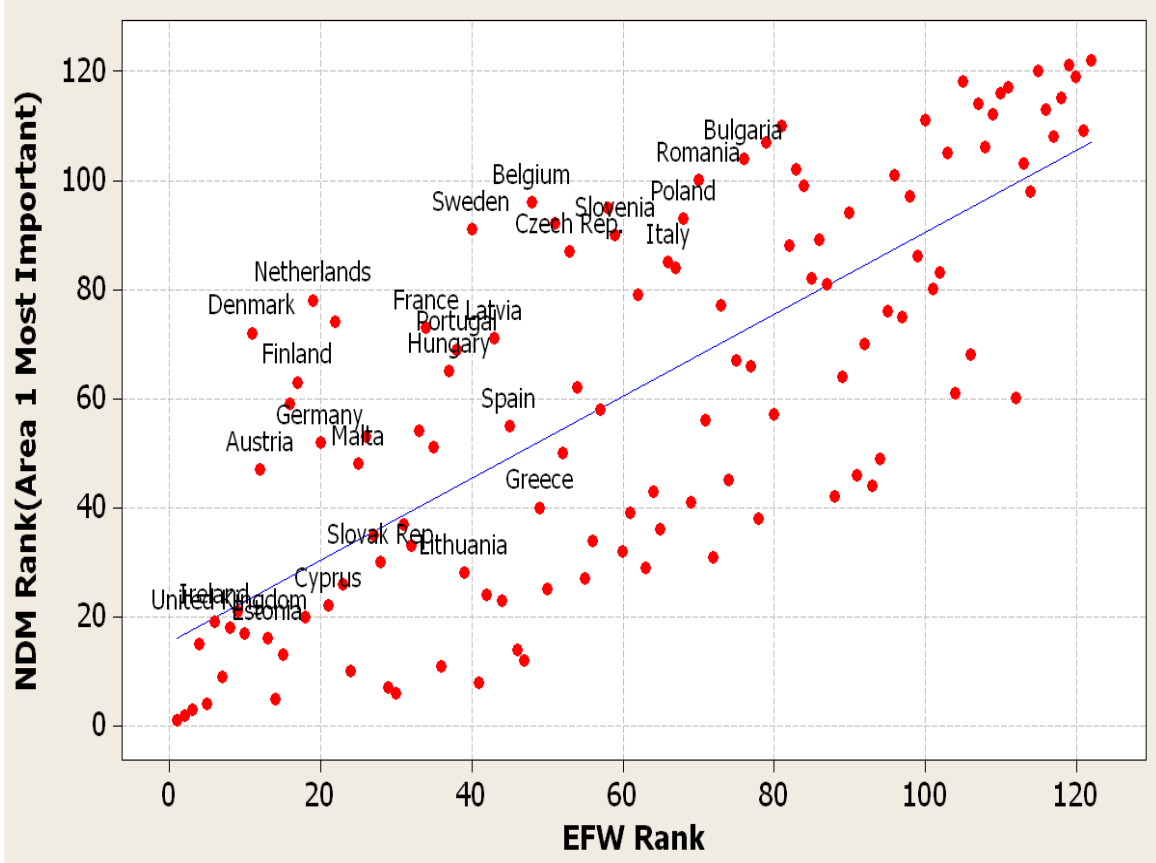
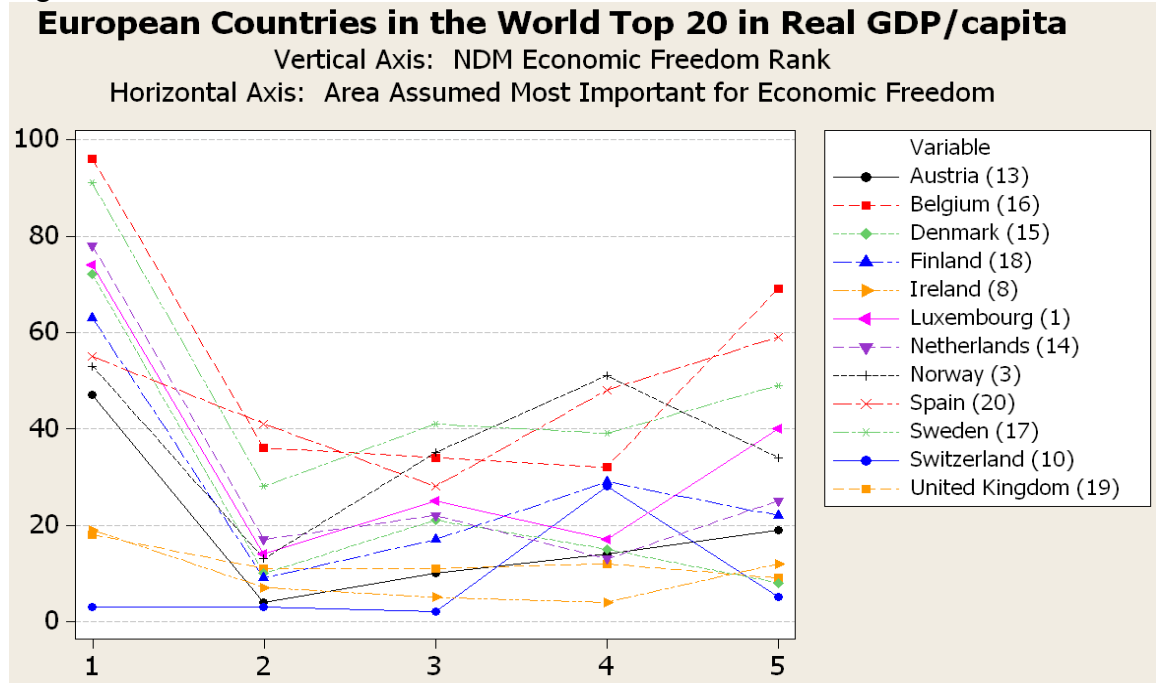


Figure 2



Note: Each country's world rank in GDP per capita in 2007 shown in parentheses.

Appendix Table A1  
Country Rankings When Area 1 (Size of Government) Is Most Important

Rank	Country	Avg. NDM	Rank	Country	Avg. NDM	Rank	Country	Avg. NDM
1	Hong Kong	119.0	42	Haiti	20.8	83	Cameroon	-19.5
2	Singapore	104.4	43	Egypt	20.8	84	Namibia	-23.0
3	Switzerland	97.6	44	Cote d'Ivoire	20.2	85	Italy	-25.6
4	Chile	95.2	45	Nicaragua	18.4	86	Sri Lanka	-26.9
5	Mauritius	86.1	46	Madagascar	18.0	87	Czech Rep.	-27.5
6	El Salvador	78.3	47	Austria	17.6	88	Nigeria	-29.5
7	Panama	75.8	48	Malta	15.5	89	Iran	-30.2
8	Albania	74.3	49	Sierra Leone	13.7	90	Slovenia	-35.2
9	United States	71.3	50	Belize	13.5	91	Sweden	-35.3
10	Costa Rica	69.8	51	Japan	12.7	92	Israel	-35.4
11	Guatemala	69.5	52	Germany	12.1	93	Poland	-35.5
12	Jamaica	68.4	53	Norway	12.1	94	Bolivia	-35.9
13	Taiwan	65.3	54	Jordan	12.0	95	Botswana	-36.7
14	Honduras	63.1	55	Spain	11.2	96	Belgium	-37.6
15	New Zealand	60.7	56	Uganda	10.4	97	Gabon	-44.3
16	Estonia	60.6	57	Mali	10.4	98	Chad	-45.7
17	Australia	58.1	58	Barbados	10.0	99	Tanzania	-46.5
18	U.K.	55.4	59	Oman	9.9	100	Romania	-47.6
19	Ireland	54.5	60	Togo	8.6	101	Brazil	-48.0
20	Unit. Arab Em.	53.1	61	Bangladesh	6.2	102	Tunisia	-56.0
21	Canada	52.0	62	Ghana	4.8	103	Nepal	-56.5
22	Cyprus	51.5	63	Finland	4.2	104	Bulgaria	-56.8
23	Zambia	50.2	64	Dom. Rep.	4.0	105	Syria	-59.0
24	Bahamas	49.1	65	Hungary	3.9	106	Senegal	-62.6
25	Peru	43.5	66	Indonesia	3.3	107	China	-63.5
26	Iceland	39.5	67	India	2.8	108	Cen. Afr. Rep.	-68.3
27	Trinidad & Tob.	34.4	68	Ecuador	2.2	109	Myanmar	-69.2
28	Lithuania	32.8	69	Portugal	2.0	110	Croatia	-69.6
29	Kenya	31.8	70	Paraguay	-1.1	111	Malawi	-71.8
30	Slovak Rep	31.3	71	Latvia	-1.4	112	Ukraine	-73.4
31	Philippines	30.8	72	Denmark	-1.7	113	Congo, D. R.	-82.3
32	Uruguay	28.7	73	France	-3.4	114	Colombia	-90.5
33	Korea	28.5	74	Luxembourg	-3.4	115	Niger	-90.9
34	South Africa	28.4	75	Argentina	-4.2	116	Burundi	-93.5
35	Kuwait	27.2	76	Benin	-5.7	117	Algeria	-94.0
36	Mexico	25.3	77	Pap. N. Guinea	-9.0	118	Guyana	-101.3
37	Bahrain	25.0	78	Netherlands	-13.2	119	Venezuela	-107.8
38	Turkey	24.0	79	Malaysia	-13.6	120	Guinea-Bissau	-113.4
39	Thailand	23.5	80	Pakistan	-16.5	121	Congo, Rep. Of	-114.0
40	Greece	23.0	81	Morocco	-17.0	122	Zimbabwe	-115.3
41	Fiji	22.8	82	Russia	-19.2			

Note: Area 1 is held constant in the first position of all importance orderings. Here, therefore, are the average NDM results in 2007 for the following 24 importance orderings: (1,2,3,4,5), (1,2,3,5,4), (1,2,4,3,5), (1,2,4,5,3), (1,2,5,3,4), (1,2,5,4,3), (1,3,2,4,5), (1,3,2,5,4), (1,3,4,2,5), (1,3,4,5,2), (1,3,5,2,4), (1,3,5,4,2), (1,4,2,3,5), (1,4,2,5,3), (1,4,3,2,5), (1,4,3,5,2), (1,4,5,2,3), (1,4,5,3,2), (1,5,2,3,4), (1,5,2,4,3), (1,5,3,2,4), (1,5,3,4,2), (1,5,4,2,3), and (1,5,4,3,2).

Appendix Table A2  
Country Rankings When Area 2 (Legal Structure and Property Rights) Is Most Important

Rank	Country	Avg. NDM	Rank	Country	Avg. NDM	Rank	Country	Avg. NDM
1	New Zealand	108.6	42	Latvia	27.5	83	Mali	-38.9
2	Hong Kong	106.5	43	Botswana	26.6	84	Russia	-39.0
3	Switzerland	105.1	44	South Africa	26.5	85	Indonesia	-43.0
4	Austria	103.8	45	Lithuania	24.3	86	Malawi	-44.0
5	Australia	103.4	46	Fiji	23.9	87	Uganda	-47.5
6	Singapore	102.8	47	Malaysia	23.5	88	Syria	-50.6
7	Ireland	102.1	48	Greece	23.1	89	Benin	-52.3
8	Canada	100.5	49	Belize	22.3	90	Brazil	-52.8
9	Finland	99.7	50	Slovenia	21.1	91	Gabon	-52.9
10	Denmark	98.9	51	Zambia	20.7	92	Dom. Rep.	-54.0
11	U.K.	97.7	52	Panama	18.6	93	Nicaragua	-55.3
12	Germany	91.8	53	Israel	18.4	94	Sri Lanka	-59.8
13	Norway	90.9	54	Jamaica	16.3	95	Sierra Leone	-65.0
14	Luxembourg	89.0	55	Ghana	15.6	96	Ukraine	-67.4
15	Iceland	88.7	56	Guatemala	14.5	97	Cote d'Ivoire	-67.9
16	United States	84.5	57	Czech Rep.	9.5	98	Argentina	-69.1
17	Netherlands	83.7	58	Egypt	7.9	99	Bolivia	-73.2
18	Mauritius	78.6	59	Uruguay	7.3	100	Guyana	-73.2
19	Oman	78.3	60	Thailand	5.1	101	Madagascar	-73.7
20	Cyprus	78.2	61	India	4.0	102	Algeria	-76.0
21	Chile	77.3	62	Trinidad & Tob.	1.8	103	Senegal	-77.6
22	Estonia	76.2	63	Poland	-0.3	104	Cameroon	-79.3
23	Malta	73.5	64	Tunisia	-2.6	105	Pakistan	-79.6
24	Unit. Arab Em.	70.1	65	Albania	-2.7	106	Colombia	-82.8
25	Costa Rica	65.1	66	Italy	-3.3	107	Paraguay	-82.9
26	Kuwait	64.9	67	El Salvador	-3.9	108	Haiti	-83.5
27	France	63.7	68	Peru	-9.8	109	Guinea-Bissau	-87.8
28	Sweden	60.0	69	Mexico	-11.3	110	Bangladesh	-87.8
29	Japan	58.8	70	Honduras	-12.9	111	Ecuador	-88.7
30	Taiwan	58.8	71	Romania	-17.0	112	Niger	-91.5
31	Bahamas	57.3	72	Tanzania	-18.8	113	Togo	-92.5
32	Portugal	53.0	73	Turkey	-20.0	114	Burundi	-95.8
33	Korea	50.5	74	Kenya	-21.2	115	Myanmar	-104.4
34	Hungary	47.0	75	Croatia	-22.3	116	Cen. Afr. Rep.	-106.3
35	Barbados	44.0	76	Iran	-23.3	117	Nepal	-108.0
36	Belgium	42.2	77	Morocco	-24.8	118	Chad	-108.3
37	Slovak Rep	41.3	78	Pap. New Guinea	-26.0	119	Congo, Dem. R.	-109.3
38	Bahrain	40.9	79	China	-26.9	120	Zimbabwe	-110.4
39	Jordan	40.6	80	Nigeria	-29.8	121	Congo, Rep. Of	-110.8
40	Namibia	35.9	81	Philippines	-32.8	122	Venezuela	-115.3
41	Spain	33.3	82	Bulgaria	-37.7			

Note: Area 2 is held constant in the first position of all importance orderings. Here, therefore, are the average NDM results in 2007 for the following 24 importance orderings: (2,1,3,4,5), (2,1,3,5,4), (2,1,4,3,5), (2,1,4,5,3), (2,1,5,3,4), (2,1,5,4,3), (2,3,1,4,5), (2,3,1,5,4), (2,3,4,1,5), (2,3,4,5,1), (2,3,5,1,4), (2,3,5,4,1), (2,4,1,3,5), (2,4,1,5,3), (2,4,3,1,5), (2,4,3,5,1), (2,4,5,1,3), (2,4,5,3,1), (2,5,1,3,4), (2,5,1,4,3), (2,5,3,1,4), (2,5,3,4,1), (2,5,4,1,3), and (2,5,4,3,1).

Appendix Table A3  
Country Rankings When Area 3 (Sound Money) Is Most Important

Rank	Country	Avg. NDM	Rank	Country	Avg. NDM	Rank	Country	Avg. NDM
1	New Zealand	106.4	42	Peru	37.5	83	Namibia	-41.5
2	Switzerland	103.2	43	Czech Rep.	37.0	84	Tanzania	-42.3
3	Hong Kong	101.5	44	Italy	36.9	85	Madagascar	-43.7
4	United States	99.8	45	Lithuania	35.8	86	Burundi	-44.1
5	Ireland	98.8	46	Honduras	35.3	87	Fiji	-46.1
6	Taiwan	94.5	47	Unit. Arab Em.	35.0	88	Sierra Leone	-46.5
7	Singapore	92.0	48	Israel	34.7	89	Tunisia	-51.0
8	Canada	81.5	49	Iceland	30.8	90	India	-51.2
9	Australia	80.3	50	Latvia	28.1	91	Brazil	-53.1
10	Austria	80.0	51	Zambia	26.4	92	Syria	-55.3
11	U.K.	78.5	52	Slovenia	23.3	93	Turkey	-55.5
12	Korea	74.3	53	Trinidad & Tob.	20.8	94	Argentina	-55.5
13	Chile	72.5	54	Uganda	20.8	95	Morocco	-57.5
14	Malta	71.9	55	Jamaica	19.8	96	Nigeria	-57.9
15	Estonia	70.6	56	Kenya	18.6	97	Colombia	-60.0
16	Japan	70.5	57	Poland	15.8	98	Benin	-61.0
17	Finland	70.2	58	Botswana	14.8	99	Guyana	-61.3
18	Cyprus	70.1	59	Belize	12.2	100	Cote d'Ivoire	-61.6
19	Mauritius	69.8	60	Egypt	9.2	101	Togo	-64.3
20	Germany	67.7	61	China	7.8	102	Cameroon	-65.3
21	Denmark	67.7	62	Ghana	5.1	103	Malawi	-69.4
22	Netherlands	67.3	63	Nicaragua	3.5	104	Dom. Rep.	-74.0
23	France	65.7	64	Romania	2.5	105	Congo, Dem. R.	-76.3
24	Portugal	60.9	65	Uruguay	-0.4	106	Bangladesh	-78.3
25	Luxembourg	60.8	66	South Africa	-5.5	107	Pakistan	-79.1
26	Panama	60.3	67	Mexico	-6.2	108	Senegal	-79.4
27	Slovak Rep	60.1	68	Philippines	-7.7	109	Nepal	-80.2
28	Spain	59.1	69	Bahamas	-10.8	110	Gabon	-81.5
29	Greece	58.9	70	Haiti	-13.1	111	Sri Lanka	-82.8
30	El Salvador	58.3	71	Bulgaria	-14.3	112	Cen. Afr. Rep.	-84.3
31	Oman	56.0	72	Russia	-23.3	113	Niger	-93.3
32	Guatemala	55.4	73	Thailand	-24.3	114	Algeria	-93.6
33	Albania	50.0	74	Croatia	-27.2	115	Ecuador	-96.9
34	Belgium	50.0	75	Paraguay	-27.2	116	Ukraine	-102.1
35	Norway	49.5	76	Barbados	-30.6	117	Guinea-Bissau	-102.8
36	Costa Rica	49.0	77	Bolivia	-31.4	118	Chad	-103.1
37	Jordan	48.7	78	Indonesia	-33.0	119	Congo, Rep. Of	-111.5
38	Bahrain	46.2	79	Pap. New Guinea	-35.9	120	Venezuela	-113.4
39	Kuwait	46.0	80	Malaysia	-36.0	121	Myanmar	-117.7
40	Hungary	42.1	81	Iran	-38.0	122	Zimbabwe	-121.0
41	Sweden	41.6	82	Mali	-39.3			

Note: Area 3 is held constant in the first position of all importance orderings. Here, therefore, are the average NDM results in 2007 for the following 24 importance orderings: (3,1,2,4,5), (3,1,2,5,4), (3,1,4,2,5), (3,1,4,5,2), (3,1,5,2,4), (3,1,5,4,2), (3,2,1,4,5), (3,2,1,5,4), (3,2,4,1,5), (3,2,4,5,1), (3,2,5,1,4), (3,2,5,4,1), (3,4,1,2,5), (3,4,1,5,2), (3,4,2,1,5), (3,4,2,5,1), (3,4,5,1,2), (3,4,5,2,1), (3,5,1,2,4), (3,5,1,4,2), (3,5,2,1,4), (3,5,2,4,1), (3,5,4,1,2), and (3,5,4,2,1).

Appendix Table A4  
Country Rankings When Area 4 (Freedom to Trade Internationally) Is Most Important

Rank	Country	Avg. NDM	Rank	Country	Avg. NDM	Rank	Country	Avg. NDM
1	Hong Kong	121.0	42	Korea	35.9	83	Croatia	-30.1
2	Singapore	119.0	43	Thailand	33.5	84	Madagascar	-30.3
3	Chile	105.5	44	Pap. New Guinea	33.1	85	Mali	-31.2
4	Ireland	105.2	45	Ghana	32.9	86	Haiti	-32.7
5	Estonia	93.7	46	Portugal	30.7	87	Barbados	-35.7
6	New Zealand	90.1	47	Kuwait	28.8	88	Fiji	-38.9
7	Unit. Arab Em.	87.0	48	Spain	22.3	89	Tunisia	-43.2
8	Slovak Rep	84.3	49	Jamaica	21.5	90	Argentina	-48.0
9	Taiwan	81.4	50	Malaysia	20.2	91	Ecuador	-49.0
10	United States	80.8	51	Norway	18.2	92	Tanzania	-53.0
11	Panama	76.5	52	Bulgaria	18.0	93	Cote d'Ivoire	-53.5
12	U.K.	73.6	53	Romania	14.5	94	Brazil	-53.5
13	Netherlands	69.4	54	Uruguay	10.3	95	Morocco	-54.3
14	Austria	69.0	55	Trinidad & Tob.	9.6	96	Sri Lanka	-55.2
15	Denmark	68.8	56	Slovenia	8.4	97	Russia	-55.3
16	Mauritius	68.7	57	Nicaragua	5.4	98	Togo	-57.8
17	Luxembourg	66.8	58	Italy	4.0	99	Bangladesh	-62.6
18	Bahrain	66.1	59	South Africa	3.0	100	Pakistan	-66.0
19	Germany	64.8	60	Albania	2.9	101	Ukraine	-66.8
20	Costa Rica	64.8	61	Mexico	1.8	102	Gabon	-69.6
21	Oman	63.4	62	Iceland	1.5	103	Iran	-73.3
22	Hungary	62.5	63	Botswana	0.8	104	Sierra Leone	-74.0
23	Jordan	56.2	64	Japan	0.6	105	Colombia	-74.5
24	Malta	54.8	65	Philippines	0.5	106	Senegal	-75.4
25	Canada	53.8	66	Greece	-0.3	107	Benin	-75.5
26	Honduras	53.4	67	Kenya	-0.7	108	Algeria	-75.9
27	Cyprus	53.2	68	China	-2.7	109	Syria	-76.0
28	Switzerland	51.4	69	Egypt	-3.3	110	Malawi	-78.2
29	Finland	50.6	70	Nigeria	-4.5	111	Cameroon	-79.5
30	Guatemala	45.3	71	Poland	-5.4	112	Niger	-82.0
31	Czech Rep.	44.3	72	Indonesia	-5.5	113	Chad	-90.5
32	Belgium	43.0	73	Paraguay	-9.2	114	Guinea-Bissau	-93.0
33	Israel	42.8	74	Namibia	-10.1	115	Congo, Dem. R.	-93.8
34	Australia	42.6	75	Uganda	-12.0	116	Nepal	-94.3
35	El Salvador	42.0	76	Dom. Rep.	-17.1	117	Burundi	-99.9
36	Lithuania	41.1	77	Guyana	-17.6	118	Congo, Rep. Of	-102.0
37	France	40.5	78	India	-19.0	119	Cen. Afr. Rep.	-113.1
38	Peru	37.9	79	Turkey	-22.6	120	Venezuela	-114.5
39	Sweden	37.3	80	Bahamas	-25.4	121	Myanmar	-119.7
40	Zambia	37.0	81	Bolivia	-26.8	122	Zimbabwe	-120.0
41	Latvia	36.1	82	Belize	-30.1			

Note: Area 4 is held constant in the first position of all importance orderings. Here, therefore, are the average NDM results in 2007 for the following 24 importance orderings: (4,1,2,3,5), (4,1,2,5,3), (4,1,3,2,5), (4,1,3,5,2), (4,1,5,2,3), (4,1,5,3,2), (4,2,1,3,5), (4,2,1,5,3), (4,2,3,1,5), (4,2,3,5,1), (4,2,5,1,3), (4,2,5,3,1), (4,3,1,2,5), (4,3,1,5,2), (4,3,2,1,5), (4,3,2,5,1), (4,3,5,1,2), (4,3,5,2,1), (4,5,1,2,3), (4,5,1,3,2), (4,5,2,1,3), (4,5,2,3,1), (4,5,3,1,2), and (4,5,3,2,1).



Appendix Table A5  
Country Rankings When Area 5 (Regulation) Is Most Important

Rank	Country	Avg. NDM	Rank	Country	Avg. NDM	Rank	Country	Avg. NDM
1	Singapore	113.8	42	Malaysia	26.5	83	Haiti	-28.8
2	Hong Kong	113.1	43	Uganda	26.1	84	Indonesia	-29.3
3	New Zealand	106.7	44	Namibia	24.1	85	Philippines	-31.3
4	Chile	103.5	45	Thailand	23.1	86	Italy	-31.5
5	Switzerland	100.5	46	Zambia	21.4	87	Egypt	-37.0
6	United States	98.3	47	Germany	20.9	88	India	-40.8
7	Oman	91.3	48	Costa Rica	19.8	89	Cote d'Ivoire	-41.8
8	Denmark	89.5	49	Sweden	19.5	90	Tanzania	-46.6
9	United Kingdom	86.3	50	Israel	18.8	91	Bolivia	-52.2
10	Canada	83.9	51	Mexico	17.6	92	Benin	-52.2
11	Estonia	81.3	52	Pap. New Guinea	15.0	93	Dom. Rep.	-52.2
12	Ireland	77.6	53	Mali	13.3	94	Madagascar	-52.9
13	Unit. Arab Em.	76.8	54	Portugal	12.3	95	Guyana	-53.4
14	Australia	73.5	55	Jamaica	11.2	96	Malawi	-53.4
15	Taiwan	72.2	56	France	10.2	97	Paraguay	-56.7
16	Kuwait	68.2	57	Peru	9.8	98	Morocco	-56.9
17	Iceland	67.6	58	South Africa	9.6	99	China	-57.2
18	Belize	62.6	59	Spain	8.8	100	Sri Lanka	-57.3
19	Austria	62.4	60	Trinidad & Tob.	8.4	101	Russia	-58.7
20	El Salvador	60.8	61	Romania	7.2	102	Guinea-Bissau	-60.0
21	Mauritius	54.5	62	Czech Rep.	6.8	103	Iran	-60.2
22	Finland	53.7	63	Botswana	6.5	104	Bangladesh	-64.1
23	Bahrain	53.5	64	Ghana	5.2	105	Cameroon	-64.6
24	Bahamas	53.0	65	Gabon	4.9	106	Brazil	-68.3
25	Netherlands	52.7	66	Nicaragua	3.2	107	Ecuador	-70.0
26	Jordan	51.9	67	Kenya	2.5	108	Argentina	-70.5
27	Latvia	48.9	68	Honduras	2.2	109	Congo, Rep. Of	-70.9
28	Barbados	47.1	69	Belgium	-2.0	110	Colombia	-72.6
29	Lithuania	45.0	70	Burundi	-3.9	111	Ukraine	-82.6
30	Guatemala	40.8	71	Bulgaria	-5.8	112	Syria	-91.2
31	Slovak Rep	39.5	72	Sierra Leone	-6.7	113	Senegal	-93.5
32	Korea	37.1	73	Greece	-8.5	114	Algeria	-95.2
33	Japan	36.9	74	Slovenia	-9.1	115	Chad	-102.5
34	Norway	35.2	75	Croatia	-9.3	116	Togo	-103.9
35	Cyprus	34.7	76	Uruguay	-10.5	117	Cen. Afr. Rep.	-109.1
36	Fiji	34.3	77	Nigeria	-16.4	118	Congo, Dem. R.	-109.9
37	Malta	32.6	78	Turkey	-17.1	119	Venezuela	-111.2
38	Panama	32.4	79	Pakistan	-17.8	120	Myanmar	-114.0
39	Albania	29.8	80	Tunisia	-18.3	121	Niger	-114.9
40	Luxembourg	27.6	81	Poland	-21.8	122	Zimbabwe	-118.4
41	Hungary	27.0	82	Nepal	-27.5			

Note: Area 5 is held constant in the first position of all importance orderings. Here, therefore, are the average NDM results in 2007 for the following 24 importance orderings: (5,1,2,3,4), (5,1,2,4,3), (5,1,3,2,4), (5,1,3,4,2), (5,1,4,2,3), (5,1,4,3,2), (5,2,1,3,4), (5,2,1,4,3), (5,2,3,1,4), (5,2,3,4,1), (5,2,4,1,3), (5,2,4,3,1), (5,3,1,2,4), (5,3,1,4,2), (5,3,2,1,4), (5,3,2,4,1), (5,3,4,1,2), (5,3,4,2,1), (5,4,1,2,3), (5,4,1,3,2), (5,4,2,1,3), (5,4,2,3,1), (5,4,3,1,2), and (5,4,3,2,1).

## References

- Beaulier, S., and R. Elder (2011), 'Employing the 'Dominetrics to Impose Greater Discipline on Performance Rankings', *Journal of Sports Economics* **12**(1): 55-80.
- Bologna, J. and J. Hall (2014), 'Economic Freedom Research: Some Comments and Suggestions,' in J. Hall (ed.), *Economic Freedom and Economic Education, Ideas and Influence of James Gwartney*, Beloit, WI: Beloit College Press.
- Caudill, S., Zanella, F., and F. Mixon (2000), 'Is Economic Freedom One Dimensional? A Factor Analysis of Some Common Measures of Economic Freedom', *Journal of Economic Development* **25**(1): 17-40.
- Cherchye, L. and F. Vermeulen (2006), 'Robust Rankings of Multidimensional Performances,' *Journal of Sports Economics*, **7**(4): 359-373.
- Gwartney, J. and R. Lawson (2000), 'Developing a Measure of Economic Freedom', in W. Rushing (ed.) *The Visible Hand: The Challenge to Private Enterprise in the 21st Century*, East Lansing, MI: Michigan State University Press.
- Gwartney, J. R. Lawson, and J. Hall (2009). *Economic Freedom of the World: 2009 Annual Report*, Vancouver, Canada: Fraser Institute.
- Gwartney, J. R. Lawson, and J. Hall (2014). *Economic Freedom of the World: 2014 Annual Report*, Vancouver, Canada: Fraser Institute.
- Hall, J. and R. Lawson (2014), 'Economic Freedom of the World: An Accounting of the Literature', *Contemporary Economic Policy* **32**(1): 1-19.
- Hall, J. and D. Yu (2012), 'Ranking the Economic Freedom of North America using Dominetrics', *Economics Bulletin* **32**(3): 1949-1961.
- Heckelman, J. and M. Stroup (2000), 'Which Economic Freedoms Contribute to

- Growth?', *Kyklos* **53**(4): 527-544.
- Huskinson, T. and R. Lawson (2015), 'Clusters of Economic Freedom', *Applied Economics Letters* **21**(15): 1070-1074.
- Kunčič, A. (2014), 'Institutional Quality Dataset', *Journal of Institutional Economics* **10**(1): 135-161.
- Lawson, R. (2008). 'On the Methodology of the Economic Freedom of the World Index', K. Banaian and B. Roberts (eds.), *The Design and Use of Political Economy Indicators*, New York: Palgrave Macmillan.
- Robinson, J.A. (2013), 'Measuring Institutions in the Tobriand Islands: A Comment on Voigt's Paper', *Journal of Institutional Economics*, **9**(1): 27-29.
- Shirley, M. M. (2013), 'Measuring Institutions: How to be Precise though Vague', *Journal of Institutional Economics*, **9**(1): 31-33.
- Sturm, J., E. Leertouwer, and J. de Haan (2002), 'Which Economic Freedoms Contribute to Growth? A Comment', *Kyklos* **55**(3): 403-416.
- Voigt, S. (2013), 'How (Not) to Measure Institutions', *Journal of Institutional Economics*, **9**(1): 1:26.