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Measuring Effective Democracy:

A Defense

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ABSTRACT

Against recent criticism, this article demonstrates that the Index of Effective Democracy (*EDI*) has scale properties that are fully consistent with the normative premises of the index's construction logic. Empirically, it is shown that the *EDI* deviates from all other indices of democracy in a perfectly intended way that incorporates substantiating qualities of democracy which the other indices neglect. As a result, the *EDI* outperforms all other democracy indices in its associative strength with key theoretical correlates of democracy, conditional and consequential. From a substantive point of view, the *EDI* is the most reliable and valid index of democracy that is currently available.

Note: A final version of this paper is forthcoming in *International Political Science Review* (33:1, 2012), and will constitute the primary source of reference to this work.

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INTRODUCTION

Since the Third Wave of Democratization (Huntington 1991), the world has witnessed an inflation of electoral democracies. Many of these new democracies lack substantial qualities, such as the protection of human rights. Thus, various scholars champion more substantiated concepts of democracy—concepts that diminish democracy for lack of a substantiating quality (Collier & Levitsky 1997; Collier & Adcock 1999). Because there is agreement that democracy is first and foremost an institutional concept, the focus is on deficiencies in essential *institutional* qualities, not on deficiencies in democracy's socioeconomic or sociocultural prerequisites (Adcock & Collier 2001). Among the deficient institutional qualities, rule of law looms the largest—and for good reasons, as we will see (Rose 2000; O'Donnell 2003).

So far, all attempts at further qualifications of democracy are *categorical*, distinguishing various types of 'defective' democracies (Diamond 2002; Merkel 2004). In contrast, Welzel (2003) proposes a *continuous* index of 'effective' democracy. This index downgrades the combined Freedom House ratings of civil liberties and political rights for deficiencies in rule of law. Welzel, Klingemann and Inglehart (2003) and Inglehart and Welzel (2005) used this index extensively in quantitative analyses to examine the relationship between modernization, human values, and democracy.

Hadenius and Teorell (2005) criticized the effective democracy index, arguing that it confuses the concepts of democracy and rule of law. In response, Welzel and Inglehart (2006) clarify that the index does not *confuse* democracy with rule of law but *qualifies* democracy by rule of law, using a substantiating--not an averaging--logic of combination.

Recently, Alexander and Welzel (2008, 2011) tested the performance of the effective democracy index against the six democracy indices that are most widely used in comparative research, including the Polity Democracy-Autocracy Index, the Vanhanen Electoral Democracy Index, the Cingranelli/Richards Empowerment Rights Index, the World Bank's Voice and Accountability Index, the Economist's Democracy Index and the original Freedom House ratings. As a result, the effective democracy index outperforms the other democracy indices in showing stronger associations with democracy's key theoretical correlates, including economic prosperity, distributional equality, civic values, civil society and—as we will see—peace. Furthermore, the index of effective democracy uncovers a pattern that remains hidden under other measures of democracy: the *global rareness of electoral democracy* before the Third Wave has been replaced by a similar *rareness of effective democracy* today.

Unaware of these contributions, Knutsen (2010) criticizes an old version of the effective democracy index that uses Transparency International's Corruption Perception Index as a proxy for rule of law. The new version of the effective democracy index, by contrast, uses the more broadly based and fine-graded Rule of Law Index from the World Bank's Good Governance Project (Kaufman, Kraay & Mastruzzi 2008).

Nevertheless, Knutsen formulates some novel criticisms that might apply to the new version of the effective democracy index. Because measuring democracy is a central topic in political science, this is an important question that has not been examined yet. Hence, this article tests to what extent Knutsen's critique is justified with respect to the new version of the effective democracy index.

The article is organized into the following sections. The first section summarizes the construction logic of the effective democracy index. Then we analyze Knutsen's criticisms point by point in the subsequent section. The results suggest a refusal of the criticisms. Consequently, we re-establish the merits of the effective democracy index in the concluding section.

THE INDEX OF EFFECTIVE DEMOCRACY

Theoretical Background

The authors of the effective democracy index start from an emancipative notion of democracy that is implicit in liberal and contractual thought (Held 2006) and expressed in Dahl's (1989) and Sen's (1999) characterization of democracy as a tool of 'human development.' These notions coincide with Brettschneider's (2007) self-governance theory of democracy and are integrated in Welzel and Inglehart's (2008) human empowerment framework. The emancipative notion defines as the key purpose of democracy the equal empowerment of ordinary people to govern their lives based on their own, and mutually agreed, preferences.[1]

From the emancipative point of view, popular rights that entitle people to make their own choices in individual matters and to have their choices count in collective matters are first-order tools of democracy. Self-governance in this sense means the combination of private freedom of choice in personal matters and political freedom of choice in public matters. Since these freedoms must be equally available for everyone, equality is a qualifying attribute of freedoms.

In legal terms, private freedom of choice is granted by personal autonomy rights while public freedom of choice is granted by political participation rights. As equal rights of the 'demos,' autonomy rights and participation rights combine into 'democratic rights,' which only in conjunction entitle people fully to govern themselves.

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[1]   For a more detailed elaboration of this position, see Note 1 in the Appendix.

Distinct from the *definitional* property, there is a *substantiating* quality that is needed to put the definitional property effectively into practice. Because rights are a legal phenomenon defined by laws, the most obvious institutional quality needed to put rights into practice is rule of law (O'Donnell 2003; Warren 2006). In the sense of law enforcement, rule of law is not itself a definitional property of democracy because law enforcement is not an exclusive quality of democracies. As demonstrated by Alexander and Welzel (2011), different degrees of law enforcement are also found among autocracies. Nevertheless, rule of law is a substantiating quality of democracy's key definitional property--democratic rights--because rights are meaningful only to the extent that rule of law enforces them.

Figure 1. The Effective Democracy Index as an Application of a General Scheme to Provide Qualified Indices of Democracy
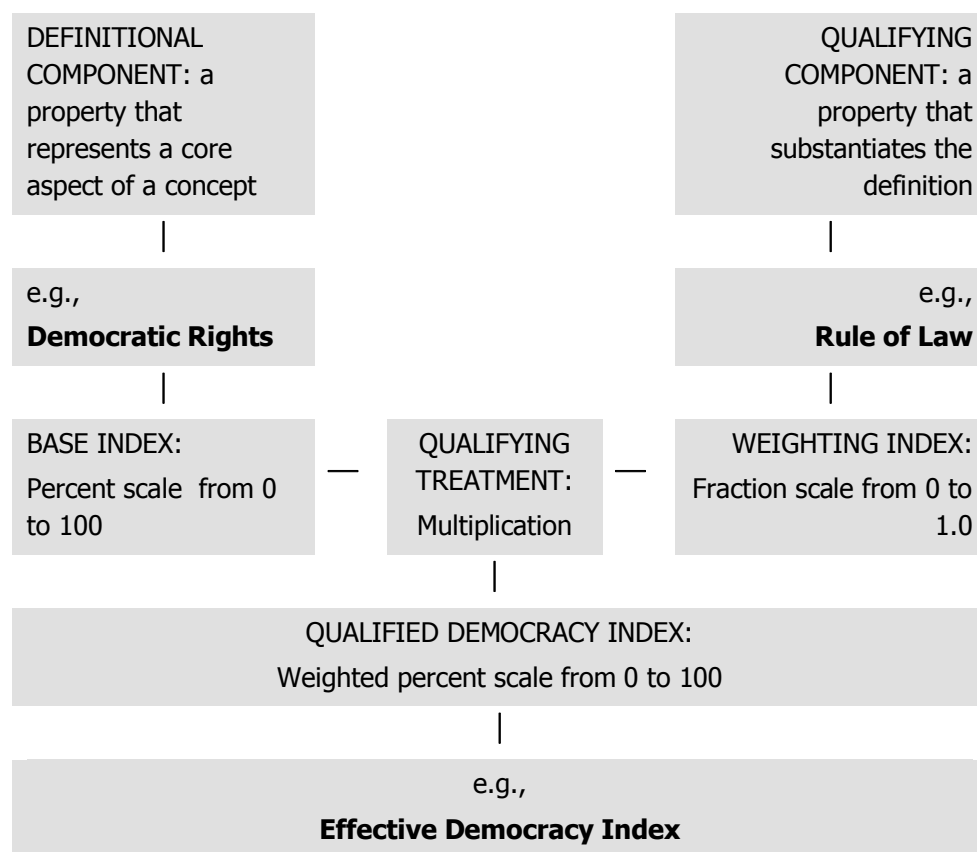
As Alexander and Welzel argue, rule of law is not a *supplementary* feature that *adds* to democratic rights. It is a *qualifying* feature that *substantiates* democratic rights. Substantiation mandates a specific combination logic. One cannot just add up democratic rights and rule of law or calculate an average of the two. This would confuse two distinct properties, one of which is a definitional quality, the other a substantiating quality of democracy. Instead, the logic of substantiation requires that one weights

down the definitional property, democratic rights, for deficiencies in its substantiating property, rule of law (Goertz 2006: 104). The logic of substantiation is depicted in Figure 1.

The Measurement Concept

An intuitive way to apply the logic of substantiation is to measure the definitional property of democracy, democratic rights, in percentages of their maximal presence on a scale from 0, for the complete absence of democratic rights, to 100, for their full presence. We call this percentage index the democratic rights index (henceforth: *DRI*).

By contrast, the substantiating property, rule of law, is measured in fractions of its maximally known strength, on a scale from 0, for the weakest observed rule of law, to maximum 1.0, for the strongest observed rule of law. We call this fractional index the rule of law index (henceforth: *RLI*).

One then weights down the definitional property of democracy for deficiencies in its substantiating property, using multiplication. The resulting index measures the presence of democratic rights *in as far as* rule of law enforces them. This is hence an index of effectively enforced democratic rights, or effectively institutionalized people power—in short: an effective democracy index (henceforth: *EDI*).

The *EDI* is at minimum 0 when *either* democratic rights are absent (0 on the *DRI*) *or* when these rights are present but minimal rule of law (0 on the *RLI*) renders them entirely ineffective. At the opposite extreme, the *EDI* is at maximum 100 when *both* democratic rights are fully present (100 on the *DRI*) *and* when maximum rule of law (1.0 on the *RLI*) renders them fully effective.

Scores on the *EDI* are intuitively meaningful. Consider a few hypothetical countries, as shown in Table 1. *A-Land* and *B-Land* both score at 80 percent in democratic rights but while *A-Land* scores at .80 points in rule of law, *B-Land* scores only at .40 points. After the substantiating treatment, *A-Land* ends up with an *EDI* of (80 * .80 =) 64 percent while *B-Land* ends up with an *EDI* of (80 * .40 =) 32 percent. *A-Land*'s wide democratic rights result in a high *EDI* score because strong rule of law enforces these rights to a large extent. *B-Land*'s similarly wide democratic rights do not result in a high *EDI* score because weak rule of law enforces these rights to a small extent. Evidently, the translation of democratic rights into effective democracy is strictly conditional on rule of law.

The reverse holds true too: the translation of rule of law into effective democracy is strictly conditional on democratic rights. For instance, *C-Land* and *D-Land* score equally strong in rule of law, at .80. But in the case of *C-Land* strong rule of law enforces a wide base of democratic rights of 80 percent, yielding a high *EDI* of 64; whereas in the case *D-Land* strong rule of law enforces only a narrow base of democratic rights of 40 percent, yielding a low *EDI* of 32. In the substantiation logic, democratic rights and rule of law are of conditional quality to each other.

Table 1.   Hypothetical Scores on the Democratic Rights Index (*DRI*), Rule of Law Index
            (*RLI*), and Effective Democracy Index (*EDI*)

Hypothetical Country:	*DRI* Score	*RLI* Score	*EDI* Score (*DRI* * *RLI*)	Δ *EDI*
Similar DRI and Different RLI (DRI high):				
A-Land	80	.80	64	32
B-Land	80	.40	32	
Similar RLI and Different DRI (RLI high):				
C-Land	80	.80	64	32
D-Land	40	.80	32	
Similar DRI and Different RLI (DRI low):				
E-Land	40	.80	32	16
F-Land	40	.40	16	
Similar RLI and Different DRI (RLI low):				
G-Land	80	.40	32	16
H-Land	40	.40	16	

Notes: *DRI*   - Democratic Rights Index (percentages, 0-to-100)
        RLI   - Rule of Law Index (fractions, 0-to-1.0)
        EDI   - Effective Democracy Index (weighted percentages, 0 to 100)

Because of their mutual conditionality, different combinations of democratic rights and rule of law can lead to the same unfavorable outcome in effective democracy. *B-Land* and *D-Land* score similarly low in effective democracy, at 32 percent, but for different reasons. *B-Land* scores low because weak rule of law leaves its wide base of democratic rights largely unenforced. *D-Land* scores equally low because its strong rule of law enforces only a narrow base of democratic rights. Hence, the people of the two countries find themselves equally *dis*empowered, though for different reasons. As a measure of people power, the *EDI* aims to make weaknesses in institutionalized people power apparent--no matter for which reason they exist.

Chosen Indicators

The operationalization of effective democracy requires indicators of democratic rights and rule of law. To measure democratic rights, Alexander and Welzel use the freedom ratings by Freedom House (2008, 2011). In terms of spatial and temporal coverage, the

freedom ratings provide the most encompassing data on the rights that define liberal democracy (Diamond 2008). And even though the ratings have been criticized for lack of transparency in coding rules (Munck & Verkuilen 2002), the ratings fare well in measurement reliability compared to other democracy indices (Bollen & Paxton 2000; Casper & Tufis 2002). Hence, the use of the freedom ratings as a measure of democratic rights seems defensible, especially for the purpose of large-*N* analyses.

Table 2.   Transforming the Combined Freedom House Ratings into a Democratic Rights Index

FREEDOM HOUSE's LABELS:	Civil Liberties Rating (CLR)	Political Rights Rating (PRR)	Added Ratings: CLR + PRR	Inversion and zero-basing: 14 - (CLR + PRR)	Percent standardization (*DRI*): (14 − (CLR + PRR)) / .12
	1	1	2	12	**100.00**
Free	1 (2)	2 (1)	3	11	91.66
	2	2	4	10	83.33
	2 (3)	3 (2)	5	9	**75.00**
	3	3	6	8	**66.66**
	3 (4)	4 (3)	7	7	58.33
Partly Free	4	4	8	6	**50.00**
	4 (5)	5 (4)	9	5	41.66
	5	5	10	4	**33.33**
	5 (6)	6 (5)	11	3	**25.00**
Unfree	6	6	12	2	16.66
	6 (7)	7 (6)	13	1	8.33
	7	7	14	0	**0.00**

The freedom ratings are provided in two indices. The 'civil liberties' ratings indicate mostly private freedoms that represent autonomy rights. The 'political rights' ratings indicate public freedoms, reflecting participation rights. For the years 2002 to 2006, the two ratings correlate at $r = .94$ ($N = 190$). As they supplement each other in generating democratic rights, they are averaged by Alexander and Welzel to obtain an overall index of democratic rights. The index is transformed into a 0-to-100 range, indicating the presence of guaranteed democratic rights in percentages of the maximum. Table 2 illustrates how the original Freedom House ratings are transformed into percentages on the democratic rights index (*DRI*). The following formula performs the transformation:

$$DRI \ = \ (14 - (PRR + CLR)) \ / \ .12$$

DRI: Democratic Rights Index

PRR: Freedom House political rights rating (1 to 7, 1 is widest political rights)

CLR: Freedom House civil liberties rating (1 to 7, 1 is widest civil liberties)

The *DRI* provides intuitively meaningful proportions of the maximum of democratic rights, starting from guarantees of *none* of these rights (0%) to guarantees of *some* of them (a quarter or a third: 25 and 33%), *half* of them (50%), *most* of them (two thirds or three quarters: 66 and 75%) and *all* democratic rights (100%).

Figure 2. Democracy as the Percentage of Democratic Rights Granted by a State
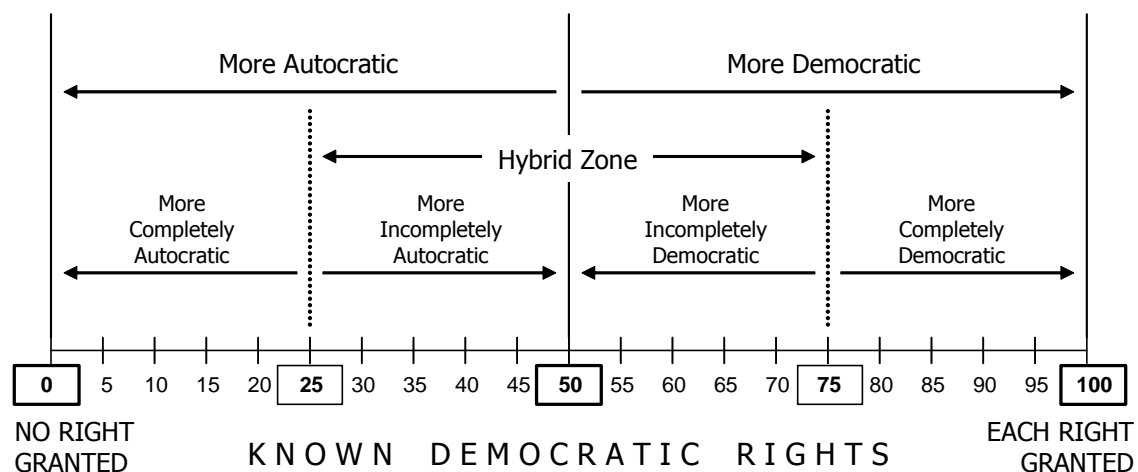
As shown in Figure 2, the percent thresholds on the *DRI* establish plausible categorizations of the absence and presence of democracy. Consider the 50 percent threshold. Below this threshold, more democratic rights are absent than present. This classifies all regimes below the 50 percent threshold as 'autocracies.' By contrast, above 50 percent threshold, more democratic rights are present than absent. This classifies regimes above 50 percent as 'democracies.' The 25 and 75 percent thresholds provide equally meaningful distinctions. The 75 percent mark divides democracies into those closer to the democratic maximum and those closer to the neutral point. This classifies the former ones as rather 'complete' democracies and the latter ones as rather 'incomplete' democracies. Among autocracies, the 25 percent mark operates in similar fashion, separating 'complete' autocracies from 'incomplete' autocracies.

The most encompassing measure of rule of law is the World Bank's Rule of Law index. Using expert judgments and population surveys, "this index measures how strictly government agents abide by the laws" (Kaufmann, Kraay & Mastruzzi 2008). Strongly overlapping with rule of law is another of the World Governance Indicators, the Control of Corruption Index. Corruption is a direct inverse of rule of law, involving exploitative power practices that violate laws (Warren 2008: 803-7). The Rule of Law Index and the Control of Corruption Index correlate at $r = .95$ ($N = 188$) for the years 2002 to 2006,

so Alexander and Welzel average them to obtain an overall Rule of Law Index (*RLI*). Since this index is used as a substantiating factor to weight granted democratic rights for how effectively they are enforced, Alexander and Welzel transform the scale into a range from 0, for the weakest rule of law ever observed since the index was founded in 1996, to 1.0, for the strongest rule of law ever observed. Scores between these two extremes can be any fraction of 1.0.[2] To tie the World Bank's rule of law scores between minimum 0 and maximum 1.0, the following formula is to be used:

RLI = (COS – LOS) / (HOS – LOS)
RLI: Rule of Law Index
COS: Country's observed score
LOS: Lowest ever observed score
HOS: Highest ever observed score

Multiplying the 0-to-100 base index of democratic rights, *DRI*, by the 0-to-1.0 qualifying index, *RLI*, we obtain the effective democracy index, *EDI*.

The *EDI* is not a latent variable. It is not built on a so called 'reflective' logic of index construction, or what Goertz (2006) calls the 'family resemblance' logic. Instead, the *EDI* is built on what is called a 'formative' logic of index construction (Goertz calls this the 'ontological' logic). In the reflective logic, two or more components are summarized into an encompassing index because, *empirically*, they are found to 'reflect' the same latent dimension. In the formative logic, components are summarized into an encompassing index because, *theoretically*, they are thought to 'form' a combination that is (a) inherently meaningful and (b) externally valid in connecting a concept to its theoretical antecedents, correlates, and consequences. For formative concepts, uni-dimensionality is no requirement because two or more distinct components do not have to be highly correlated in order to form a meaningful and valid combination (Diamantopoulos & Winklhofer 2001; Coltman et al. 2008; Baxter 2009).

That is exactly the rationale of effective democracy: it is thought to be a meaningful combination of democratic rights and rule of law that is valid in connecting democracy to the antecedents, correlates, and consequences that key theories attribute to democracy. Formative concepts are judged on the basis of their inherent meaning (do they make sense?) and their external validity in capturing other aspects of reality to which the concept should be connected in theory. As far as meaning is concerned, we

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[2]   The minimum in the *RLI* at 0 is an empirically observed one, not a theoretical one. The theoretical minimum in the *RLI* would represent the imaginable but unreal situation of either complete anarchy or complete despotism, in which case every given law is ignored by every power holder all the time. The same is true for the maximum (1.0) in the *RLI*: this is also an empirically observed extreme rather than a theoretical one. If it were a theoretical maximum, it would represent the imaginable but unreal possibility of perfect rule of law, in which case not a single given law is ever violated by any power holder any time. Whenever, as in the case of the *RLI*, it is unlikely that the theoretical extremes of a concept will ever occur in reality, one can assign the numerical minimum and maximum to the empirically observed extremes.

have reasoned why effective democracy is a meaningful combination of democratic rights and rule of law. As far as validity is concerned, the analyses below address this issue.

The following section re-examines the *EDI* in light of Knutsen's criticism, focusing on the recent five-year time span from 2002 to 2006 to keep results comparable to Alexander and Welzel's findings. Data on the *DRI*, *RLI*, and *EDI* for these years are documented in Appendix-Table 1.

EXAMINING THE CRITICISMS OF THE EFFECTIVE DEMOCRACY INDEX

The 'Ordinal Measure' Critique

The first problem with the *EDI*, according to Knutsen, is the 'ordinal measure' problem. The argument is that both the *RLI* and *DRI* are on an ordinal instead of interval scale level and that the codes on these indices do not have a natural numerical meaning. Thus, the multiplicative procedure that is used to construct the *EDI* is flawed because this mathematical operation presumes numerically interpretable coding schemes.

Let's examine this problem separately for the *RLI* and the *DRI*. To begin with the *RLI*, the index is derived from dozens of data sources summarized into a factor scale that has more than a hundred discrete values. For the *EDI* construction, the rule of law data are 'normalized' into fractions of the strongest rule of law ever observed, on the condition that the weakest rule of law ever observed is set at 0. The resulting coding scheme has clear numerical meaning, indicating distances to the weakest and strongest rule of law observed. With its more than hundred discrete values, the *RLI* is as close as one is likely to get to an interval scale.

Considering the *DRI*, both the political rights and civil liberties scales provide a seven-point index. Taken together, they provide a thirteen-point index, as shown in Table 2. The scale level of this index would just be ordinal, if the scores provided information only on rank *order* but not on rank *intervals*. This assumption is incorrect, however. Freedom House (2008) uses a checklist of twenty-five questions, each of which is rated on a five-point scale from zero to four. In combination, the twenty-five questions produce a hundred-points scoring scheme. The combined thirteen-point index is simply a collapsed version of the hundred-points scoring scheme. Based on that scheme, scores on the thirteen-point index represent equally sized intervals of known range.[3] Hence, the index does not only contain order information; it also contains interval information.

If one inverts the thirteen-point index and transforms the scores into percentages, as shown in Table 2, one obtains the *DRI*—a perfect reproduction of the

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[3]　　Collapsing the hundred-points scoring system into a thirteen-point index creates twelve intervals, each covering a range of exactly 8.33 points.

intervals in the original hundred-points scoring scheme. The percentage scores on this scheme represent numerically meaningful proportions of the maximal scope of democratic rights. Averaging the *DRI* over a number of years, these proportions become more fine-grained. But already with a grading into a dozen equally sized intervals, we obtain numerically meaningful proportions.

This consideration refutes the critique that the *DRI* provides only ordinal information that is numerically meaningless. More generally, the assumption that the scoring schemes of the *DRI* or the *RLI* have insufficient numerical meaning to allow for such mathematical operations as multiplication is pointless.

The Imbalanced Link Critique

Knutsen claims that the *EDI* is not an impartial measure of its two components because the *EDI* correlates less closely with democracy's definitional component, the *DRI*, than with the substantiating component, which was the corruption perception index in the old *EDI* version. The looser tie of the *EDI* to democracy's definitional property, Knutsen suggests, questions the *EDI*'s status as a measure of democracy.

Unfortunately, Knutsen's claim is empirically false, at least concerning the new version of the *EDI*, which uses the *RLI* instead of the corruption perception index. The new *EDI* 2002-6 correlates at $r = .899$ ($N = 181$; $p = .000$) with the *RLI* 2002-6 and at $r = .889$ ($N = 181$; $p = .000$) with the *DRI* 2002-6. The .01-difference between the two correlations is negligible and statistically insignificant.

Even if the *EDI* was unequally correlated with its two factors, the logic that such an inequality renders the product meaningless is flawed. If a product correlates more strongly with one of its factors, this occurs because there is more variance in the stronger correlating factor. A difference in variance between two factors does not question the meaning of their product. If all the world's countries guaranteed the full set of democratic rights, scoring 100 percent on the *DRI*, but they continued to vary on the *RLI*, effective democracy would only depend on rule of law. If so, the *EDI* would be perfectly correlated with the *RLI* and completely uncorrelated with the *DRI*--and rightly so since the latter is a constant in this case. Inequality in the correlations of the *EDI* with its two factors, if it existed, does not question the meaning of the *EDI*. Logically and empirically, the imbalanced-link-critique is mistaken.

The Double Treatment Critique

The problem that Knutsen emphasizes most is the 'double treatment' of countries by overlapping information. The criticism starts from Freedom House's self-declared intention to measure not only formally guaranteed rights but rights in as far as they are respected in practice. This intention implies that rule of law information is already

absorbed by the *DRI*. If so, qualifying the *DRI* by the *RLI* is a redundant double treatment.

 This argument assumes that the *DRI* absorbs most of the information included in the *RLI*. In fact, however, the *DRI* does *not* absorb most of the information covered by the *RLI*. To be sure, the two are significantly and positively correlated. Yet, a correlation of $r = .68$ ($N = 181$; $p = .000$) indicates an overlapping variance of just 46 percent. This is considerable but most of the variance (54% to be precise) in the *DRI* and the *RLI* is not overlapping. Consequently, at each *DRI*-level there is lots of independent variation in the *RLI* making possible a *non-redundant* qualification of the *DRI*.

 Still, one might insist that the *DRI* and the *RLI* overlap at least partially so that the double treatment problem is reduced but not removed. This seems to be a reasonable concern. But as the following discussion will demonstrate, even for the overlapping components of the *DRI* and the *RLI*, the *EDI* does *not* produce redundant double treatment. Instead, creating the *EDI* is fully equivalent to filter out absorbed rule of law information from the *DRI* and recombining it with the *DRI* interactively. Doing so establishes scale properties precisely as they are requested by the logic of mutual conditionality.

Double Treatment or Establishing Mutual Conditionality?

Regressed on democratic rights, a country's observed score in rule of law equals the score that is predicted by democratic rights plus the residual score that is unpredicted by democratic rights. The predicted score represents the variance component of rule of law that is absorbed by democratic rights: this component captures 46 percent of the variation in rule of law. The residual score represents the variance component of rule of law that is not absorbed by democratic rights: that component captures 54 percent of the variation in rule of law. Accordingly, if one qualifies democratic rights for rule of law, one qualifies for both the absorbed and the unabsorbed component of rule of law.

 As far as the unabsorbed component is concerned, the qualifying procedure corrects the democratic rights index for rule of law information that is not incorporated in democratic rights. Clearly, there is no double treatment involved here. But for the absorbed component, this seems different. Because this component of rule of law is already incorporated in democratic rights, using it again to qualify democratic rights appears indeed like a double treatment. However, the intuitive plausibility of this suspicion is deceptive. Let us explain.

 Even insofar as the democratic rights index absorbs rule of law information, it does it in the wrong way (Munck & Verkuilen 2002: 28). Freedom House includes rule of law among four of its twenty-five check questions. These four questions account for sixteen points on the hundred-point scoring scheme (Freedom House 2008). Thus, rule of law accounts for less than a sixth of the overall freedom rating. This proportion is not only arbitrary and minor; it is simply 'averaged' into the overall scoring scheme.

Averaging treats rule of law as a supplementary aspect of democratic rights, which is the wrong combinatory logic—provided one accepts that rule of law *conditions* democratic rights instead of supplementing them. Hence, what one should do is filter out the absorbed rule of law information and then recombine it with democratic rights interactively.

In order to do so, we can take advantage of the fact that the absorbed rule of law information is the variance component in rule of law that is predicted by democratic rights. This factum involves two features that make it easy to filter out the absorbed rule of law information and recombine it interactively with democratic rights.

First, the predicted rule of law component is a linear transformation of democratic rights into the scale range of rule of law. Thus, *any* linear transformation of democratic rights into the scale range of rule of law represents the rule of law information that is absorbed by democratic rights. This means that we can also take the simplest such transformation to represent the absorbed rule of law information. The simplest transformation is to take a hundredth of the given score on the democratic rights index, yielding fractions from 0 to 1.0 that are in perfect correspondence with every given score in democratic rights.[4]

Second, the original democratic rights index cannot change by filtering out *absorbed* rule of law information. This is true because the absorbed rule of law information is completely predicted by democratic rights, which means it is a perfectly correlated component. Under all circumstances, filtering out a perfectly correlated component reproduces exactly the same index.

In conclusion, two statements hold. First, the hundredth fraction of democratic rights provides a simplified but flawless representation of the rule of law information absorbed by democratic rights. Second, the original democratic rights index is identical to the index obtained if we filter out all the absorbed rule of law information. From these two statements it follows suit that filtering out the absorbed rule of information and recombining it interactively with democratic rights is the same as multiplying the original democratic rights index by a hundredth fraction of itself.

Doing so yields the *EDI* for the overlapping components of democratic rights and rule of law. This *EDI* does not 'double-treat' countries. It simply establishes mutual conditionality for the overlapping variance components of democratic rights and rule of law.

When we calculate the *EDI* for the overlapping variance components of the *DRI* and the *RLI*, we do not take into account any new rule of law information that is not absorbed by the *DRI*. Hence, for the overlapping components, the *EDI* does in no way

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[4]   Regressing the *RLI* on the observed *DRI* scores (DRI_{obs}), the formula for the predicted *RLI* scores (RLI_{pred}) is: $RLI_{pred} = .216 + .004 * DRI_{obs}$, ($N = 181$). This produces predicted *RLI* scores whose numerical values differ slightly from the hundredth of the observed *DRI* scores. But since both are a linear transformation of *DRI* scores into the scale range of the *RLI*, they correlate at $r = 1.0$. As a perfect correlate of the predicted *RLI* scores, the hundredth of the observed *DRI* scores represents the predicted *RLI* flawlessly.

affect the rank order of countries known from the *DRI*. Yet, because the rescaling establishes mutual conditionality, it changes the score distances between countries. And it does so exactly as requested under mutual conditionality.

Table 3. Score and Scale Property Changes through the *EDI* Procedure

RANK	DRI Category	DRI	RLI Category	RLI	EDI = DRI * RLI	People Power	DRI² / 100	Distance to Next Rank	Δ DRI − EDI
1		**100.0**		**1.00**	**100.0**		**100.0**	5.0	0.0
2		97.5		.975	95.0	Very Strong People Power	95.0	4.7	2.5
3	Complete Democracy	95.0		.950	90.3		90.3	4.7	4.7
4		92.5		.925	85.6		85.6	4.6	6.9
5		90.0	Very Strong Rule Of Law	.900	81.0		81.0	4.4	9.0
6		87.5		.875	76.6		76.6	4.3	10.9
7		85.0		.850	72.3		72.3	4.2	12.7
8		82.5		.825	68.1	Fairly Strong People Power	68.1	4.1	14.4
9		80.0		.800	64.0		64.0	3.9	16.0
10		77.5		.775	60.1		60.1	3.8	17.4
11		**75.0**		**.750**	56.3		56.3	3.7	18.7
12		72.5		.725	52.6		52.6	3.6	19.1
13	Incomplete Democracy	70.0		.700	49.0		49.0	3.4	21.0
14		67.5	Fairly Strong Rule Of Law	.675	45.6	Fairly Weak People Power	45.6	3.3	21.9
15		65.0		.650	42.3		42.3	3.2	22.7
16		62.5		.625	39.1		39.1	3.1	23.4
17		60.0		.600	36.0		36.0	2.9	24.0
18		57.5		.575	33.1		33.1	2.8	24.4
19		55.0		.550	30.3		30.3	2.7	24.7
20		52.5		.525	27.6		27.6	2.6	24.9
21		**50.0**		**.500**	**25.0**		**25.0**	**2.5**	**25.0**
22		47.5		.475	22.5		22.5	2.2	24.9
23		45.0		.450	20.3		20.3	2.2	24.7
24		42.5		.425	18.1		18.1	2.1	24.4
25		40.0		.400	16.0		16.0	1.9	24.0
26	Incomplete Autocracy	37.5	Fairly Weak Rule Of Law	.375	14.1		14.1	1.8	23.4
27		35.0		.350	12.3		12.3	1.7	22.7
28		32.5		.325	10.6	Very Weak People Power	10.6	1.6	21.9
29		30.0		.300	9.0		9.0	1.4	21.0
30		27.5		.275	7.6		7.6	1.3	19.1
31		**25.0**		**.250**	6.3		6.3	1.2	18.7
32		22.5		.225	5.1		5.1	1.1	17.4
33		20.0		.200	4.0		4.0	0.9	16.0
34		17.5		.175	3.1		3.1	0.8	14.4
35	Complete Autocracy	15.0	Very Weak Rule Of Law	.150	2.3		2.3	0.7	12.7
36		12.5		.125	1.6		1.6	0.6	10.9
37		10.0		.100	1.0		1.0	0.4	9.0
38		7.5		.075	0.6		0.6	0.3	6.9
39		5.0		.050	0.3		0.3	0.2	4.7
40		2.5		.025	0.1		0.1	0.1	2.5
41		**0.0**		**.000**	**0.0**		**0.0**		0.0

Table 3 illustrates the effects of establishing mutual conditionality for the overlapping components of democratic rights and rule of law. The left-hand column shows scores on the original *DRI* in descending order from 100 to 0 with the distance to the next rank always being 2.5 percent points. With this grading of the 0-to-100 *DRI* scores, one obtains 41 ranks from 100 (rank 1) to 0 (rank 41). To the right of the *DRI*, the absorbed rule of law information is depicted as a hundredth-fraction of the *DRI* scores, also given in descending order from 1.0 (rank 1) to 0 (rank 41) in the third column. The *EDI* for the overlapping variance components of the *DRI* and the *RLI* is shown to the right of the absorbed *RLI*.

Rescaling Effects

For the overlapping variance components of the *DRI* and the *RLI*, the *EDI* creates a perfectly regular asymmetry: only one quarter of the *DRI* and *RLI* combinations yield an *EDI* score above 50 percent, whereas three quarters of the *DRI* and *RLI* combinations yield an *EDI* score below 50 percent. This pattern reflects what Goertz (2006) calls the 'minimal condition logic.' In line with this logic, a high *EDI* score is obtained only when *both DRI and RLI* are high, whereas low *EDI* scores are obtained when *either* the *DRI or* the *RLI or* both are low. By necessity, this logic creates asymmetry between a small set of combinations that yield high *EDI* scores and a large set of combinations that yield low *EDI* scores.

The very same logic also implies the following. While a semi-democratic country with a 50 percent score on the *DRI* is equally distant from absent democratic rights (0%) and complete democratic rights (100%), with a score of 25 percent on the *EDI* that same country is double as distant from the completion of effective democracy than from the absence of effective democracy. This change in scoring echoes the difference between an averaging and an interactive logic of combination. If two components are perfectly correlated with each other and one of them is half completed, the other one is half completed too. And the average of two half completed components is still a half completion. But if the two components interact, as they do under mutual conditionality, the logic changes and the calculus is half times a half completion. This yields only a quarter completion overall. Generally speaking, the logic of mutual conditionality evaluates things under the imperative of a full completion. From the viewpoint of a full completion, a half completion is almost as much a failure as a non-completion.

Examining the center diagram of Figure 3, one sees the distribution of countries over the scores that the *EDI* produces for the overlapping variance components of the *DRI* and the *RLI*. Comparing this distribution to the original *DRI* in the left-hand diagram, we see that, simply by establishing mutual conditionality, the distribution changes in a threefold way. First, there is a lower density of countries clustering at the very highest

Figure 3. Global Distribution of Countries over the *DRI* and the *EDI* (the latter for overlapping as well as both overlapping and non-overlapping variance components on the *DRI* and *RLI*)

| | | *DRI* 2002-6 | *EDI*overl 2002-6 | *EDI*all 2002-6 |
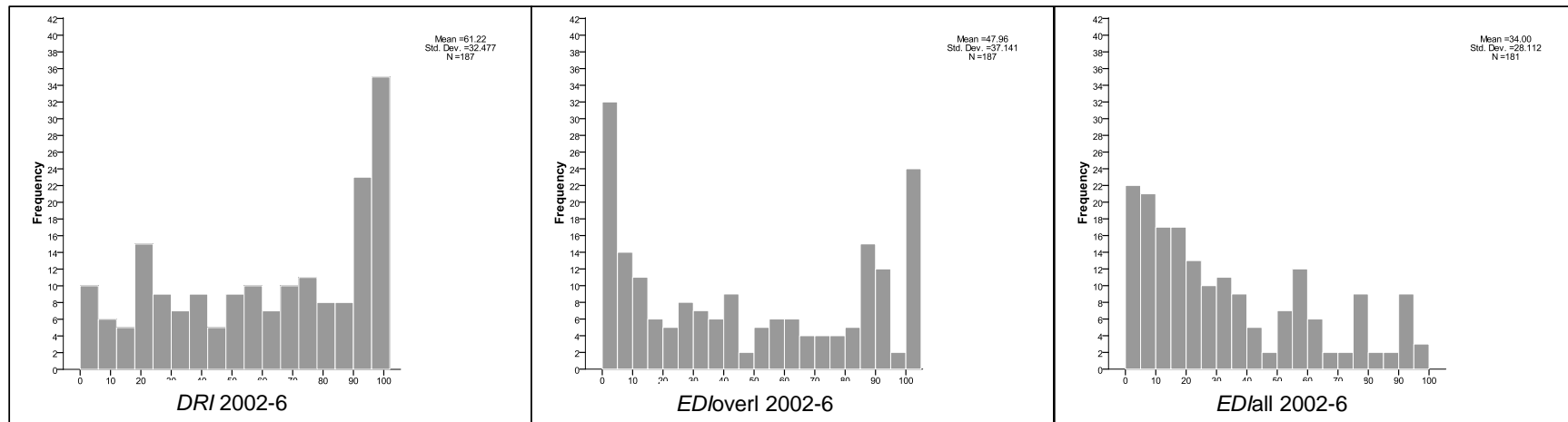
Key:
DRI – Democratic Rights Index
*EDI*overl – EDI for overlapping
      DRI and RLI variance
      components
*EDI*all – EDI for overlapping and
      non-overlapping variance
      components in DRI and RLI

Statistics

		DRI	*EDI*overl	*EDI*all
N	Valid	187	187	181
	Missing	13	13	19
Mean		61.2151	47.9641	33.9973
Std. Error of Mean		2.37496	2.71602	2.08958
Median		66.6667	44.4444	26.0392
Std. Deviation		32.47714	37.14104	28.11244
Range		100.00	100.00	97.10
Minimum		.00	.00	.00
Maximum		100.00	100.00	97.10
Percentiles	25	31.9444	10.2045	11.6864
	50	66.6667	44.4444	26.0392
	75	94.4444	89.1975	56.0443

Variance coefficient: **.53**   **.77**   **.83**

democracy scores. Second, the global mean score is lower, at 48 percent points compared to 61 percent points in the left diagram. Third, there is more variance between countries: the coefficient of variance is .77 compared to .53 in the left diagram. Hence, already for the overlapping variance components, establishing mutual conditionality changes the picture towards a more demanding assessment of democracy. This is what one would expect from a decidedly substantive perspective on democracy.

In as far as the *DRI* absorbs rule of law information, the *EDI* produces country scores that are fully equivalent to an interactive recombination of the *DRI* with the absorbed *RLI*. This recombination creates a regular asymmetry between double as many *DRI* and *RLI* combinations yielding low *EDI* scores as combinations yielding high *EDI* scores. This asymmetry is mandated by the logic of mutual conditionality, no matter how much rule of law information is absorbed by the *DRI*. Even for the overlapping components of the *DRI* and the *RLI*, the *EDI* does not double-treat countries but simply establishes mutual conditionality.

Re-Ranking Effects

After clarifying what the *EDI* does for the overlapping variance components of the *DRI* and *RLI*, the next question is what it does for the non-overlapping components (which, we know, are the bigger components because more than fifty percent of the variance is unshared). For the overlapping variance components, the *EDI* changes the country scoring but not the country ranking in the *DRI*. For the non-overlapping components, however, the *EDI* changes the country ranking in the *DRI*. Specifically, the *EDI* down-ranks countries to the extent that there are deficiencies in rule of law that are *not covered* by the *DRI*.

Consequently, countries with rather favorable *DRI* scores but poor *RLI* scores obtain *EDI* scores as low as those of some milder versions of autocracy. This property of the *EDI* reflects the possibility that, in a highly corrupted democracy, ordinary people can be as disempowered as in a strictly law-abiding version of autocracy. If we accept that rule of law is a conditioning quality of democratic rights, it follows inescapably that, in a qualified measure of democracy, countries must be down-ranked to the extent that their deficiencies in rule of law are unabsorbed by their rights ratings.

Because of these features, India's favorable *DRI* score of 75 percent is downgraded so much that its *EDI* score is just as low as that of Singapore. The reason is severe deficiencies in rule of law that are not reflected in India's *DRI* score (see Appendix-Table 1 for a documentation of these data). Indeed, India's *RLI* score is pretty low, at .47 points, reflecting rampant corruption, clientelism, patronage, severe group discrimination, widespread political violence, torture and other human rights abuses throughout large parts of the country (Vittal 2003). With these violations, India's fairly well operating electoral regime fails to empower the people (Heller 2000). Hence, India's wide extension of democratic rights remains largely ineffective, yielding an *EDI* score of

roughly (75 * .47 =) 35 percent. Using a broad set of indicators, the *Economist*'s (2006) Intelligence Unit classifies India as a 'flawed democracy' because of severe deficiencies in the enforcement of its constitutional principles. Hence, India's weak performance in rule of law does not seem to be a measurement error of the *RLI*.

An *EDI* of 35 percent places India at the level of Singapore. This may surprise some readers. However, although Singapore's *DRI* is already low, at 39 percent, the narrow base of democratic rights in Singapore is almost fully enforced by a very strong rule of law, as manifest in an exceptionally high *RLI* score of .93. Thus, Singapore's *EDI* yields (39 * .93 =) 36 percent—one percent point above India. Even though Singaporeans live under a more restricted electoral regime than people in India, the rights of Singaporeans are otherwise less violated. Of course, this does not make Singapore any bit more democratic than its low *DRI* score suggests. The *dis*empowerment that characterizes countries in the autocratic zone of the *DRI* is simply not further deepened by additional deficiencies in rule of law.

This comparison of India and Singapore is further supported when we look at alternative measures of 'civic governance,' indicating a civilian use of institutional power without violating, abusing, and terrorizing the people. We select the three such civic indicators with the widest coverage of countries, including the inverted Gibney/Wood/Cornett (GWC) Political Terror Scale, the Cingranelli/Richards (CIRI) Personal Integrity Index, and the World Bank's (WB) Political Stability Index.[5] Each of these three indicators places India and Singapore in similarly opposite positions as does the *RLI*. For the time span from 2002 to 2006, India scores .29 on the (inverted) Political Terror Scale, .02 on the Personal Integrity Index, and .39 on the Political Stability Index. Singapore scores .77, .83, and .89, respectively, on these indices. Had we used any of these indices instead of the *RLI* to create the *EDI*, we would have obtained a similar result: India's *EDI* would drop below the level of Singapore. In fact, it would drop even farther below Singapore than when the *RLI* is used.[6]

The equally low *EDI* scores of India and Singapore are not appropriately characterized by saying that Singapore is as 'democratic' as India. On the *EDI*, both countries are in the zone of 'fairly weak people power,' marked in Table 3. Therefore, it is more appropriate to say that--under enforcement criteria—people power in India is as weakly institutionalized as in Singapore. Sure, the weaknesses derive from different

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[5]   'Civic governance' is self-evidently a substantiating quality of democratic rights because guaranteeing democratic rights while harming and intimidating people through state violence and terror makes these rights meaningless. All three of the indicators measure civic governance in terms of the absence of such violations. Each of the three indicators is described in more detail in under Note 2 in the Appendix.

[6]   Taking the longitudinal component of the analyzed institutional indicators into account, the results of this and the following sections remain the same: using a time-pooled-cross-sectional dataset in which each country appears in repeated observations as many times as annual measures are available for the respective institutional indicators, the same associational patterns appear. These results are available on request from the authors.

causes: in Singapore, people power is weakly institutionalized because of a narrow base of democratic rights; in India, people power is weakly institutionalized because a wide base of democratic rights is weakly enforced. But the different reasons for the weaknesses are of secondary relevance when the existence of such weaknesses is the focus of interest. The *EDI* is constructed to expose democratic deficiencies, whether they result from limitations in the base of democratic rights or lack of the enforcement of rights.

Summarizing the double-treatment issue, we can conclude the following. Index scores in rule of law include both a component absorbed and a component unabsorbed by democratic rights. Because of this, qualifying democratic rights by rule of law does two things at once. For the absorbed component, the qualifying procedure is identical to filtering out absorbed rule of law information and recombining it with democratic rights interactively. Doing so does not affect the country ranking but rescales democracy scores in such a way that there are double as many *RLI* and *DRI* combinations leading to low scores than combinations leading to high scores on the *EDI*. For the non-absorbed component, the qualifying procedure down-ranks previously equally ranked countries for deficiencies in rule of law that are not absorbed by democratic rights. Re-scaling accounts for 46 percent of the deviation of the *EDI* from the *DRI*; re-ranking accounts for 54 percent of the deviation. Both deviations are requested by the logic of mutual conditionality and none of them involves a double-treatment.

A Word on Case Picking

Knutsen picks a number of cases, such as Argentina, Benin, India and Singapore to suggest implausible ratings on the *EDI*. However, the cases seem implausible only from a purely electoral perspective. The arguments Knutsen uses to evidence that a country should be rated as more democratic than it appears on the *EDI* all invoke electoral regime criteria, like the existence of fair elections, change in government, and unhindered campaign activity. Thus, Knutsen applies the criteria of an electoral definition of democracy to evaluate various countries' *EDI* scores when the whole point of the *EDI* is to overcome a merely electoral definition. Clearly, the *EDI* is not judged against its own premise as an index of effectively institutionalized people power.

Turning the tables on Knutsen, one can easily gather a similarly suspicious list of cases on the *DRI* (for the following examples, see the data in the third column of Appendix-Table 1). On the *DRI* 2002-6, Portugal scores as high as Sweden, Dominica as high as Germany and Mongolia as high as South Korea, despite enormous differences in rule of law and in other aspects of civic governance that are substantial for democracy. In a number of cases, such differences in substantiating qualities appear reverted on the *DRI*. Zimbabwe scores higher on the *DRI* than Vietnam and Ghana higher than Argentina. Vice versa, Russia scores lower than Ethiopia and Uganda. And so does Bosnia compared to Tanzania, Turkey compared to Sri Lanka, Macedonia compared to

Peru, or Japan compared to Belize. If one sticks to a purely electoral definition of democracy, these rankings might make sense. But under a substantive notion of democracy, one would not assign Portugal the same democratic quality as Sweden or put Belize on a par with Japan.

On a more systematic note, Knutsen complains that the *EDI* diminishes differences on the *DRI* under weak rule of law. Knutsen criticizes this feature because great progress in democratization does not surface in the *EDI* when rule of law is weak. Yet, under the premise that democratic rights are meaningful to the extent—and only to the extent—that they are enforced, the criticism runs actually in the opposite direction: large improvements in democratic rights greatly overestimate people's empowerment when rule of law remains weak.

In any case, the *EDI* provides country scores and rankings that are fully consistent with the *EDI*'s intention. Whether one accepts this measurement perspective is ultimately a normative decision. Yet, each index must be evaluated according to its own normative premises.

Reliability Problems

Knutsen argues that the *EDI* is a less reliable measure of democracy than other standard democracy indices. He supports this claim showing a factor analysis in which the *EDI* loads less strongly on the underlying democracy factor than the other democracy indices.

This is a fair reliability test only if the *EDI* and the standard democracy indices are intended to measure exactly the same concept. This is, however, not the case. Instead, the *EDI* is meant to be a conceptual innovation on standard measures of democracy. Unlike the standard democracy indices, the *EDI* does not measure just the presence of democracy's definitional properties. Instead, it is a strictly *conditional* measure: it measures the presence of democracy's definitional properties on the condition that the institutional qualities needed to make these properties effective are in place. Modeling this conditionality is a novelty that should set the *EDI* apart from standard democracy indices that lack this conditionality.

Knutsen's factor analysis simply demonstrates that this is indeed the case, underlining the singularity of the *EDI* among existing democracy indices. Knutsen's factor results are exactly what one would expect if the *EDI* is unique among existing democracy indices in capturing qualities that substantiate democracy. Accordingly, if one includes such institutional qualities, the *EDI* appears as a bridge that links the definitional and the substantiating properties of democracy.

The factor analysis in Table 4 demonstrates this point. The analysis covers three indices that measure the presence of definitional properties of democracy: the Polity Democracy-Autocracy Index, the Vanhanen Electoral Democracy Index, and the CIRI

Empowerment Rights Index.[7] The analysis also includes three indices that measure substantiating properties of democracy: the GWC (inverted) Political Terror Scale, the WB Political Stability Index, and the CIRI Personal Integrity Index. The *EDI* is included as a seventh index that might link the other two groups. The results support this expectation.

Table 4. Dimensional Structure of Definitional and Substantiating Properties of Democracy: Principal Components Analysis

Definitional and Substantiating Properties of Democracy:	*Dimension 1*: Definitional Properties of Democracy	*Dimension 2*: Substantiating Properties of Democracy
Polity Democracy-Autocracy Index	.94	.17
Vanhanen Electoral Democracy Index	.87	.29
CIRI Empowerment Rights Index	.86	.35
Effective Democracy Index	**.75**	**.55**
GWC (Inverted) Political Terror Scale	.26	.94
WB Political Stability Index	.28	.91
CIRI Personal Integrity Index	.36	.90
Eigenvalue	5.1	1.2
Explained Variance	46	44
KMO Measure	.81	
N (number of countries	143	

Note: Entries are factor loadings after varimax rotation.

The first group of three indices represents indeed one underlying dimension—definitional properties of democracy. The second group of three indices represents a second dimension—substantiating properties of democracy. All six indices show only small minor loadings on the other dimension. The exception is the *EDI*. The *EDI* has its main loading on the definitional property dimension (.75), so it still primarily represents democracy. But the *EDI* is less exclusively a representative of just democracy than the other three indices. This is obvious from the fact that the *EDI* also has a considerable minor loading (.55) on the substantiating property dimension, much higher than the other democracy indices. Hence, more than other democracy indices, the *EDI* links the definitional and the substantiating dimensions of democracy. This result confirms the reliability of the

[7] For a detailed description of these democracy indices, see Note 3 in the Appendix.

EDI as a measure that includes substantial qualities of democracy untapped by other democracy indices.

Validity Problems

Knutsen claims that the *EDI* is systematically biased to favor rich countries. As evidence of this claim he presents regression results showing that the *EDI*'s unshared variance with the *DRI* is strongly predicted by a country's per capita GDP. Knutsen concludes that this bias questions the validity of the *EDI*.

The link between the *EDI* and economic development is a truism but the conclusion that this link invalidates the *EDI* misinterprets validity theory. Knutsen's finding simply shows that rule of law is closely correlated with economic development and more closely so than are democratic rights: the *RLI* 2002-6 and *DRI* 2002-6 correlate, respectively, at $r = .82$ and $r = .47$ ($N = 169$; $p = .000$) with per capita GDP in purchasing power parities in 2002. Accordingly, when we substantiate the *DRI* by the *RLI* to create the *EDI* we necessarily obtain a closer link to economic development than the *DRI* has: the *EDI* 2002-6 correlates at $r = .75$ with per capita GDP.

In fact, the *EDI* is more closely linked than the *DRI* to *everything* that is a closer correlate of the *RLI*. To conclude that this regularity questions the validity of the *EDI* is to argue that the product of two factors is always invalid when one of the factors has its own correlates.

The fact that rule of law has its own correlates by no means invalidates rule of law as a substantiating quality of democracy. For this reason, it is mistaken to disqualify the *EDI*'s link to the correlates of rule of law as an undesirable property. Quite the contrary, the correct conclusion is that this is a perfectly desirable property, as long as we consider rule of law to be a substantiating quality of democracy's definitional properties.

Let's examine this question further, using Knutsen's own approach. The author analyses the residuals of the *EDI* that are unexplained by the *DRI*. These residuals represent the deviation of the *EDI* from the *DRI*. The right-most column in Appendix-Table 1 displays the *EDI-DRI* residual for each country.

It is of inherent interest to know to what extent the deviation of the *EDI* from the *DRI* results from the coverage of substantiating qualities of democracy that are not covered by the *DRI*. The existence of such a link would validate the *EDI* as a qualified measure of democracy that *covers otherwise uncovered* qualities of democracy. This question can be examined by correlating the *EDI-DRI* residuals with those parts of the variation in substantiating qualities that are not absorbed by the *DRI*. Table 5 shows these (partial) correlations, correlating the *EDI-DRI* residuals with the residuals in the (inverted) Political Terror Scale, the residuals in the Personal Integrity Index, and the residuals in the Political Stability Index—all of these being residuals that are unexplained by the *DRI*. In addition, the *EDI-DRI* residuals are correlated with the residuals in the

WB Voice and Accountability Index—which are also residuals that are unexplained by the *DRI*.[8] The Voice and Accountability Index is an index of democracy indices and, hence, covers democracy's definitional properties most comprehensively. The residuals in this index represent all those definitional features of democracy that are not covered by the *DRI*.

Correlating these residuals with the *EDI-DRI* residuals tells us whether and to what extent the *EDI* deviates from the *DRI* because the *EDI* covers aspects of democracy that the *DRI* does not cover.

Table 5. Partial Correlation of the *EDI − DRI* Residuals with Institutional Qualities of Democracy uncovered by *DRI*

INSTITUTIONAL QUALITIES, uncovered by DRI (residuals):	*Correlation with EDI − DRI RESIDUALS*:
GWC (Inverted) Political Terror Scale 2002-6	.36*** (172)
CIRI Personal Integrity Index 2002-6	.34*** (156)
WB Political Stability Index 2000-6	.50*** (176)
WB Voice and Accountability Index 2000-6	.76*** (181)
Note: All correlations significant at the .001-level.	

The correlations in Table 5 are all statistically highly significant. They show that the *EDI-DRI* residuals associate positively with both substantiating and definitional properties of democracy that the *DRI* itself does not cover.

From the viewpoint of index validity, it is by no means problematic that the *EDI-DRI* residuals correlate with economic development. It is, however, an interesting question if the *EDI-DRI* residuals correlate more strongly with economic development than with definitional properties of democracy that the *DRI* leaves uncovered. Apparently, this is not the case as the regression analyses in Table 6 demonstrate.

The analyses in Table 6 regress the *EDI-DRI* residuals on a country's per capita GDP and on the definitional properties of democracy that are uncovered by the *DRI* (using the residuals in the WB Voice and Accountability Index that the *DRI* leaves unexplained). Apparently, the deviation of the *EDI* from the *DRI* is more strongly linked with aspects of democracy uncovered by the *DRI* than with per capita GDP. This is evident from the larger regression coefficients and the higher T-values for the uncovered democracy aspects.

According to these findings, the *EDI* deviates from the *DRI* systematically in ways that tie the *EDI* to otherwise untapped qualities of democracy. If this shows anything, it

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[8]   For a detailed description of the Voice and Accountability index, see Note 4 in the Appendix.

is the higher validity of the *EDI* compared to the *DRI* as a substantive measure of democracy.

Table 6.   Explaining the *EDI – DRI* Residuals: OLS Models

PREDICTORS:	DEPENDENT VARIABLE: EDI – DRI Residuals 2002-6
GDP per capita in 2002 at PPP	.37 (6.7)***
Democracy Residual (uncovered by *DRI*)[a]	.77 (9.9)***
Adjusted R²	.67
N (number of countries)	165

Notes: Entries are standardized beta-coefficients with T-values in parentheses. Regression diagnostics for heteroskedasticity (White test), multicollinearity (variance inflation factors) and influential cases (DFFITs) reveal no violation of OLS assumptions.

Significance levels: * p<.100, ** p<.050, *** p<.005.

[a]   Residual in WB Voice and Accountability Index 2002-6 unexplained by *DRI* 2002-6.

Another take on validity is provided by the 'nomological' validity approach (Elkins 2000; Adcock & Collier 2001; Denton 2008). In the version of *predictive* validity, this approach qualifies an index as a more valid measure of the underlying concept if this index predicts better than its alternatives the theoretically expected *consequences* of the concept. In the *postdictive* version, this validity criterion qualifies an index as more valid if it is better predicted than its alternatives by the theoretically expected *antecedents* of the concept in question.

As regards predictive validity, a widely agreed consequence of democracy is peace. Initially, the democratic-peace-thesis has been discussed for its 'dyadic' evidence: democracies don't fight *each other* (Russett & Oneal 2001). But since the beginning, it has also been argued that democracies are *generally* more peaceful (Gelpi & Griesdorf 2001). Evidence for this claim has been weak until recently when new insights have been gained on two accounts. For one, Forsberg (2007) and Stockemer (2008) found support for a 'monadic' interpretation of the democratic peace: democracies are less likely to initiate violent conflict with any kind of regime, including autocracies. Next, democracies are also more peaceful internally in how they treat their people (Davenport & Armstrong 2007; Davenport 2007). Evaluated against these different versions of the democratic peace thesis, the democracy index that predicts the countries' external and internal peace the best, is the most valid democracy index (for a similar logic see Elkins 2000).

To perform a predictive validity analysis, the regression models in Table 7 use the (inverted) Global Peace Index in 2008 as the dependent variable. This index is based on more than twenty indicators covering a country's involvement in violent conflicts, both externally and internally. These indicators are summarized into a fine-graded scale with multi-digit fractions from 1 to 4 (Vision of Humanity 2010), which we inverted into a scale from 0 for the lowest observed peace level to 1.0 for the highest observed level.[9] Because Israel is an extraordinary outlier on the Global Peace Index,[10] Table 7 shows each model in two versions: including Israel and excluding Israel (results in parentheses). Regardless of whether Israel is included or not, the *EDI*'s predictive power with respect to peace outperforms those of the other democracy indices. Only the index of democracy indices, the Voice and Accountability Index, comes close to the *EDI*'s predictive power with respect to peace. Moreover, the *EDI* is the only democracy index next to which the predictive power of economic development with respect to peace turns completely insignificant.

Hence, the *EDI* does not just favor rich countries, as Knutsen claims. It favors countries whose democratic qualities are better than the *DRI* suggests. By the same token, the *EDI* disfavors countries whose democratic qualities are lower than the *DRI* suggests. In conclusion, the *EDI* corrects the *DRI* precisely in the ways it should from a substantive point of view.

As regards postdicitive validity, Alexander and Welzel (2008, 2011) invoke human empowerment theory. In this theory, democracy is first and foremost an empowering institutional feature that should be antedated by empowering conditions at the social basis of democracy. Accordingly, the index of democracy that is best predicted by these empowering conditions is the 'postdictively' most valid one. As their analyses show, the *EDI* has higher postdictive validity than all of the standard indicators of democracy for a wide set of empowering conditions at the social basis of democracy, including economic prosperity, distributional equality, civic values and civil society.

In short, what has been pointed out as a systematic measurement bias of the *EDI*—namely its closer association with antecedents, consequences, and qualities of democracy--should instead be interpreted as an outright validity certificate of the *EDI*. At least, this is the established logic for the validity of formative concepts.

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[9]   Data and documentation are available for download at: http://www.visionofhumanity.org/gpi-data/#/2010/scor.

[10]   Israel's score on our transformed version of the Global Peace Index in 2008 is .20 when the average for all other countries with Israel's *DRI* score (87.5) is .47 (SD: .11).

Table 7. Regressing the Global Peace Index 2008 on Economic Development and Various Indices of Democracy

	DEPENDENT VARIABLE: Global Peace Index 2008 (inverted)										
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
PREDICTORS:	Beta	T-Value	Beta	T-Value	Beta	T-Value	Beta	T-Value	Beta	T-Value	Beta	T-Value
• GDP/per capita 2002 in PPP	.32 (.36)	3.7*** (4.2***)	.43 (.46)	5.0*** (5.5***)	.36 (.40)	3.8*** (4.2***)	.36 (.40)	4.2*** (4.7***)	.18 (.22)	1.9* (2.3**)	.03 (.06)	0.3[n.s.] (0.6[n.s.])
• FH Democratic Rights Index 2002-6	.32 (.34)	3.6*** (4.0***)										
• Polity Democracy 2002-6			.17 (.19)	2.0** (2.3**)								
• Vanhanen Electoral Democracy					.21 (.22)	2.2** (2.3**)						
• CIRI Empowerment Rights 2002-6							.26 (.26)	2.9*** (3.1***)				
• WB Voice and Accountability 2002-6									.47 (.47)	4.8*** (5.1***)		
• Effective Democracy Index 2002-6											.58 (.59)	5.0*** (5.2***)
Adjusted R²	.30 (.35)		.25 (.30)		.25 (.30)		.27 (.32)		.35 (.39)		.36 (.41)	
N	123 (122)		120 (119)		123 (122)		123 (122)		124 (123)		123 (122)	

Notes: Results in parentheses are under the exclusion of Israel. Entries are standardized beta-coefficients with T-values in parentheses. Regression diagnostics for heteroskedasticity (White test), multicollinearity (variance inflation factors) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p<.100$, ** $p<.050$, *** $p<.005$.

Rule of Law under Absent Democracy

The ultimate validity question, however, has not been addressed yet. It is the question of whether stronger rule of law in the case of autocracies really means lesser disempowerment of the people. This is assumed in our index construction because stronger rule of law yields a higher *EDI* score not only in the democratic zone of the *DRI* (i.e., above 50 percent) but also in the autocratic zone of the *DRI* (i.e., below 50 percent).

This feature might appear misleading. As outlined by Tilly (2007), stronger rule of law among autocracies could mean more effective repression and thus more, not less, disempowerment of the people. In this case, the logic of our index construction would operate in the wrong direction where democracy is largely absent. On the other hand, it is just as plausible that, even under the absence of democracy, stronger rule of law does mean lesser disempowerment of the people because it saves them from the worst excesses of arbitrary rule. Indeed, as Rose (2000) argues, even in autocracies repression is a power practice that occurs more often in violation of formally enacted laws than as an act of true-to-the-latter enforcement of law.

The case cannot be decided theoretically. It is an empirical question whether stronger rule of law in autocracies means more or less repression. We can sort this out by examining how rule of law relates to measures of state repression, especially in the zone where we observe the absence of democracy. Using the 2002-6 Political Terror Scale (non-inverted this time) as a measure of state repression, the answer is straightforward. Among the sixty-eight states worldwide which fall into the autocratic zone of the *DRI* in 2002-6, state repression correlates strongly *negatively*, at $r = -.65$, with rule of law. Even among autocracies, stronger rule of law means less, not more, state repression.[11]

Two cases in point are North Korea and Singapore. North Korea is a repressive autocracy and so its political terror score is high, at .73 for the years 2002-6. If rule of law in autocracies indicates high levels of state repression, North Korea's rule of law score should be high. But it is very low, at .21 for 2002-6. Singapore is an autocratic example in the opposite direction. Its rule of law score is favorable, indeed one of the highest in the world: .93. If such a high rule of law score in a non-democracy is indicative of state repression, Singapore's score in political terror should be high. But it is low, at .23. In fact, this score is far below that of some established democracies, including India, with a very high political terror score, at .71.

The substantiation logic used to create the *EDI* can be applied to various alternative indicators, so we can create different versions of the *EDI* and compare them. For instance, instead of the *RLI*, the (inverted) Political Terror Scale can be used as the component to weight the *DRI*. We call the resulting index *EDI 2*. But we can also use

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[11]   For democracies, of course, this holds true too: among the 108 societies in the democratic zone of the *DRI* the correlation is $r = -.61$.

the Personal Integrity Index to weight the *DRI* (*EDI 3*) or the Political Stability Index (*EDI 4*). We can also exchange the base component of the *EDI*, the *DRI*, by using a percent version of the Empowerment Rights Index (*EDI 5*). Finally, we can exchange both the base component and the weighting component of the original *EDI*, for instance, by weighting the Empowerment Rights Index as the base component by the Political Stability Index as the substantiating component (*EDI 6*).

Table 8.   Correlations between Different Versions of the *EDI*, measured over 2002-6: Pearson's *r* (*N*)

*ALTERNATIVE EDI*s:	CORRELATION with Original *EDI*	
EDI 2 (*DRI * IPTS*)	.92***	(172)
EDI 3 (*DRI * IRI*)	.92***	(156)
EDI 4 (*DRI * PSI*)	.95***	(176)
EDI 5 (*IEI * RLI*)	.97***	(156)
EDI 6 (*IEI * PSI*)	.91***	(156)

Notes: DRI – FH Democratic Rights Index
(0-t0-100 scale)
IPTS – Inverted Political Terror Scale
(0-to-1.0 scale)
IRI   – CIRI Personal Integrity Index
(0-to-1.0 scale)
PSI   – WB Political Stability Index
(0-to-1.0 scale)
IEI   – CIRI Integrity and Empowerment
Index (0-to-100 scale)
RLI   – Rule of Law Index (0-to-1.0 scale)

In none of these versions of the *EDI* does the empirical pattern differ substantially from the original *EDI*. Table 8 demonstrates this point, showing how the original *EDI* correlates with alternative versions of the *EDI* that either vary the *EDI*'s substantiating component (*EDI 2* to *EDI 4*) or its base component (*EDI 5*) or both (*EDI 6*). None of the correlations is below *r* = .91: in no case is there a smaller than eighty-three percent shared variance between the original *EDI* and its possible alternatives. Hence, applying the substantiation logic to different indicators of democracy's definitional and substantiating properties produces similar patterns. The logic of substantiation is to a large extent indicator-resistant. It is a quite robust logic.

CONCLUSION

The *EDI* corrects the *DRI* for institutional qualities that are substantial to democracy but are untapped by the *DRI*. Compared to other democracy indices, the *EDI* changes the countries' democracy scores systematically in a direction that increases democracy's link to other societal phenomena to which democracy should theoretically be linked. To interpret this as measurement bias is false because associative strength with theoretically expected correlates is considered a validity criterion, not an undesirable bias, in measurement theory.

Interestingly, the greater associative strength is obtained by democracy's *substantiating* qualities rather than democracy's *definitional* properties. This is an important and genuinely novel insight that has so far been overlooked. Apparently, what links democracy to other social phenomena is not so much the definitional properties of democracy itself but the substantiating qualities that make the definitional properties effective. This insight surfaces with the *EDI* much more than with any other democracy index.

This observation is illuminating. Before the Third Wave of Democratization, electoral democracy was a distinct and rare type of regime that was largely limited to the Western world. At that time, Western countries did not engage in democracy promotion and so authoritarian elites around the world faced little pressures to adopt electoral democracy. In the meantime, the incentive structure of the international system has changed. Countries that adopt electoral democracy have advantages, including privileged access to Western financial support. In response to this situation, authoritarian elites have managed to install fairly well operating electoral regimes while still withholding power from the people. The strategy to achieve this goal is to undermine the qualities that are needed to substantiate democracy, especially rule of law. This is easier in poor than in rich, in less networked than in more networked, and in less educated than in more educated populations because in each of the former, the people have lesser means, connections, and skills to resist the elites' power manipulations. For this reason, things that have been emphasized in democratic theory as developmental requisites of democracy, are nowadays found to be more closely linked with the substantiating qualities than with the definitional properties of democracy.

Insisting in this case on a purely electoral definition of democracy obscures the true challenges democracy faces today: manipulations of democracy's substantiating qualities. What is needed therefore is an index of democracy that shows the deficiencies in democracy *even under fully operating* electoral regimes. This is what the index of effective democracy does.

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APPENDIX

Notes

Note 1:
This note refers to footnote 1 (p. 3) in the text.

Alexander and Welzel (2008) validate the emancipative notion of democracy from four key views:

(i)   *Popular views* of democracy: echoing the literal meaning of democracy as the 'rule of the people,' survey data show that ordinary citizens around the world understand democracy primarily in terms of the rights that empower people to govern their lives.

(ii)   *Activists' views* of democracy: democracy movements of the past and of today act as people power movements that demand first and foremost rights for citizens.

(iii)   *Constitutional views* of democracy: model constitutions of democracy, like those of the US, France or Germany, follow an order of priority that stipulates the rights of the people before anything else.

(iv)   *Scholarly views* of democracy: despite manifold differences, and regardless of whether they advocate minimalist or maximalist versions of democracy, scholarly views of democracy all have in common that the citizens have more rights under democracy than under autocracy.

Each of these views justifies a notion of democracy that emphasizes the guarantee of democratic rights as the chief definitional property of democracy.

Note 2:
This note refers to footnote 5 (p. 18) in the text.

The Political Terror Scale by Gibney, Wood and Cornett (2008) codes country reports of Amnesty International and the US State Department on violence, coercion, and repression used by state authorities against citizens. Countries receive a score of 1 for the lowest and 5 for the highest level of state repression. This is done twice based on Amnesty International and State Department information, so one can average the two scores for each country-year into a nine-point scale. Averaged over the years 2002-

6, this becomes a 50-point continuous scale, which we inverted in polarity and re-scaled it into a fractional index with minimum 0 for the highest to 1.0 for the lowest repression level. Data and documentation are available for download at: www.politicalterrorscale.org.

The Personal Integrity Index from the Human Rights Data Project at Binghamton by Cingranelli and Richards (2008) uses practically the same sources as those included in the Political Terror Scale to estimate how much power holders in a country respect in the daily practice of governance a number of 'physical integrity rights' that are intended to protect people's personal integrity. The original index ranges from 0 for the lowest respect to 8 for the most respect of personal integrity. Averaged over the period 2002-6, this becomes a 40-point index which we rescaled into a fraction index with minimum 0 and maximum 1.0. Data and documentation are available for download at: http://ciri.binghamton.edu.

The Political Stability Index is provided by the World Bank's World Governance Indicators Project (Kaufmann, Kraay & Mastruzzi 2008), which is an attempt to systematize all available data on the quality of governance and to provide encompassing estimates of the quality of governance in its various dimensions. One of them is labeled 'political stability and absence of violence' and measures the maintenance of public order with non-violent means. Scores are factor scores with more than 100 discrete values. We rescaled this index into a fractional index from 0 for the lowest ever observed to 1.0 for the highest ever observed political stability, from the first measure in 1996 until 2006. Data and documentation are available for download at: http://info.worldbank.org/governance/wgi.

Note 3:
This note refers to footnote 7 (p. 21) in the text.

The Democracy-Autocracy Index from the Polity IV Project (Marshall & Jaggers 2004) codes information about constitutional constraints on state power and popular controls over state power, yielding an index from −10 (pure autocracy) to +10 (complete democracy). We rescaled the index into percentages from 0 for pure autocracy to 100 for complete democracy and averaged scores over the five-year period 2002-6. Data and documentation are available for download at: http://www.systemicpeace.org/polity/polity4.htm.

The Electoral Democracy Index by Vanhanen (2003) interacts data on electoral competitiveness (measured by the percent of parliament seats obtained by opposition parties) and data on electoral mobilization (voter turnout in parliamentary elections in percent). The product of the two is divided by 100 so that one obtains an index from minimum 0, when either there is no opposition or no elections, to a maximum of approximately 50, when the voter turnout is 100 percent and the opposition comes close to hold 50 percent of seats. Again, we rescaled this index into a percentage index with minimum 0 for the lowest possible score and maximum 100 for the highest possible score. We took the latest available data from 2002. Data and documentation are for

download at: http://www.prio.no/CSCW/Datasets/Governance/Vanhanens-index-of-democracy.

Like the Personal Integrity Index, the Empowerment Rights Index is from the Human Rights Data Project by Cingranelli and Richards (2008). For the Empowerment Rights Index, reports by Amnesty International and the US State Department are analyzed to code violations of basic political rights. The original index ranges from 0 for the lowest respect to 10 for the most respect of 'empowerment rights.' Averaged over the period 2002-6, this becomes a 50-point index which we rescaled into a percent index with minimum 0 and maximum 100. Data and documentation are available for download at: http://ciri.binghamton.edu.

Note 4:
This note refers to footnote 8 (p. 23) in the text.

Like the Political Stability Index, the Voice and Accountability Index is provided by the World Bank's World Governance Indicators Project (Kaufmann, Kraay & Mastruzzi 2008). The Voice and Accountability Index is practically speaking an index of democracy indices and hence, by its information base, the most comprehensive measure of democracy as such. Scores are factor scores with more than 100 discrete values. We rescaled this index into a percentage index from 0 for the lowest ever observed to 100 for the highest ever observed level of democracy, from the first measure in 1996 until 2006. Data and documentation are available for download at: http://info.worldbank.org/governance/wgi.

Appendix-Table 1. Scores on the *EDI*, *DRI*, *RLI* and their Residuals: Time Span 2002-6

COUNTRY:	EDI	DRI	RLI	DRI^2	EDI-DRI Residuals
Finland	97.10	100.00	.97	100.00	32.52
Iceland	96.73	100.00	.97	100.00	32.15
Denmark	95.55	100.00	.96	100.00	30.97
New Zealand	94.93	100.00	.95	100.00	30.35
Switzerland	94.40	100.00	.94	100.00	29.82
Norway	93.68	100.00	.94	100.00	29.10
Sweden	93.58	100.00	.94	100.00	29.00
Luxemburg	92.35	100.00	.92	100.00	27.78
Austria	91.68	100.00	.92	100.00	27.10
Netherlands	91.35	100.00	.91	100.00	26.77
Australia	90.58	100.00	.91	100.00	26.00
Canada	90.55	100.00	.91	100.00	25.97
UK	87.81	97.22	.90	94.52	25.36
Germany	86.97	97.22	.89	94.52	24.53
U.S.A.	84.89	100.00	.85	100.00	20.31
Ireland	84.60	100.00	.85	100.00	20.02
Belgium	79.83	97.22	.82	94.52	17.39
Bahamas	78.76	100.00	.79	100.00	14.18
Andorra	77.90	100.00	.78	100.00	13.32
Liechtenstein	77.77	100.00	.78	100.00	13.19
France	77.63	97.22	.80	94.52	15.19
Barbados	76.75	100.00	.77	100.00	12.17
Malta	76.63	100.00	.77	100.00	12.05
Spain	75.64	97.22	.78	94.52	13.20
Portugal	75.36	100.00	.75	100.00	10.78
Chile	71.84	93.06	.77	86.59	12.60
Japan	71.09	91.67	.78	84.03	12.92
Cyprus	67.22	98.61	.68	97.24	3.71
Slovenia	66.34	97.22	.68	94.52	3.90
Tuvalu	64.13	100.00	.64	100.00	-.45
Estonia	63.13	94.44	.67	89.20	2.82
Uruguay	62.23	98.61	.63	97.24	-1.28
Italy	61.90	97.22	.64	94.52	-.55
Hungary	61.38	94.44	.65	89.20	1.08
Dominica	60.91	97.22	.63	94.52	-1.53
Israel	59.73	87.50	.68	76.56	4.77
S. Lucia	59.56	94.44	.63	89.20	-.75
Costa Rica	59.49	94.44	.63	89.20	-.82
Mauritius	58.77	93.06	.63	86.59	-.47
Taiwan	58.71	88.89	.66	79.01	2.68

… continuation (*Appendix-Table 1*)

COUNTRY:	EDI	DRI	RLI	DRI²	EDI-DRI Residuals
S. Kitts	58.38	94.44	.62	89.20	-1.92
Czech R.	58.24	94.44	.62	89.20	-2.07
S. Vince	57.09	91.67	.62	84.03	-1.08
Kiribati	56.69	100.00	.57	100.00	-7.89
Greece	56.40	88.89	.63	79.01	.36
Cabo Verde	55.69	95.83	.58	91.84	-5.68
Grenada	55.17	93.06	.59	86.59	-4.07
Poland	54.45	94.44	.58	89.20	-5.85
Botswana	54.42	81.94	.66	67.15	3.73
Slovakia	54.21	94.44	.57	89.20	-6.10
Lithuania	54.17	94.44	.57	89.20	-6.14
Latvia	54.06	94.44	.57	89.20	-6.25
South Korea	52.69	86.11	.61	74.15	-1.20
South Africa	50.79	90.28	.56	81.50	-6.31
Micronesia	47.38	95.83	.49	91.84	-14.00
Belize	45.08	94.44	.48	89.20	-15.23
Suriname	42.13	84.72	.50	71.78	-10.70
Panama	41.98	91.67	.46	84.03	-16.19
Bulgaria	41.94	87.50	.48	76.56	-13.03
Namibia	41.79	79.17	.53	62.67	-6.77
Vanuatu	39.26	84.72	.46	71.78	-13.57
Croatia	39.08	76.39	.51	58.35	-7.34
Trinidad-T.	37.90	75.00	.50	56.25	-7.45
Mongolia	37.57	81.94	.46	67.15	-13.12
Seychelles	37.20	66.67	.56	44.44	-1.74
Romania	37.15	83.33	.45	69.44	-14.61
Singapore	36.34	38.89	.93	15.12	18.77
Ghana	36.03	80.56	.45	64.89	-13.59
India	35.28	75.00	.47	56.25	-10.07
Sao Tome	34.12	86.11	.40	74.15	-19.78
Mali	32.92	77.78	.42	60.49	-14.56
Brazil	32.78	73.61	.45	54.19	-11.50
Dominican R.	32.08	83.33	.38	69.44	-19.67
Thailand	31.94	65.28	.49	42.61	-5.93
Mexico	31.88	76.39	.42	58.35	-14.54
Lesotho	30.91	66.67	.46	44.44	-8.03
Jamaica	30.58	77.78	.39	60.49	-16.91
Guyana	30.49	79.17	.38	62.67	-18.06
El Salvador	30.36	75.00	.40	56.25	-14.98
Senegal	30.21	68.06	.45	46.32	-9.80

… continuation (*Appendix-Table 1*)

COUNTRY:	EDI	DRI	RLI	DRI²	EDI-DRI Residuals
Madagascar	29.94	63.89	.47	40.82	-6.86
Argentina	29.41	76.39	.38	58.35	-17.01
Kuwait	29.05	43.06	.68	18.54	8.27
Benin	28.73	79.17	.36	62.67	-19.82
Sri Lanka	28.62	59.72	.48	35.67	-4.98
Peru	27.64	70.83	.39	50.17	-14.50
Philippines	27.43	72.22	.38	52.16	-15.79
Turkey	26.91	55.56	.48	30.86	-3.48
Bolivia	26.39	73.61	.36	54.19	-17.89
Fiji	26.04	56.94	.46	32.43	-5.42
Macedonia	24.94	63.89	.39	40.82	-11.86
Malaysia	23.73	40.28	.59	16.22	5.09
Nicaragua	23.61	66.67	.35	44.44	-15.33
Ecuador	22.21	68.06	.33	46.32	-17.80
Honduras	21.82	66.67	.33	44.44	-17.12
Burkina Faso	21.58	50.00	.43	25.00	-4.54
Jordan	21.20	37.50	.57	14.06	4.70
Malawi	21.14	56.94	.37	32.43	-10.32
Papua New Guin.	20.83	70.83	.29	50.17	-21.32
Moldova	20.73	61.11	.34	37.35	-13.94
Colombia	20.68	55.56	.37	30.86	-9.72
Mozambique	20.49	58.33	.35	34.03	-12.04
Tanzania	20.35	55.56	.36	30.86	-10.04
Albania	19.57	61.11	.32	37.35	-15.09
Ukraine	19.50	59.72	.32	35.67	-14.10
Solomon Isld.	19.41	66.67	.29	44.44	-19.53
Bosnia	19.31	50.00	.38	25.00	-6.81
Indonesia	18.81	62.50	.30	39.06	-16.92
Morocco	18.47	37.50	.49	14.06	1.97
Bahrain	18.18	27.78	.65	7.72	9.16
Georgia	18.18	56.94	.31	32.43	-13.28
Nepal	17.98	45.83	.38	21.01	-4.93
Armenia	17.65	47.22	.37	22.30	-6.33
Guatemala	17.50	54.17	.32	29.34	-11.82
Zambia	16.60	48.61	.34	23.63	-8.45
Gambia	16.41	38.89	.42	15.12	-1.16
Paraguay	16.15	62.50	.26	39.06	-19.58
Niger	16.09	52.78	.30	27.85	-12.17
UAE	15.74	22.22	.71	4.94	10.99
Oman	15.66	23.61	.66	5.57	9.84

… continuation (*Appendix-Table 1*)

COUNTRY:	EDI	DRI	RLI	DRI^2	EDI-DRI Residuals
Bangladesh	14.89	52.78	.28	27.85	-13.37
Gabon	14.69	38.89	.38	15.12	-2.88
Kenya	14.49	50.00	.29	25.00	-11.63
Venezuela	14.12	52.78	.27	27.85	-14.14
Mauritania	13.86	31.94	.44	10.20	1.63
Tunisia	13.65	25.00	.55	6.25	6.76
Sierra L.	13.53	52.78	.26	27.85	-14.72
Comoros	13.04	43.06	.30	18.54	-7.73
Qatar	13.01	19.44	.67	3.78	10.40
Brunei	12.89	22.22	.58	4.94	8.14
Maldives	12.57	25.00	.50	6.25	5.69
Bhutan	12.44	19.44	.63	3.78	9.82
Djibouti	12.08	36.11	.33	13.04	-3.36
Uganda	12.05	36.11	.33	13.04	-3.39
Guinea-Bissau	11.71	45.83	.26	21.01	-11.20
Ethiopia	11.66	33.33	.35	11.11	-1.64
Nigeria	10.16	48.61	.21	23.63	-14.89
Russia	9.87	31.94	.31	10.20	-2.36
Egypt	9.43	20.83	.45	4.34	5.75
Kyrgyztan	9.26	31.94	.30	10.20	-2.97
Togo	8.88	27.78	.32	7.72	-.15
Algeria	8.79	25.00	.35	6.25	1.90
Yemen	8.45	27.78	.30	7.72	-.58
Congo	8.35	33.33	.25	11.11	-4.95
Burundi	7.85	30.56	.25	9.34	-3.31
CAR	7.79	37.50	.21	14.06	-8.71
Swaziland	7.74	20.83	.37	4.34	4.05
Kazakhstan	7.59	26.39	.29	6.96	-.37
Azerbaijan	7.58	26.39	.29	6.96	-.38
Pakistan	7.40	23.61	.31	5.57	1.58
Liberia	6.99	34.72	.19	12.06	-7.38
Guinea	6.94	25.00	.28	6.25	.06
Iran	6.38	16.67	.38	2.78	5.91
Rwanda	6.36	18.06	.34	3.26	4.82
Cambodia	6.34	23.61	.27	5.57	.52
Cote D'Ivoire	6.08	23.61	.24	5.57	.26
Chad	5.77	22.22	.26	4.94	1.02
Tajikistan	5.75	22.22	.25	4.94	1.00
Angola	4.74	22.22	.21	4.94	-.01
Eritrea	4.37	9.72	.44	.95	9.24

… continuation (*Appendix-Table 1*)

COUNTRY:	*EDI*	*DRI*	*RLI*	*DRI²*	*EDI-DRI* Residuals
Cameroon	4.18	15.28	.27	2.33	4.78
Belarus	3.77	13.89	.27	1.93	5.43
Vietnam	3.59	9.72	.37	.95	8.46
Haiti	3.54	22.22	.15	4.94	-1.21
China	3.33	8.33	.40	.69	9.26
Zimbabwe	3.16	15.28	.20	2.33	3.76
Afghanistan	2.20	16.67	.12	2.78	1.72
Laos	1.93	6.94	.28	.48	8.94
Eq. Guinea	1.67	8.33	.20	.69	7.60
Saudi Arabia	1.50	2.78	.56	.08	11.71
Iraq	1.38	9.72	.16	.95	6.24
Uzbekistan	1.37	5.56	.24	.31	9.44
Somalia	.56	5.56	.08	.31	8.64
Syria	.51	1.39	.40	.02	11.79
Burma	.00	.00	.17	.00	12.34
Cuba	.00	.00	.36	.00	12.34
N. Korea	.00	.00	.21	.00	12.34
Libya	.00	.00	.33	.00	12.34
Sudan	.00	.00	.22	.00	12.34
Turkmenistan	.00	.00	.22	.00	12.34
MINIMUM	.00	.00	.00	.00	-21.00
MAXIMUM	97.10	100.00	.97	100	33.00
MEAN	34.00	61.00	.48	48.00	.00
SD	28.00	32.00	.21	37.00	12.80