Data Disclosure, Accountability and the Facets of Transparency*

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Abstract

A substantial literature links government transparency to political accountability, and hence to governance outcomes. Yet transparency is a multifaceted concept – broadly defined it may pertain to any aspect of information transmission. Theoretically, it is critical to assess *what* information is being transmitted, and transmitted *to whom*. Empirical work, however, has often neglected such distinctions, focusing instead on proxies for a nebulous conception of 'openness.' In this paper, we offer a framework for conceptualizing various forms of transparency. We introduce our own index of a particular facet of transparency – which focuses on the disclosure of aggregate economic data – and relate this form of transparency to other cross-national measures. We seek to take one step toward clarifying theoretical mechanisms and the empirical measures. In so doing, we also offer guidance on assessing which facets and measures of transparency are relevant to assessing which theoretical mechanisms.

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Seminal contributions to political science stress the centrality of information to political interactions. Information has been shown to play a role in war initiation (Fearon, 1995), the signing and ratification of treaties (Hollyer and Rosendorff, 2011, 2012), Congressional committee assignments (Gilligan and Krehbiel, 1987), political responses to economic crises (Alesina and Drazen, 1991; Fernandez and Rodrik, 1991), and ethnic ties and public goods provision (Habyarimana et al., 2009) – prominent examples can be found in nearly every subfield of the discipline.

Information's role is perhaps most prominent in models of political accountability. Here, citizens attempt to discipline their political leaders for the decisions they take in office – whether by recourse to the ballot box or to the streets. Citizens receive some signal of the government's performance, which may be used to update their believes about their leaders' hidden actions (Barro, 1973; Ferejohn, 1986) or types (Banks and Sundaram, 1993; Fearon, 1999). Typically, as the precision of this signal rises, citizens' beliefs align more closely with governments' behavior, ensuring that under-performing leaders are more likely to be subject to electoral punishment or citizen unrest. Increasing citizens' access to information thus enhances leaders' incentives to serve the public interest, improving governance outcomes (Adserà, Boix and Payne, 2003; Besley and Burgess, 2002) and/or increasingly the likelihood of removal in the wake of poor performance (Ferraz and Finan, 2008*b*). The extent to which citizens are able to draw inferences about government behavior based on this signal is described as the level of transparency – which may capture any aspect of information transmission with the polity.

While the theoretical definition of transparency is such models is straightforward – most typically it is depicted as the precision (the inverse of the variance) of the public's signal of government performance – the operationalization of this parameter is not. Indexes used for this purpose abound. Most focus on aspects of the media market – whether it be the freedom of the press (as measured by Transparency International) (Brunetti and Weder, 2003), newspaper circulation figures (e.g., Adserà, Boix and Payne, 2003; Besley and Burgess, 2002), or the ownership structure of media outlets (Djankov et al., 2003). Others emphasize the role of open political institutions (Broz, 2002), the presence or absence of freedom of information laws (FOILs) (e.g. Berliner, 2011; Islam, 2006), or the dissemination of data (Bueno de Mesquita et al., 2003; Hollyer, Rosendorff and Vreeland, 2011; Williams, 2009). Choosing which measure of transparency to use under what circumstances can thus be a fraught decision. Worse still, choosing poorly can result in misspecified empirical models, even as the abundance of choices increases the number of 'researcher degrees of freedom' (Simmons, Nelson and Simonsohn, 2011), which, in turn, raises the danger of Type I errors.

We contend that the abundance of operationalizations of transparency results from a very stylized and broad definition of accountability – and thus of transparency. Governments make decisions across a broad variety of issue dimensions, and may be held more or less accountable across each. Which facets of transparency are relevant similarly vary across issue dimensions and institutional structures.

Specifically, we contend that the facets of transparency differ in *what* information is conveyed and *to whom* that information is conveyed. As we elaborate below, information may pertain to policy decisions,

policy outcomes (which may be more or less aggregated), or to the mapping between decisions and outcomes. Information may also be distributed broadly (and known to be distributed broadly), or it may reach only a narrow audience. Consequently, these forms of transparency may have varying implications for accountability according to the issue dimension under consideration.

In this paper, we are particularly interested in a specific form of transparency: the broad public dissemination of aggregate data on policy outcomes, specifically on economic outcomes. We contend that such information is critical for accountability with regards to many (but not all) aspects of economic decision making, especially when the methods by which governments are held to account entail some degree of collective action. We discuss a measure of this form of transparency – the HRV Index (Hollyer, Rosendorff and Vreeland, 2013*a*) – and compare it to alternatives frequently used in the literature.

In what follows, we first develop a conceptual framework through which different facets of transparency may be classified. This framework contains two dimensions: The first pertains to the content of information, which may relate to policy outcomes, policy choices/implementation, and the mapping between policy choices and outcomes. The second dimension considers the breadth of dissemination of information and particularly whether or not this information constitutes common knowledge. Section 2 maps commonly used cross-national measures of transparency into this framework. In Section 3, we describe our preferred measure of a particular facet of transparency: government's disclosure of aggregate data on policy outcomes.[1] We then compare cross national measures of various facets of transparency in Section 4. Section 5 concludes.

1 The Facets of Transparency

The Content of Information

Consider a very simple model of policy generation in which a government chooses a policy p from the set $\mathcal{P},\ p \in \mathcal{P}$. There are N citizens in this society, where each citizen is denoted $i \in \{1, 2, ..., N\} \equiv \mathcal{I}$. Each individual experiences some outcome y_i which is a function $g(\cdot)$ of the government's policy choice, plus some random noise ϵ_i, which is drawn from some distribution $f(\cdot)$.[2] We thus have:

$$y_i = g(p) + \epsilon_i. \tag{1}$$

We can assume, even in the absence of any external information, each citizen i is aware of her own outcome y_i. Transparency may thus inform citizen i of: (1) The policy choice p of the government. (2) The outcomes experiences by some set $\mathcal{J}$ of other citizens $\mathcal{J} \subseteq \mathcal{I} \backslash i$. The larger the cardinality of $\mathcal{J}$, the

[1] For technical details on the construction of this index, see Hollyer, Rosendorff and Vreeland (2013*a*).

[2] This is an extreme simplification. Specifically, the assumption that the functional form of $g(\cdot)$ is constant across all citizens assumes that there is a uniform definition of a 'good' policy. This assumption follows much of the literature on accountability and retrospective voting, but is unnecessary and may not hold in many situations. One could consider policies as having varying effects for subsets of the population and focus, for instance, on the median voter. For ease of discussion, we focus on the simplest case.

higher the level of aggregation of these outcomes. (3) The functional form of $g(\cdot)$ mapping policy choices into outcomes.

Information on Policy Choices

Consider first information on the policy p adopted by the government. Since citizens seek to induce the government to make welfare enhancing choices, the implications of information regarding policy choices p hinges critically on whether the mapping from policies into outcomes $g(\cdot)$ is also known. When this mapping is known with certainty, transparency with regards to policy choices will be sufficient to ensure accountability. When such certainty is absent, however, such information will be of less use – citizens cannot deduce the 'correct' policy and so will not be able to punish politicians for making the 'wrong' choice.

Indeed, if the mapping $g(\cdot)$ is unknown, circumstances exist under which information regarding policy choices may reduce welfare. Prat (2005) presents a model with one such result. Here, citizens are uncertain of the mapping $g(\cdot)$, though they have beliefs over which policies are right and which wrong. Politicians, who are better (but still imperfectly) informed of this mapping, must make a policy choice. Under these circumstances, transparency regarding this policy choice may cause politicians to ignore their private information and cater to the beliefs of the populace. In the event that the policy fails, the politician is less likely to be punished for following the conventional wisdom than for hewing an unconventional path. Similarly, Stasavage (2004) demonstrates that transparency regarding the conduct of international negotiations may lead to increased posturing by government representatives, even if such posturing reduces the likelihood of finding an optimal compromise. Such posturing may lead citizens to believe that the representative is fighting for their interests, even as it reduces the likelihood an optimal outcome is achieved.

The impact of information on policy choices therefore critically depends on the state of knowledge about the mapping between policies and consequences. This, in turn, will vary from issue area to issue area. In some instances, the welfare consequences of policies are straightforward. For instance, there is likely to be little disagreement that corruption and misappropriation on the part of politicians is deleterious to all save perhaps those involved in the corruption scheme (though, the size of the group of beneficiaries may vary, see Fernández-Vásquez, Barberá and Rivero, 2013). In other instances, open discussion and vigorous debate regarding the consequences of policy decisions may make information regarding the policy choices more valuable. Transparency with regards to p and with regards to the shape of $g(\cdot)$ may be complementary in ensuring accountability. In still other circumstances, however, the relationship between policy choices and outcomes may be sufficiently complex and abstruse that information regarding policy choices will play little role in enhancing leader accountability. Citizens may remain rationally ignorant of the complex relationship between policy choices and outcomes (Downs, 1957) – particularly with regards to the minutiae of budgetary, tax, and trade policies, for example.

Information on Policy Outcomes

Consider the availability of information with regards to the welfare of other citizens – that is, information with regard to policy *outcomes*. The value of such information may not be contingent on citizens' knowledge of other aspects of the policy-making process. So long as outcomes are poor, the public can infer that policy choices or implementation was also poor. (Though, some knowledge of what outcomes are feasible may be necessary to adequately define what constitutes a poor outcome). Consequently, there is little disagreement in the theoretical literature that increasing citizen knowledge of policy outcomes improves accountability.

The ability of citizens to draw inferences of government performance based on policy outcomes, nevertheless, hinges critically on (1) the extent to which factors orthogonal to government decisions influence citizen welfare (i.e., the distribution $f(\cdot)$ above), and (2) the magnitude of the effect of policy decisions on citizen welfare (i.e., for any $p_1, p_2 \in \mathcal{P},\ p_1 \neq p_2$, $g(p_1) - g(p_2)$). As the variance of outcomes rises and the effect of policies on individuals falls, information regarding policy outcomes must be increasingly aggregated to ensure government accountability.

Consider, for instance, an extreme example where $f(\cdot)$ is degenerate. That is, no factors other than government policies affect outcomes. An example might be the delivery of a government service – if a citizen's social security check fails to arrive this can only be attributable to a failure by a branch of government. No additional information is necessary for citizens to attribute this failure to the government. On the other hand, the overall economic well-being of any given citizen is attributable to many factors beyond the government's control. Knowledge of y_i, therefore, will tell an individual citizen i very little about the government's performance. The distribution of $f(\cdot)$ may be more or less dispersed – as the level of dispersion rises, the amount of information conveyed by the outcome for any one citizen (y_i) diminishes. As the distribution of $f(\cdot)$ grows more disperse, the need for aggregation rises. For instance, to deduce the government's contribution to economic performance, citizens require more highly aggregated information than when evaluating performance with regards to the delivery of public services (for a related discussion, see Duch and Stevenson, 2008). Such aggregate information provides value above and beyond that contained in any given citizen's personal experiences.[3] We term this principle the 'law of large numbers' effect with regards to aggregate information on policy outcomes.

We do not contend that the 'law of large numbers effect' fully solves the informational problems faced by the populace. Even if aggregate economic outcomes are fully known, assessing government responsibility for these outcomes is a difficult task. For instance, economic well-being may fluctuate with a variety of shocks orthogonal to government policy. But, shocks to aggregate level measures are the sum of a variety of similar shocks at the individual or regional level. Our contention is that – in practical settings – the

[3]This discussion relates to the literature on sociotropic versus 'pocketbook' voting in American politics (Kramer, 1983; Markus, 1988). Note further that the disclosure of more and more accurate economic data would provide greater information not only regarding the average effectiveness of government policies on individual welfare, but also more information regarding the distribution of these effects. Such data might reflect particularly poor (strong) performance in certain sectors, geographic locations, or provide information about changes in the income distribution.

effects of such shocks on aggregate-level outcomes is likely to be smaller than those on individual-level outcomes, such that the provision of aggregate-level data enables citizens to draw better (though still imperfect) inferences about the appropriateness of government policies.

Aggregate information may also facilitate collective action. Collective action on the part of members of the populace is often inhibited by uncertainty over the willingness of others to participate in collective activities (Kuran, 1991). This has particularly important implications for the accountability of autocrats, as severe collective action problems inhibit methods of disciplining such governments. Because aggregate information with regards to outcomes provides insight into the experiences, and thus into the beliefs, of others, it may play a critical role in shaping the incentives for collective action (Hollyer, Rosendorff and Vreeland, 2013*b*; Morris and Shin, 2002).

Information on the Link Between Outcomes and Policies

Finally, consider information on how policies translate into outcomes, which may be more or less available. That is, levels of transparency with regards to the functional form of $g(\cdot)$ may vary across polities and issue areas. As noted above, this variation may arise in part due to the complexity of the issue area itself. The implications of bans on no-bid contracts, for instance, may be straightforward. In other instances, polities may be more transparent with regards to the shape of $g(\cdot)$ due to the publication of forecasts by non-partisan government research agencies, such as the Congressional Budget Office. Or, more broadly, the public's understanding of the relationship between policy choices and outcomes may be enhanced due to the unfettered workings of a private 'marketplace of ideas,' to use William Douglas' phrase.

As with information regarding policy choices, transparency with regards to the shape of $g(\cdot)$ may prove of little value on its own. This knowledge acts as a complement to knowledge of policy choices in ensuring government accountability. Information as to which policies would be optimal will be of little use if the public cannot observe the policies the government actually adopts. Some information with regards to $g(\cdot)$ may also complement the role of transparency with regards to policy outcomes in promoting accountability. To the extent that the public is better aware of what constitutes a feasible outcome, it will be better able to judge whether current outcomes qualify as 'good' or 'bad'.

The Breadth of Availability

A second dimension along which information may vary is the degree to which this information is publicly available. By publicly available, we mean the degree to which any piece of information constitutes *common knowledge*. Public information thus has two prerequisites: (1) It must be available to all citizens. (2) All citizens must be aware of the fact that this information is known to all others (and know that all others are similarly aware of this fact).

The first aspect of this criterion is straightforward. The degree to which information shapes citizen behavior depends on the set of citizens to whom it is made available. If only a small minority of citizens is

able to access information – regardless of the content – it is unlikely that these citizens will be able to hold the government to account under any set of political institutions. Information can only shape the behavior of those citizens to whom it is made available.

The second aspect of the publicness of information involves more subtle 'higher order beliefs.'[4] Information that is known to be publicly available helps citizens to form an understanding of their shared beliefs. As Morris and Shin (2002) note, public information serves not only to cause citizens to update their own beliefs about the performance of the government, it also allows these citizens to update their beliefs about how widely these beliefs are shared. Public information thus plays a dual role: it informs citizens both about reality and about how others might perceive this reality.

The importance of each aspect of publicness varies depending on the institutions used to hold leaders accountable. The breadth of availability is be most crucial when governments are held to account through (large) elections. Citizen strategies in the voting booth are likely to be largely free of strategic considerations – each citizen acts according to the information she has available. Thus, the pertinent question is how many citizens are well informed. By contrast, when governments are held to account through citizen collective action, knowledge that information is available to others may be critical. In situations characterized by strategic complementarities, higher order beliefs are crucial: the willingness of citizens to participate in collective action is contingent on their beliefs that others are willing to participate. Consequently, information that is known to be public will play an outsized role in such activities (Morris and Shin, 2002). This may be true even if information is shared, and known to be shared, only within a subset of the population.

2 Operationalizing Transparency

Having thus constructed a typology of the different forms of information on the policy-making process, we now consider the relationship between this typology and commonly used measures of transparency. We focus our attention on cross-national indexes of transparency.[5] While our characterizations are relevant for sub-national studies as well, authors of such studies are far more likely to employ their own custom measures than off-the-shelf datasets.

Specifically, we examine three types of measures: First, we consider institutional measures of transparency, by which we mean measures of access to information regarding government decision-making. These measures include the presence/absence of FOILs, the disclosure of debate minutes (e.g., of the board meetings of central banks), and measures of the 'openness' of political institutions (often collapsed into measures of democracy). Second, we consider measures of the media market. In particular, we focus on measures of media freedom (Freedom House) and media circulation (newspaper circulation figures). Finally, we examine indexes which measure the dissemination of data by governments. Here we refer to aggregate (often economic) data which only governments have the capacity to collect and share.

[4] Higher order beliefs refer to the beliefs individuals hold about the beliefs of others.

[5] For examples of studies employing such measures, see Adserà, Boix and Payne (2003), Broz (2002), Brunetti and Weder (2003), and Islam (2006).

Institutional Measures

Institutional measures of transparency reflect the extent to which citizens can access information on the decision making processes of governments or governmental bodies. Broz (2002, 866-7) provides a clear definition of this type of transparency: "Transparency in the political system means that public decisions are made openly, in the context of competing interests and demands, political competition, and sources of independent information."

Broz (2002) measures this form of transparency using the level of democracy, as reflected in the Polity index. The other most commonly used class of such measures reflects the presence/absence of FOILs (Berliner, 2011; Islam, 2006). Alternative measures of institutional transparency may reflect the openness of specific institutions. For instance, measures of central bank transparency – which typically capture the disclosure of board minutes, the publication of bank forecasts, and/or the discussion of past forecasting errors (e.g. Stasavage, 2003) – also capture this aspect of information transmission (see also Chortareas, Stasavage and Sterne, 2002).

In terms of our categorization, such transparency most closely reflects public disclosure of the policies adopted by the government (p). FOILs and open decision-making processes provide citizens with information on the actions implemented by governing bodies (and, in the case of central banks, forecasts of how these policies are likely to change). They do not typically involve information on policy outcomes, as experienced by targeted citizens, nor information on the mapping between policies and such outcomes.

These measures vary in the extent to which they are public. Typically, disclosures mandated by FOILs are narrowly targeted at the party who initiated the freedom of information request. Though, the resultant information may be disseminated more widely by these parties, who are often members of the press. On the other hand, legislative debates and central bank disclosures are typically directed to a relatively broad audience.

Similarly, higher order beliefs about policy choices may vary. All members of the investor community, for instance, are likely to be aware that others within this community are analyzing central bank press releases. By contrast, citizens who follow legislative debates remain uncertain about the attentiveness of other citizens.

Since institutional measures of transparency primarily reflect disclosure of government policy choices, the value of such information depends on (1) the extent to which citizens are aware of the mapping between policies and outcomes and (2) the breadth with which such information is disseminated. It therefore follows that institutional measures of transparency are most likely to be useful in holding governments to account for relatively simple examples of malfeasance: corruption, misappropriation, inefficiency. For instance, the release of audits of government policy choices and implementation have been demonstrated to increase the sanctioning of corrupt governments (Di Tella and Schargrodsky, 2003; Ferraz and Finan, 2008*a*). The welfare implications of these policies and practices are relatively straightforward for citizens to evaluate. On the other hand, such forms of transparency are likely to matter less for government accountability with regards to more complex policies. Witness, for instance, the rather muted reaction by the US public to

disclosures regarding NSA spycraft. Since the welfare implications of these policies are ambiguous, the US public is less able ensure government accountability with regards to national intelligence activities.

Institutional transparency is also likely to be of greatest value when disclosures are disseminated widely. FOILs, for instance, are likely to be of greatest use when a free and vibrant press is present to both file requests and make any releases available to the broader public.

The Media

The most commonly used measures of transparency reflect the performance and penetration of the media. Typically these measures reflect one of two aspects of media operations: (1) the extent to which the press is free to report on stories of its own choosing (e.g., Freedom House's Freedom of the Press index), and (2) the breadth of the populace the press is able to reach (e.g., newspaper circulation *per capita* figures from the World Bank). We discuss each of these measures in turn, after first examining the role of the media in light of the typology developed above.

The media have the most wide-ranging impact on information dissemination of all the mechanisms we examine. A free and vibrant press may convey information on all aspects of the policy process to the public. With or without the help of FOILs or open political institutions, investigative pieces may relay information on the policy choices of governments to citizens. (Though, naturally, institutional transparency and the media are complements in this regard.) Analyses and opinions, disseminated by the media, may help to inform citizens of the mapping between policy choices and outcome $g(\cdot)$. A functioning marketplace of ideas may help citizens to understand which of the policy options available will achieve the most desirable results. Finally, the media may play a role in conveying information on policy outcomes. Members of the press may contact parties affected by a given policy and air their stories to the broader public.

While there are no aspects of the policy process on which the media is wholly unable to provide information, there is one type of information that it is usually incapable of providing on its own: aggregated information on policy outcomes. Individual news agencies typically cannot invest the resources necessary to document movements in price indexes, levels of economic growth, levels of poverty, or education rates. The media are unable to collect this sort of information for two reasons: (1) The collection of such information often entails enormous fixed costs. Indeed, the collection of census data often involves workforces that number in the tens or hundreds of thousands (and, in some instances, even in the millions).[6] (2) The collection of such information is subject to a public goods problem (Rodrik, 1995). Once one news outlet collects and publicizes information on aggregate outcomes – whether this information is in the form of qualitative assessments or quantitative data – others may simply reproduce this information. Since much of the benefit from the publication of information flows to entities other than the original source, news agencies will under-invest in its collection. Since the fixed-costs to gathering aggregate measures of welfare are very

[6] For instance, the most recent Indian census required 2.7 million workers, who often had to travel enormous distances, to complete the enumeration. "Heads Up: A National Head Count Should Show Dramatic Changes." *The Economist.* February 24, 2011. http://www.economist.com/node/18233732?story_id=18233732

high, the mass media will tend not to collect these measures.

Because the media may relay information on a variety of aspects of the policy-making process, the presence/absence of a vibrant press may play an important role in government accountability across a wide array of policy dimensions. The main limitation to the press' role lies in its inability to gather highly aggregated information with regards to policy outcomes. As a result, the press' role in accountability will be most limited when (1) the public is imperfectly informed of the mapping between policies and consequences $g(\cdot)$, and (2) when factors other than government policy explain much of the variance in individuals' welfare (i.e., the variance of $f(\cdot)$ is large).[7] In other words, the press will play its greatest role when (1) the consequences of relevant policies are clear, (2) when policies are targeted at relatively small groups or geographic areas, or (3) when government actions play an overwhelming role in determining policy outcomes.

The media may thus play a critical role in ensuring accountability in instances of government mismanagement or corruption, whether such policies are unearthed with the help of FOILs or open governmental institutions – as in Reinikka and Svensson's (2003) investigation of corruption in Uganda – or not – as in the *New York Times*' investigations into the Tweed Ring (Ackerman, 2005). They may also be critical in assessing the effectiveness of policies that are targeted at narrow geographic areas or groups of individuals. Since these policies are targeted, the costs of collecting representative information are likely to be relatively low. For instance, (Reinikka and Svensson, 2003) find that proximity to newspaper outlets played an important role in reducing misappropriation of school grants in Uganda. Absent other sources of information, however, the media are likely to be unable to provide information on policies' effects on broader considerations such as economic output, price level movements, unemployment, etc.

If the media is to play this central role, two criteria must be satisfied: (1) news agencies must be free of government interference and (2) they must be able to reach large audiences. The first criterion goes directly to the credibility of the information relayed by new entities. The second criterion deals with the breadth of the audience – the second dimension along which definitions of transparency may vary.

Of the two major cross-national indexes used to measure the role of the media, each captures one of these criteria while largely ignoring the other. Consider Freedom House's Freedom of the Press Index. This index reflects subjective expert judgments of: (1) the laws and regulations that constrain media content, (2) the degree of political control over the media, and (3) the structure of media ownership.[8] Countries that score well on this index, therefore, possess a relatively unconstrained press. One might therefore expect that competition between news outlets will help to ensure that the information relayed to the public is – at least on average – unbiased. Or, if there is bias, it is unlikely to systematically favor the incumbent government's perspective. A high score on the Freedom of the Press index, however, is no guarantee that information on the policy-making process will become common knowledge.

[7] This discussion relates to a Duch and Stevenson's (2008) examination of citizens' ability to draw inference about government behavior in the economic realm. While Duch and Stevenson discuss the importance of variation in outcomes that is orthogonal to government policy, they do not explicitly examine the role of the various forms of transparency discussed in this piece.

[8] See http://freedomhouse.org/templace.cfm?page=533.

On the other hand, alternative measures often focus on the extent of the media's reach – for instance, measures of newspaper circulation *per captia* (for an application, see Adserà, Boix and Payne, 2003). This index proxies for the ability of the press to reach a broad swath of the population and may be an important explanatory variable in some contexts. The newspaper circulation index, however, suffers from the opposite problem from that of Freedom House. High newspaper circulation numbers may be driven by the pervasiveness of state-run media outlets offering biased coverage of government actions.

Which index researchers should employ therefore varies according to the scope of their analysis and on the importance of the breadth of dissemination to the particular accountability mechanism in question. If governments can be held accountable by a small (informed) subset of the population, then the Freedom of the Press measure is more relevant. If it is critical that information be common knowledge within the population, however, measures of media coverage are more relevant. In many circumstances an aggregate index that reflects both measures may be preferable to either on its own.

Data Dissemination

A final facet of transparency relates to the disclosure of aggregate data on policy outcomes by the government to the public. Cross-national indexes of this facet of transparency typically proxy for governments' release of data to the public by measuring the release of data to international agencies. Such indexes may focus on the missingness of one important piece of data such as GDP or tax measures (e.g., Bueno de Mesquita et al., 2003), or they may reflect the reporting of a broader array of measures (Hollyer, Rosendorff and Vreeland, 2011, 2013*a*; Williams, 2009). Others have focused on the speed with which certain indicators are reported to international bodies such as the World Bank and IMF (Islam, 2006).

The release of such data provides information on aggregate policy outcomes. That is, they serve to inform individual i of the welfare of some aggregation of other citizens $\mathcal{J}$. Moreover, measures of such forms of transparency tend to focus on government disclosures since, as argued above, the combination of (1) high fixed costs of collection and (2) externalities in information dissemination tend to make the collection of aggregate data a natural monopoly dominated by the government.

The release of economic data provides the public with information on policy outcomes. Economic data are hardly unique in this regard. A free and vibrant media may also ease the flow of information about policy outcomes; reporters may examine the effects of government decisions as well as the decision-making process itself. Similarly, social networks may allow those impacted by policy decisions to communicate with one another and with those not directly targeted by policy choices.

Aggregate data are unique in one regard: their ability to provide information regarding a large number of individual outcomes.

The dissemination of aggregate data is therefore likely to play a prominent role in accountability in precisely the circumstances when the ability of the media to do so is limited. That is, aggregate data are most likely to be valuable when: (1) The public is imperfectly informed as to the optimal policy choice.[9] (2) The

[9]We refer to optimality from the perspective of the majority, or of a member of the winning coalition. It is not necessary for all

policy in question affects a broad swath of the public. If policies are narrowly tailored, members of the media or social networks are likely able to discover the policy's effects simply by contacting interested parties. (3) Policy choices do not perfectly map into welfare implications for individuals.[10] This requirement ensures that each individual's welfare is an imperfect indicator of the 'correctness' of the government's decisions. Thus, individuals should not optimally condition their decision of whether to discipline the government on their individual welfare alone.[11] Moreover, the weaker the correlation between government policies and individual outcomes, the more important aggregate information. The law of large numbers implies that data offer an increasingly precise signal of the appropriateness of government decisions as the level of aggregation rises.

These aggregate data may also be critical in mobilizing collective action. As noted above, aggregate data have the power to inform citizens of the experiences – and thus the likely beliefs and willingness to mobilize – of others. Consequently, the disclosure of aggregate information may take on heightened importance in circumstances under which collective action is required for government accountability. For instance, when free and fair elections are absent, threats of protests or strikes may be all that disciplines a government.

Government disclosures of aggregate data are typically made broadly available; though, the number of citizens who directly access these data are likely to be small. The information contained in such releases is typically translated into qualitative statements about citizen welfare – e.g., the strength of the economic growth or the extent of unemployment – and disseminated via the press and word of mouth. Consequently, this facet of transparency is likely to be complemented by measures of media penetration.

3 The HRV Index of Data Dissemination

While several measures of institutional transparency and media freedom are commonly used in empirical studies, fewer projects employ measures of data dissemination, in part because no thorough or theoretically rigorous measure of this facet of transparency has previously been available. Here, we discuss one measure that we construct in an attempt to fill this void: the HRV index. We treat a state's tendency to disclose data as a latent (unobserved) term predicting the missingness/non-missingness of 240 variables from the World Development Indicators (WDI) data series. This latent term is extracted using a dynamic item response model (full technical details are available in Hollyer, Rosendorff and Vreeland, 2013*a*) that ensures minimal loss of information from collapsing a 240 dimensional observation into a single-dimensional representation. The index has a consistent meaning over time and covers 125 countries from 1980-2010. We believe that this approach offers several advantages over earlier measures of data disclosure, as we elaborate below.

The HRV index provides a precise measure of a limited but important component of transparency. We

citizens to share policy preferences, though this assumption is often adopted for simplicity in retrospective voting models.

[10] This is equivalent to assuming that the distribution of ϵ_i, as discussed above, is not degenerate (e.g., $\epsilon_i = 0 \; \forall \; i$).

[11] See Kuran (1991) and Khemani (2007) for related discussions.

emphasize that our measure does not capture all the facets of transparency. As discussed above, our measure of aggregate data disclosure is of most value when examining government accountability with regards to policies with uncertain outcomes. Notably, this measure is important for accountability with regards to macroeconomic policies. Other measures – whether of the media or of institutional openness – will be more appropriate to assess accountability with regards to corruption or specific instances of malfeasance. Still, our measure is crisply defined, reproducible, meaningful, and important as both an intrinsically interesting outcome variable and as a potential explanatory variable. We encourage scholars to use it – along with other appropriate measures of other facets of transparency – to test various hypotheses about the relationships between transparency and accountability, governance, and democracy. These data are available for download at ...

Construction

The HRV index confers several advantages. First, it measures governments' collection and disclosure of data directly, by relying on the presence or absence of reported values from the WDI. The World Bank assembles these data from information provided by other international organizations, who, in turn, obtain their data from national statistical offices. Moreover, the reporting of these measures reflects the disclosure of credible information. The World Bank codes observations that are deemed questionable as missing in the WDI. Our measure thus reflects the disclosure of credible information by national statistical agencies.

We treat *transparency* – or rather this facet of transparency – as a latent (unobserved) term predicting the presence or missingness of data on 240 measures drawn from the WDI. We obtain estimates of this term through the use of a Bayesian item response (theory) model (IRT model). IRT models are a class of procedures, drawn from the psychometrics literature (for a thorough overview, see van der Linden and Hambleton, 1997) and used to reduce the dimensionality of data with minimal loss of information. Such models have previously been used in political science to estimate the ideal points of legislators (Clinton, Jackman and Rivers, 2004), to refine indexes of democracy (Treier and Jackman, 2008; Pemstein, Meserve and Melton, 2010), to examine support for the US within the UN General Assembly (Voeten, 2004; Bailey, Strezhnev and Voeten, 2013), and to combine expert estimates of bureaucratic agency ideologies (Clinton and Lewis, 2008).

The HRV index is thus a latent term that best explains the missingness of 240 variables from the WDI. In total, the WDI contains 1265 different measures, many of which we do not consider. We select variables from the WDI for inclusion in our measurement model based on the following criteria: (1) We omit any variable that is not reported by at least one country in every year between 1980 and 2010. This ensures that the index has consistent meaning over time. (2) We exclude all variables that are reported only for a subset of countries (such as developing or highly indebted countries). (3) We drop all variables from the WDI that are constructed from World Bank surveys (rather than government releases). (4) We exclude WDI variables that can be constructed from other items reported to the WDI. Measures of labor market participation, for instance, are reported for men, women and both. Moreover, population figures

include breakdowns by sex. Therefore, of the three types of labor market measure, we include only female participation in our model. (5) We delete multiple references same variable that are reported in differing units (for instance, different currencies).

We additionally trim the set of countries included in our measurement model. We exclude states that did not exist for the full 1980-2010 period.[12] We also delete all micro-states from the model – we define states as micro-states if their population falls below 500,000 for any year in the 1980-2010 period.

These observations are then fit using an IRT model. The model treats the missingness/non-missingness of each of the 240 variables for each of 125 countries in each of 31 years (1980-2010) as a function of the latent transparency measure, and variable-specific slope and intercept terms. It thus adjusts for the fact that certain variables are reported more frequently – by all country-years – than others, and for the fact that the reporting of some variables is simply more informative than the reporting of others. The reporting of a variable is informative if its missingness predicts the missingness of other variables. We also adjust for the fact that country-year observations are not independent over time – our algorithm smooths movements in index values over time using non-parametric methods. A full discussion of the model, along with convergence and goodness-of-fit measures, is reported in Hollyer, Rosendorff and Vreeland (2013*a*). This process produces 3875 country-year observations of transparency (data dissemination), each with a posterior density representing uncertainty over the estimated values.

This process thus confers several advantages over alternative indexes of aggregate data disclosure: Unlike measures that focus on the reporting of a small number of important variables (e.g., Bueno de Mesquita et al., 2003; Rosendorff and Vreeland, 2006), the HRV index captures governments' tendency to disclose a wide variety of different types of data to the public. Unlike measures that focus on the percentage of variables reported by a given country in a given year (e.g. Hollyer, Rosendorff and Vreeland, 2011; Williams, 2009), the HRV index reflects the fact that the reporting of one variable is not equivalent to the reporting of all others. Indeed, the IRT model nests this simple averaging procedure.[13] The HRV index additionally has a consistent meaning over time, adjusts for time dependence in the data, and includes information on uncertainty over measurement – allowing for the use of procedures to adjust for attenuation bias.

Capacity and Transparency

Few studies have employed data-availability as a variable, but those that do implicitly disagree as to the processes that drive this form of transparency. Bueno de Mesquita et al. (2003), Hollyer, Rosendorff and Vreeland (2011) and Williams (2009) treat missing data as a reflection of governments' willingness to

[12] We do, however, keep countries that fractured in the index, if the largest constituent portion of that country remained independent. So, Russia is treated as the continuation of the USSR, Ethiopia remains in the dataset after the succession of Eritrea, Indonesia remains after the succession of East Timor, etc. Countries formed (or eliminated) by merger during this period – notably the merger of East and West Germany and North and South Yemen – are dropped from the analysis.

[13] For a comparison of measures that reflect the percentage of variables reported to international organizations and the HRV index, see Hollyer, Rosendorff and Vreeland (2013*a*).

disseminate data. Stone (2008), by way of contrast, treats missing data as a reflection of state capacity – under the assumption that missing data results from states' inability to disseminate information.

We suggest that this facet of transparency should not be viewed in contradistinction to state capacity. Nor does data dissemination only reflect the willingness (whether primitive or induced) of a government to provide information. In our view, dissemination is a reflection of *both* the willingness of a government to provide information *and* its ability to do so. Governments with greater fiscal resources and/or a more technically competent bureaucracy are, *ceteris paribus*, more likely to be transparent. Conversely, governments with a stronger preference for disclosure – whether induced by political institutions (Broz, 2002; Hollyer, Rosendorff and Vreeland, 2011) or primitive – are likely to be more transparent. Hollyer, Rosendorff and Vreeland (2011), for instance, demonstrate that democracies systematically report more data than non-democracies, even after controlling for alternative determinants of data dissemination. Governments with a strong preference for secrecy will tend to avoid such disclosure. For instance, Ross (2006) notes that "high-performing authoritarian states" tend to report child mortality and economic data infrequently, despite relatively high *per capita* income levels and low mortality rates.

From citizens' points of view, it may not matter whether missing data result from a lack of capacity or an unwillingness to disclose. In the absence of disclosure, citizens will be less able to draw accurate inferences about government behavior. Regardless of whether her government was *unable* or *unwilling* to collect and disclose data, she is equally uninformed.

This is not to say the question of whether willingness or capacity has a greater effect on disclosure is unimportant. To the contrary, this question is central to political science, and we offer a dependent variable which scholars can use to test various hypotheses about what causal mechanism dominates under different circumstances.

Indeed, one can easily attribute the rankings of certain states on our index to either their capacity or their willingness to disclose data. For instance, Cuba receives low transparency scores throughout the period covered by our index. In the early 1980s, Cuba's *per capita* GDP was nearly twice that of the median country in the Penn World Table, and the government had vastly expanded education provision – from levels similar to prevailing rates in the much of the developing world in the 1950s and 1960s, to rates similar to those of the developed world in 1980 (Barro and Lee, 1996). In short, the Cuba possessed a high level of state capacity, but *chose* not to disclose data to the WDI. By contrast, Somalia experienced precipitous drops in its HRV score in 1990 and 1991 – coinciding with the collapse of the Siad Barre government and the outbreak of civil war. It is probable that we can attribute most of the decline in transparency in this instance to the loss of state capacity, as Somalia became the paradigmatic example of a failed state.

More generally, we find that the HRV index correlates with GDP *per capita* (often used as a proxy for capacity), regime type, and their interaction in a manner that cuts against the claim that data dissemination simply reflect states' capacity or willingness to disclose. Our analysis reveals that HRV scores correlate strongly with income, but only under democratic rule. Poor (read capacity constrained) democracies disclose data at similar levels to poor autocracies. By contrast, rich democracies disclose substantially and

significantly more data than do rich autocracies. In states that possess both the ability (here proxied by income) and the willingness (here proxied by democracy) to disclose, disclosure is high. In states where either factor is lacking, rates of disclosure are low. Results of this analysis are available from the authors on request.

Validity

To demonstrate the behavior of the HRV index, we examine movements in index values within a given country over time. In particular, we present index movements in a series of countries that, *ex ante*, one would expect to exhibit varying levels of transparency as a result of well-known political or economic shocks. Below, we present results for a series of such countries in which one would expect monotonically increasing, monotonically decreasing, and non-monotonic trends in transparency over time.

The economic and (to a lesser extent) political liberalization of the People's Republic of China since the late-1970s and early-1980s through the present is familiar and widely commented upon.[14] This liberalization has proceeded to such an extent that some authors refer to the PRC as exemplifying 'authoritarian deliberation' under which information is provided to the public, and public opinion is, in turn, considered in the policy-making process (He and Warren, 2011).[15] One might therefore expect levels of disclosure over the 1980-2010 period to have experienced a noticeable improvement. Figure 1 demonstrates that – at least according to our measure – such an increase in transparency has indeed taken place. In particular, HRV scores jump dramatically between 1981 and 1984 – coinciding with the introduction of the current constitution in 1982.

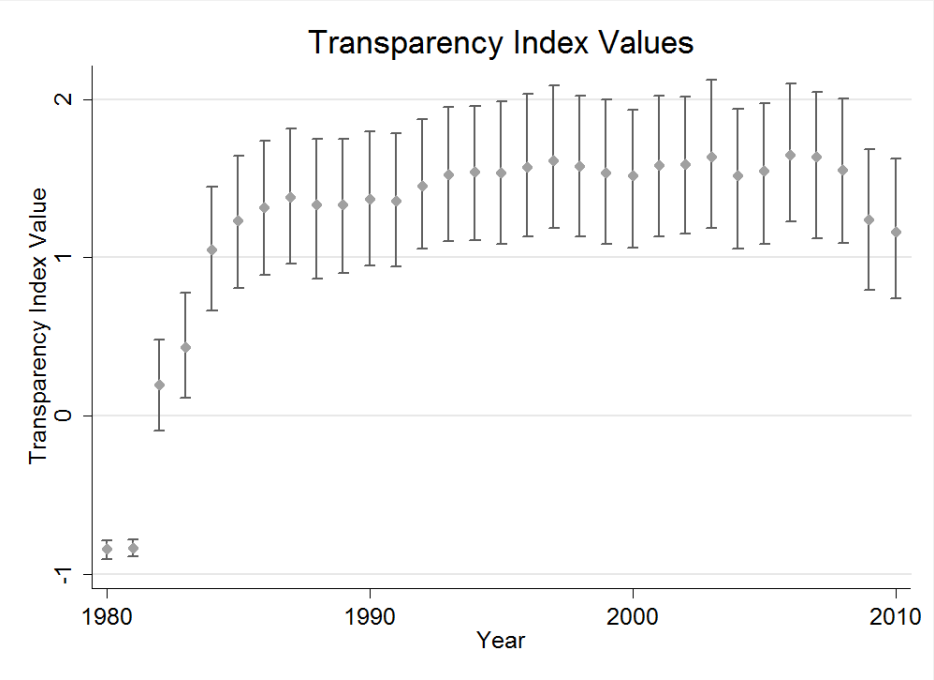
Cambodia experiences a similar (roughly) monotonic increase in HRV scores over time. This secular rise in levels of disclosure is in keeping with broader political and economic trends in the country. Throughout the 1980s (from 1979-1989), Cambodia was subject to Vietnamese occupation and civil war. The government of the People's Republic of Kampuchea battled rump elements of the former Khmer Rouge, royalist factions and the Khmer People's National Liberation Front (Ear, 2007). The Paris Peace Agreement terminated hostilities in 1991, and led to the establishment of the United Nations Transitional Authority in Cambodia, under whose auspices multi-party elections were held in 1993 (Roberts, 2003). The signing of the peace accords and cessation of hostilities is accompanied by a large and significant jump in HRV scores. During the civil war period, Cambodia's HRV scores hover in the bottom first percentile among all country-years, between 1991 and 1992 they jump to the 25th percentile.

The 1993 elections produced a victory for the royalist party; though, opposition from the former-Vietnamese backed Cambodian People's Party (CPP), under the leadership of Hun Sen, led to the formation of a power sharing coalition (Weyden, 2000). In practice, the CPP proved able to consolidate

[14] On the opening of China's political system, see Landry (2008). On accountability in China see Tsai (2007). Kelliher (1997) notes that the Chinese discussion of local self-government largely focused on the replacement of corrupt officials with competent political outsiders.

[15] China's liberalization has also given rise to a greater openness to foreign influence. For a discussion of these changes, with specific reference to investment and climate change, see Lewis (2007, 163-165).

Figure 1: PRC HRV Scores Over Time



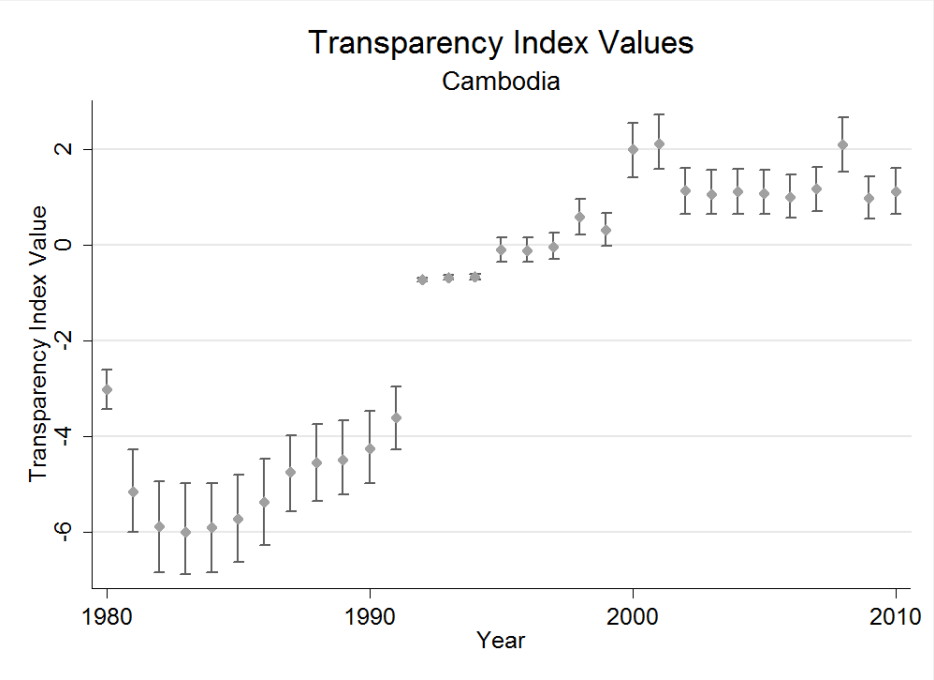
A longitudinal plot of the PRC's HRV Index scores from 1980-2010. HRV Index scores are on the y-axis, while time is measured on the x-axis. Diamonds denote mean predicted index scores. Whiskers denote 95 percent highest posterior density intervals.

control under the veneer of the coalition government, and the coalition continued to function from 1993 until 1996 (Weyden, 2000). This period is marked by slight increases in HRV scores. In 1996 and 1997 tensions between the CPP and royalists led to clashes and eventually to the exile of the leader of the royalist camp (McCargo, 2005; Weyden, 2000). However, elections were again held in 1998 (in which the CCP won a majority), which were deemed free and fair by the international community (Weyden, 2000). Since that time, the CCP has solidified its control – McCargo (2005, 106) describes it as a hegemonic party not unlike the PRI in pre-2000 Mexico. Its political control has not been subject to substantial challenges and it has pursued industrialization, urbanization, and WTO membership (Heder, 2005; Roberts, 2003). During this period, HRV scores rose, before stabilizing at levels similar to those in the People's Republic of China.

In contrast to China and Cambodia, a number of countries experienced substantial declines in data dissemination. For instance, Zimbabwe experienced increasing levels of unrest and trade union-led opposition to the ZANU-PF government beginning in the mid-1990s. General strikes were held in 1996, and met with police intimidation (van der Walt, 1998). This period also saw the forced confiscation of white-owned farms setting off a precipitous economic decline and hyperinflation in the early and mid-2000s.[16] Levels of

[16]For an overview of political developments in Zimbabwe during the mid- and late-1990s, see Sithole (2001). On the collapse of business-state relations see Taylor (2007, 30-34).

Figure 2: Cambodia HRV Scores Over Time



A longitudinal plot of Cambodia's HRV Index scores from 1980-2010. HRV Index scores are on the y-axis, while time is measured on the x-axis. Diamonds denote mean predicted index scores. Whiskers denote 95 percent highest posterior density intervals.

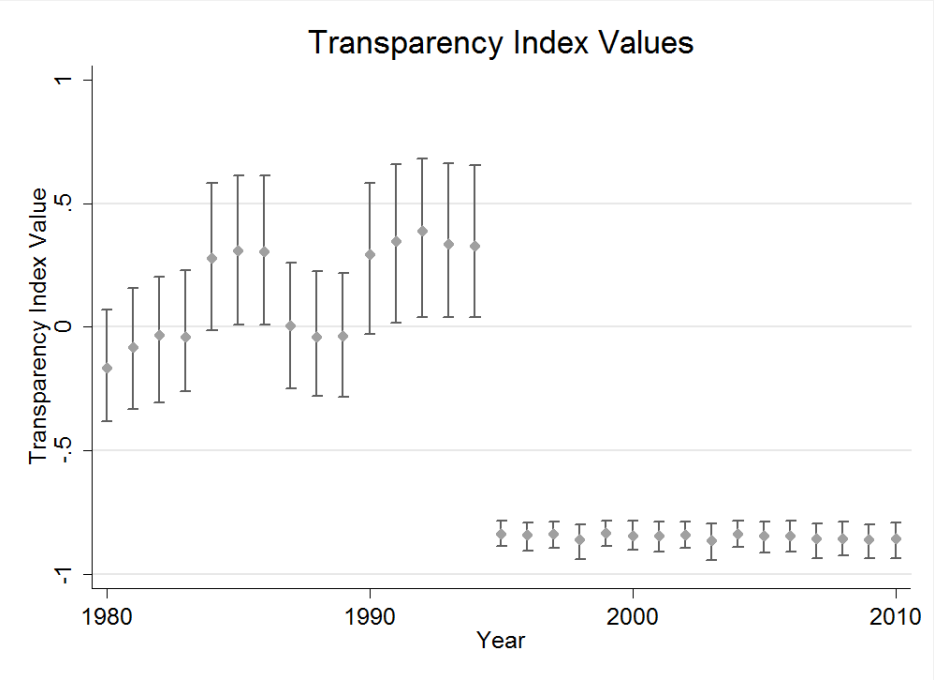
political repression increased dramatically prior to the 2008 elections pitting the incumbent Robert Mugabe against a strong opposition lead by Morgan Tsvangirai and Simba Makoni. The Mugabe regime began to plan – and to implement – its repressive strategy in 2007. This period saw dramatic clashes between pro-regime forces and opposition figures, including the beating of Tsvangirai by riot police (Meredith, 2007, 238-239).

Figure 3 plots the HRV index scores for Zimbabwe over time. A large and significant drop in HRV index scores is visible in 1995 – during the initial period of labor strikes and protests. Zimbabwe's levels of disclosure remain steady at low levels throughout the remaining years of the index, during the period of Mugabe's increasingly authoritarian rule.

Nor are changes in HRV scores over time always monotonic within countries. Take, for instance, the case of Zambia. As depicted in Figure 4, Zambia's HRV values are fairly constant at middling levels throughout the 1980s. There is a large and significant drop, however, in levels of data disclosure between 1991 and 1992. Estimated discolsure values remain low for five years, before increasing again in 1997, after which they stabilize at values slightly greater than those during the 1980s period.

Zambia's decline in transparency scores during the early and mid-1990s coincides nearly perfectly

Figure 3: Zimbabwe HRV Scores Over Time



A longitudinal plot of Zimbabwe's HRV Index scores from 1980-2010. HRV Index scores are on the y-axis, while time is measured on the x-axis. Diamonds denote mean predicted index scores. Whiskers denote 95 percent highest posterior density intervals.

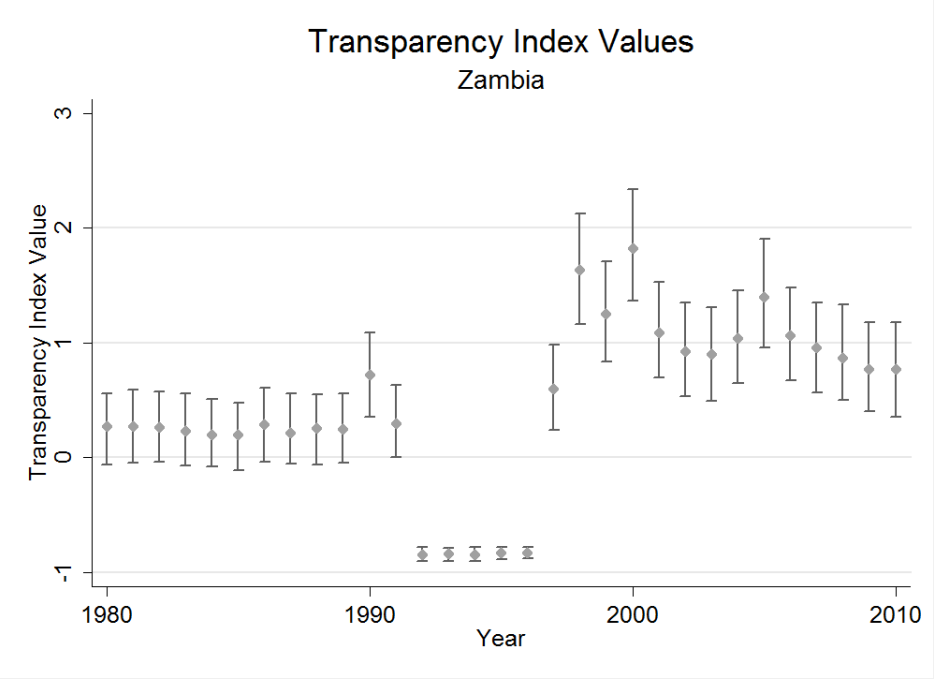
with the first term in office of President Frederick Chiluba. Chiluba was elected in Zambia's first democratic elections in 1991. He replaced the single-party government of Kenneth Kaunda, which had been in power since 1964 (and which banned opposition parties in 1972). Kaunda's government relied heavily on a system of patronage to maintain political support during years of economic stagnation owing to declining price for copper, the country's largest export. An attempted coup in 1990 and widespread strikes in 1991 forced Kaunda to agree to multi-party elections, in which Chiluba's MMD party won a sweeping victory, with 75 percent of the vote and 125 of 150 seats in the legislature (Baylies and Szeftel, 1992; Posner and Simon, 2002).

It may seem surprising that the introduction of multi-party democracy was associated with a *decline* in disclosure levels in Zambia. In other instances of democratic reform, such as in Tanzania and Eastern Europe (see below), increasing democracy led to substantial increases in HRV scores. Yet, Chiluba's first term in office was marked by low levels of protections for civil rights and economic upheaval. Bratton (1998, 59) remarks that "[Zambia] stands as perhaps the clearest example of the trend of declining quality of second elections in the sub-Saharan region." Upon entering office, Chiluba dismissed the chiefs of many SOEs and official news agencies, ostensibly as part of the MMD's economic reform program (Baylies and

Szeftel, 1992). In practice, the state was centralized under executive control and patronage, such that Van de Walle (2002) classifies the government as a 'dominant executive' non-democracy (see also von Soest, 2007). Following a 1991 IMF loan (via the Rights Accumulation Program), austerity measures and price liberalization were adopted, which – coupled with a major drought in 1993 – caused GDP *per capita* to fall by roughly 3.3 percent per year between 1991 and 1996 (Posner and Simon, 2002; Rakner, van de Walle and Mulaisho, 1999). Little progress was made on promised privatization plans (Rakner, van de Walle and Mulaisho, 1999). And, in elections in 1996, Chiluba altered the constitution to ban Kaunda from presenting a challenge (due to his foreign parentage) and the election employed disputed voter roles (Posner and Simon, 2002; Rakner, van de Walle and Mulaisho, 1999).

By the late-1990s, however, some aspects of policy-making began to change for the better. Strained relations with the international community led to the application of more stringent conditions with regard to loan programs – notably through access to the IMF's Enhanced Structural Adjustment Facility. The rate of privatizations increased, and discussions began regarding the privatization of copper mining (Rakner, van de Walle and Mulaisho, 1999). And, in 2000, Chiluba was forced to abandon attempts to amend constitutional term limits, and stepped down from office. Consistent with these developments, measures of disclosure rebounded to – and then slightly exceeded – earlier levels.

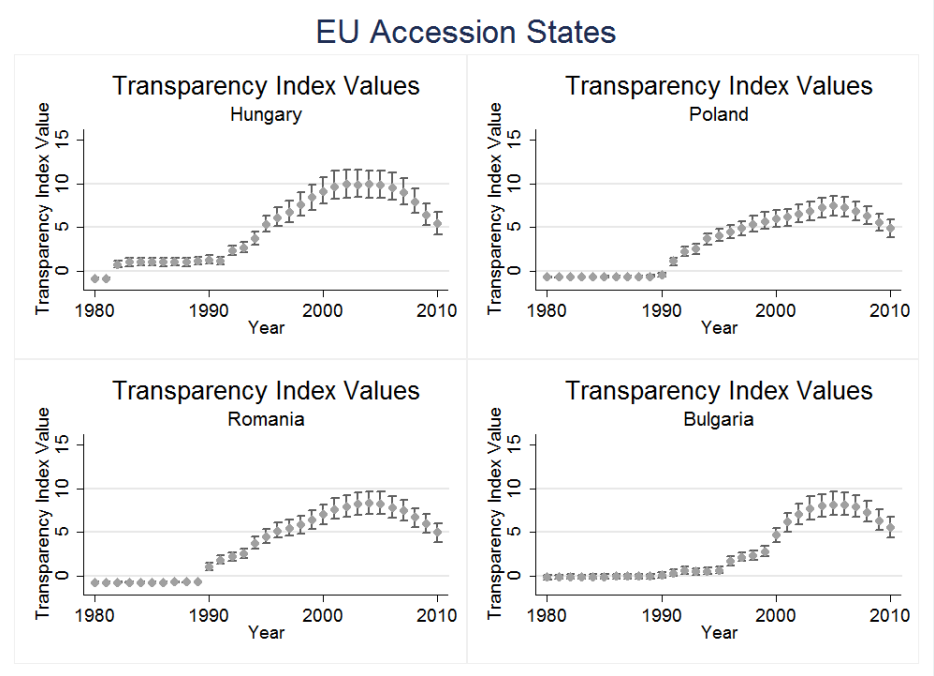
Figure 4: Zambia HRV Scores Over Time



A longitudinal plot of Zambia's HRV Index scores from 1980-2010. HRV Index scores are on the y-axis, while time is measured on the x-axis. Diamonds denote mean predicted index scores. Whiskers denote 95 percent highest posterior density intervals.

Turning to our final set of cases, we focus our attention on what might, at first, seem an oddity with the HRV index. In recent years, Eastern European countries – including Bulgaria and Romania – have been among the most transparent states in our index. While these strong performances with respect to data disclosure contrast with often mixed or poor records in regards to other forms of governance; we note a consistent relationship between data disclosure and EU accession. All Eastern European accessor states in our dataset experience dramatic increases in HRV scores during the period of application for EU membership, followed by slight declines in more recent years. At their height, these states converge to scores similar to those in the most transparent established EU members. Similar, though more muted, patterns can be seen in Cyprus and in Turkey, during the period the latter was considering applying for EU membership. These findings are consistent with existing scholarship that has stressed the transformative role played by the EU accession process – particularly in Eastern Europe (Hollyer, 2010; Levitz and Pop-Eleches, 2009; Vachudova, 2005). The convergence of these states with the highest standards of EU disclosure is consistent with arguments that the EU exercises its greatest influence over applicant states and relatively weak member states (Borzel et al., 2007). And recent backsliding is consistent with claims that the EU's influence diminishes once membership is granted (Gray, 2009; Hollyer, 2010).

Figure 5: HRV Scores and EU Accession



Longitudinal plots of HRV scores for the Eastern European states admitted to the enlarged EU from 1980-2010. HRV Index scores are on the y-axes, while time is measured on the x-axes. Diamonds denote mean predicted index scores. Whiskers denote 95 percent highest posterior density intervals. y-axis values are common to all time series.

4 Comparing the Facets of Transparency

So far, we have examined different theoretical conceptions of transparency, related these conceptions to commonly used indexes, and introduced a new measure of a particular facet of transparency – the disclosure of aggregate economic data. We have not established, however, that the indexes that we discuss differ in meaningful ways. If all cross-national measures of transparency are very highly correlated, the theoretical distinctions we draw may well be moot. All indexes would serve as equally strong proxies for the availability of information more generally, and empirically distinguishing between the mechanisms to which we draw attention would be practically impossible. In this section, we examine the relationship between indexes which, we argue, capture varying facets of transparency. First, we examine the extent to which measures of these facets covary. We then undertake a more systematic comparison between data dissemination (as measured by the HRV index) and each alternative measure in turn.

Table 1 presents a correlation matrix of measures of five different aspects of transparency. To measure the dissemination of aggregate economic data, we use the HRV index, as described above. We include two measures of the media environment. First, we include a measure of press freedoms, as captured by Freedom House's Freedom of the Press index measured between 1994 and 2010 (and rescaled such that 100 indicates the highest possible level of freedom and 0 represents the lowest). Second, we use daily newspaper circulation per 1,000 residents as reported by the World Bank to capture press penetration. This measure is reported in five year increments from 1980-1995 and annually from 1994-2010. Finally, we include a measure of institutional transparency as reflected by the presence/absence of an FOIL. This measure is coded based on data from Berliner (2011), and takes a value of 1 if a FOIL is in effect in a given country in a given year and a value of 0 otherwise. This data series runs from 1990-2008.

Table 1: Correlations Between the Facets of Transparency

	HRV Index	**Freedom House**	**Newspaper Circ.**	**FOIL**	**Media**
HRV Index	1.00				
Freedom House	0.62	1.00			
Newspaper Circ.	0.59	0.57	1.00		
FOIL	0.60	0.55	0.51	1.00	
Media	0.68	0.89	0.89	0.60	1.00

As is evident from Table 1, all four measures correlate with one another, though only at intermediate levels. Correlation values overwhelmingly fall in the 0.5-0.6 range, implying that variation in one index typically explains 25-35 percent of the variation in the others. Considerable differences remain between these indexes, however, which we explore in more detail below.

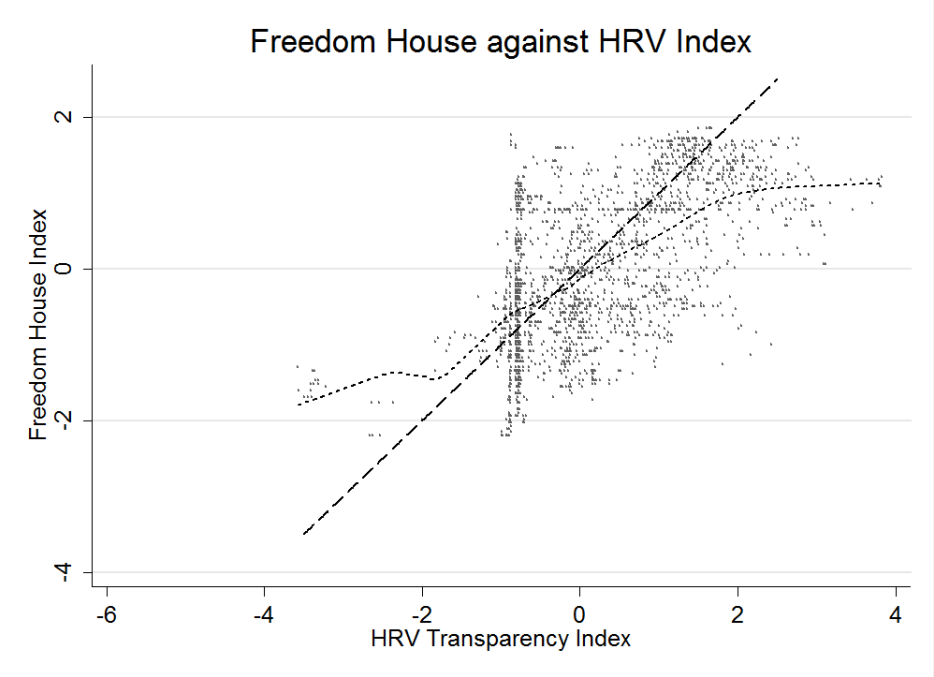
We argued above that it may be desirable, in many circumstances, to capture the transparency of the media by combining measures of both the media's independence and reach. Here, we apply a simple means to aggregate these two measures. We employ a principal components factor analysis – using the

Freedom House and newspaper circulation measures – to create a new measure of media transparency, which we simply label our 'media measure'. This term is reported in the final column and row of Table 1. Both the Freedom House and newspaper circulation indexes have 0.88 factor loadings. This term also correlates more strongly with data dissemination and institutional transparency than either media term on its own.

Data Dissemination and the Media

First we consider the relationship between our measure of data dissemination and indexes of various aspects of media transparency. We consider Freedom House scores, newspaper ciruclation figures, and our aggregation of the two indexes in turn.

Figure 6: HRV Index Plotted Against Freedom House Scores



A scatter plot of (standardized) Freedom House Freedom of the Press Scores and (standardized) HRV Index scores. Each observation corresponds to a country-year, and all country years with observations on both indexes between 1994 and 2010 are plotted. The dashed line runs through the origin at a 45 degree angle. The dotted line is a lowess smoother.

Figure 6 depicts a scatterplot of HRV Index scores against Freedom House scores both from 1994-2010. Both indexes have been standardized by subtracting the mean index value from each observation and dividing by the standard deviation so that each index is on the same scale with mean zero and standard deviation 1. The dashed line follows a 45 degree angle, so the two measures would be perfectly correlated

if all observations fell on this line. Observations that fall above the line score relatively highly on the Freedom House Index (plotted on the y-axis) as compared to the HRV Index (plotted on the x-axis). The reverse holds for observations that fall below the line. The dotted curve represents a lowess smoother that is applied to these data.

The correlation between the two indexes is apparent in the figure. The slope of the lowess curve is positive for the full range of values; though it flattens at the extremes of both measures. The HRV index thus ranks the most transparent country-years more highly, relative to other observations, than does Freedom House – and it ranks the least transparent country-years less highly. This relationship may reflect the constrained range of values (0-100) that the Freedom House Index can assume. The HRV index imposes no *ex ante* constraints on the range of values that can be estimated. [17]

The two indices broadly agree on which countries should receive relatively high and relatively low transparency scores – though the magnitude of the difference between high/low-scoring countries and mean index values is far greater in the HRV Index than in Freedom House. Freemdom House, however, assigns a wide range of scores to country-years that rank in the middle of the HRV index. Perhaps this relationship reflects differences in the way the two indices evaluate laws and institutions versus practices. Roughly one-third of the Freedom House index is determined by questions relating to legal protections for freedom of speech.[18] These laws may vary greatly; though they may not reflect great differences in government behavior. Thus, Laos, Fiji and Papua New Guinea receive very similar HRV scores in 2004 – though Laos receives a far lower (less transparent) Freedom House score than the others. The legal environments differ greatly, but all collect and report similar amounts of data. By contrast, Saudi Arabia and Tunisia receive identical Freedom House scores in the same year – both have similar legal protections for the freedom of speech – but Saudi Arabia receives a substantially lower HRV Index score.

Table 2 explores the relationship between these two indexes more systematically. HRV Index scores are regressed on the Freedom House Index, and on an indicator for democracy (we use the DD/ACLP definition of democracy as coded by Cheibub, Gandhi and Vreeland, 2010), GDP *per capita* in thousands of constant PPP adjusted 2005 US dollars (Heston, Summers and Aten, 2009), and the interaction between these latter two terms.[19]

These results first confirm that the two indexes are positively correlated, even after the inclusion of controls. It appears that country-years that are more open with regards to one facet of transparency are also more open with regards to the other. We can also see that – perhaps somewhat surprisingly – the HRV Index correlates more strongly with democracy than does Freedom House. Democratic countries consistently receive higher (autocratic countries lower) scores on the HRV index than they receive on Freedom House's measure. This result holds despite Freedom House's explicit focus on the protection of

[17] Cheibub, Gandhi and Vreeland (2010) note that democracy indexes tend to agree on which country-years should be assigned extreme values (highly democratic, highly autocratic), but disagree over mid-range values. In this instance, the two indexes diverge on extreme values. This is primarily because the HRV index indicates that high- and low-scoring country-years are more extreme, relative to the average country-year, than does the Freedom House Index.

[18] See http://www.freedomhouse.org/template.cfm?page=350&ana_page=376&year=2011.

[19] We weight all observations in these regressions by the inverse of the standard deviation of the HRV Index predictions.

Table 2: HRV Index Regressed on Freedom House Scores

Freedom House	0.687***	0.515***	0.424***	0.197*
	[0.415,0.958]	[0.200,0.829]	[0.111,0.736]	[-0.014,0.408]
Democracy		0.729**	0.768***	0.477*
		[0.171,1.287]	[0.273,1.262]	[-0.012,0.965]
GDP *per capita*			0.027	0.004
			[-0.010,0.064]	[-0.014,0.021]
Democracy				0.073**
$\times$ GDP *per capita*				[0.002,0.144]
$\hat{\sigma}$	1.496	1.500	1.469	1.420
N	2120	1870	1870	1870

Results of an OLS regression of HRV Index scores against the Freedom House Index, a democracy indicator, GDP *per capita* (in thousands of PPP US $), and the interaction of GDP *per capita* and democracy. 95 percent confidence intervals are presented in parentheses. All standard errors are clustered by country and all observations are weighted by the inverse of the standard deviation of the HRV index estimate. *** denotes significance at the 99 percent level, ** denotes significance at the 95 percent level, and * denotes significance at the 90 percent level. $\hat{\sigma}$ represents the standard error of the regression.

a core democratic principle – freedom of the press – and HRV's lack of an analogous focus. High income democracies perform particularly strongly on HRV relative to Freedom House – possibly due to top-coding in the latter index.

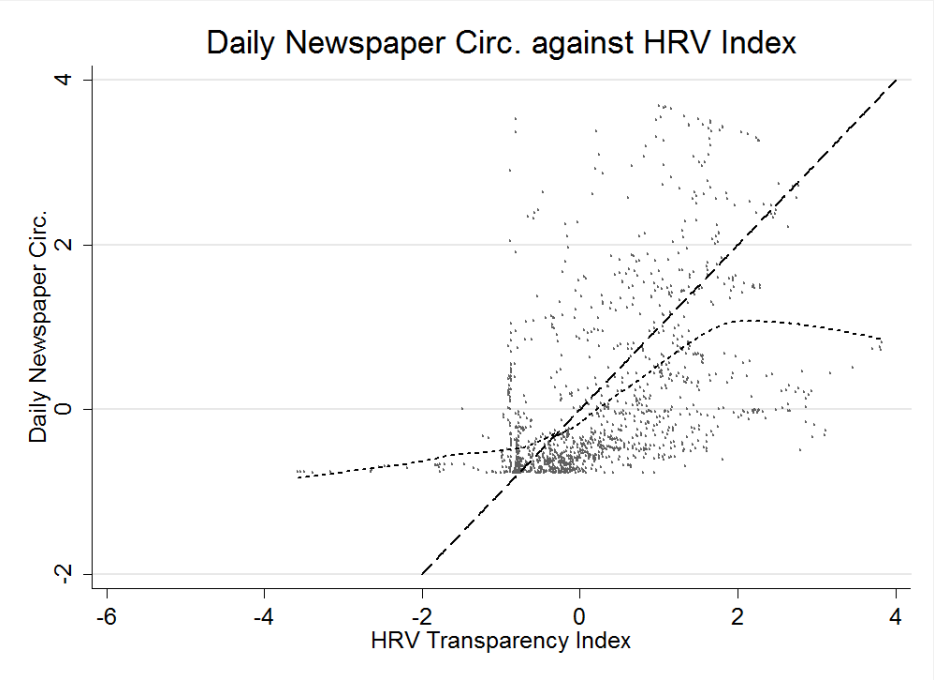
Next, we consider the relationship between data dissemination and newspaper circulation. Figure 7 depicts a scatter plot of the HRV Index against newspaper circulation. Both measures have been standardized by subtracting the mean value from each observation and dividing by the standard deviation. The dashed line corresponds to a 45 degree angle; while the dotted line is a lowess smoother plotted over the data.

Figure 7 indicates that both indexes broadly agree on a set of low scoring countries. Countries with high scores on the HRV index, however, vary greatly in their daily newspaper circulation numbers. The two indexes are correlated, though the disagreement over which countries are highly transparent is greater than between Freedom House and the HRV values.

Table 3 presents the results of a regression of HRV Index values against daily newspaper circulation numbers.[20] The two indexes are related to one another – though the correlation drops with the inclusion of controls. Several systematic discrepancies between the two indexes are apparent. In particular, democracies are ranked as more transparent by the HRV Index than by daily newspaper circulation numbers.

[20]These values have not been standardized. All observations have been weighted by the inverse of the standard deviation of the HRV Index estimates.

Figure 7: HRV Index Plotted Against Daily Newspaper Circulation



A scatter plot of (standardized) World Bank Daily Newspaper Circulation per 1000 numbers and (standardized) HRV Index scores. Each observation corresponds to a country-year, and all country years with observations on both indexes between 1997 and 2004 are plotted. The dashed line runs through the origin at a 45 degree angle. The dotted line is a lowess smoother.

This strong democratic performance on the HRV index holds regardless of the level of income. This finding meshes well with the theoretical expectation that high newspaper circulation numbers may be driven by a pervasive state media in autocracies. These findings are important since our theoretical expectations about the role of transparency relate not simply to the volume, but to the quality, of information relayed to the public.

Also, we compare data dissemination to an aggregate measure of media transparency, which we construct through a principal components factor analysis of the Freedom House and newspaper circulation variables. The resultant 'aggregate media measure' by construction has a mean of zero and a standard deviation of one – it correlates with both Freedom House and newspaper circulation at a level of 0.88. Figure 8 plots this measure (on the y-axis) against standardized HRV index scores (on the x-axis). The dashed line is a 45 degree angle through the origin, representing a perfect correlation; while the dotted line is a lowess smoother applied to the data.

Figure 8 reveals that the relationship between this aggregate measure and the HRV index is stronger than the relationship between HRV scores and either of its component parts – confirming the results reported in Table 1. Both indexes broadly agree on high and low scoring country-years, and variation

Table 3: HRV Index Regressed on Daily Newspaper Circulation

Newspaper circ.	0.006***	0.004***	0.004**	0.003
	[0.004,0.009]	[0.002,0.007]	[0.000,0.007]	[-0.001,0.006]
Democracy		1.118***	1.090***	0.735***
		[0.633,1.604]	[0.619,1.562]	[0.366,1.103]
GDP *per capita*			0.010	-0.005
			[-0.030,0.051]	[-0.025,0.016]
Democracy				0.047
$\times$ GDP *per capita*				[-0.026,0.121]
$\hat{\sigma}$	1.366	1.282	1.287	1.269
N	1447	1447	1439	1439

Results of an OLS regression of HRV Index scores against the World Bank's Daily Newspaper irculation per 1000 numbers, a democracy indicator, GDP *per capita* (in thousands of PPP US $), and the interaction of GDP *per capita* and democracy. 95 percent confidence intervals are presented in parentheses. All standard errors are clustered by country and all observations are weighted by the inverse of the standard deviation of the HRV index estimate. *** denotes significance at the 99 percent level, ** denotes significance at the 95 percent level, and * denotes significance at the 90 percent level. $\hat{\sigma}$ represents the standard error of the regression.

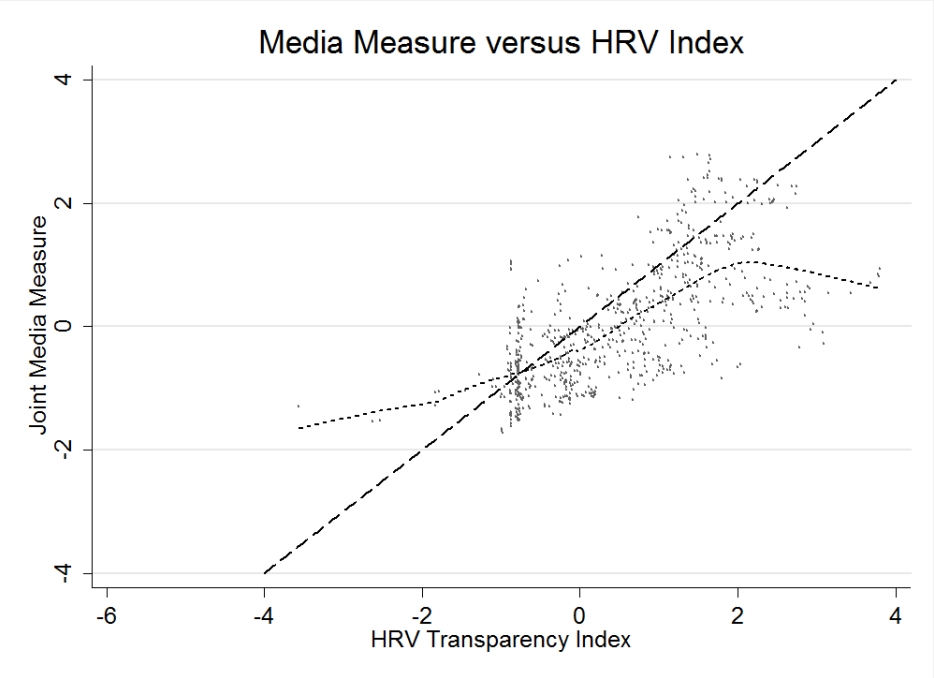
in one index is highly predictive of variation in the other throughout the range of possible scores. However, the slope of the lowess curve is substantially less than one throughout the graph, implying that HRV continues to rank high and low scoring country-years as more extreme (relative to the average country-year) than does the aggregate media index. Moreover, the lowess curve flattens in at extreme values of both indexes, suggesting that the HRV index finds greater variation among highly opaque and highly transparent countries than does the aggregate media measure.

Table 4 examines deviations between these two indexes in greater detail. It reports the results of regressions of HRV index values on the aggregate media index, a democracy indicator, GDP *per capita*, and the interaction between the latter two terms. As in the previous regressions, all observations are weighted by the inverse of the standard deviation of the predicted HRV value.

Again, the results reveal that the HRV index correlates more strongly with the aggregate media measure, even after the inclusion of controls. But, as is true with both the Freedom House and newspaper circulation measures, democracies tend to systematically receive higher HRV scores than aggregate media scores – though, coefficients on the democracy term hover just below levels of statistical significance (p-values range from 0.104 to 0.127).

Systematic differences between measures of data dissemination and measures of media transparency, therefore, exist. In particular, democracies tend to systematically disclose more data (relative to autocra-

Figure 8: HRV Index Plotted Against Aggregate Media Measure



A scatter plot of 'Aggregate Media Measure' scores and (standardized) HRV Index scores. Each observation corresponds to a country-year, and all country years with observations on both indexes between 1997 and 2004 are plotted. The dashed line runs through the origin at a 45 degree angle. The dotted line is a lowess smoother.

cies) than one would predict from differences in the media across these regime-types. This discrepancy may reflect the extent to which the decision to disclose aggregate economic information fundamentally lies with the government; whereas, the functioning of the media market lies only partially under the control of the government. Moreover, countries tend to vary more – particularly in the extremes – on levels of data disclosure than in the functioning of the media. Extreme observations on the HRV index tend to depart more radically from average observations than extreme observations on any of the media indexes we examine. In Hollyer, Rosendorff and Vreeland (2013*a*), we demonstrate that these discrepancies have practical effects. We replicate the work of Adserà, Boix and Payne (2003), by regressing ICRG governance measures on standardized HRV index and Freedom House index values. The HRV index is more strongly predictive of government performance with respect to both 'Law and Order' and 'Bureaucratic Quality' than is newspaper circulation, particularly in autocratic states. Both are similarly predictive of 'Corruption' – though data disclosure is more strongly predictive in autocracies and newspaper circulation in democracies. These discrepancies are broadly in keeping with the theoretical expectations about the role of the various facets of transparency discussed above.

Table 4: HRV Index Regressed on Aggregate Media Measure

Media Measure	1.288***	1.113***	1.003***	0.880***
	[0.619,1.957]	[0.470,1.755]	[0.579,1.427]	[0.343,1.417]
Democracy		0.498	0.535	0.424
		[-0.105,1.101]	[-0.119,1.188]	[-0.122,0.971]
GDP *per capita*			0.011	0.001
			[-0.038,0.061]	[-0.022,0.025]
Democracy				0.025
$\times$ GDP *per capita*				[-0.089,0.140]
$\hat{\sigma}$	1.526	1.515	1.513	1.510
N	728	728	728	728

Results of an OLS regression of HRV Index scores against an aggregate media measure, a democracy indicator, GDP *per capita* (in thousands of PPP US $), and the interaction of GDP *per capita* and democracy and all observations are weighted by the inverse of the standard deviation of the HRV index estimate. 95 percent confidence intervals are presented in parentheses. All standard errors are clustered by country. *** denotes significance at the 99 percent level, ** denotes significance at the 95 percent level, and * denotes significance at the 90 percent level. $\hat{\sigma}$ represents the standard error of the regression.

Data Dissemination and Institutional Transparency

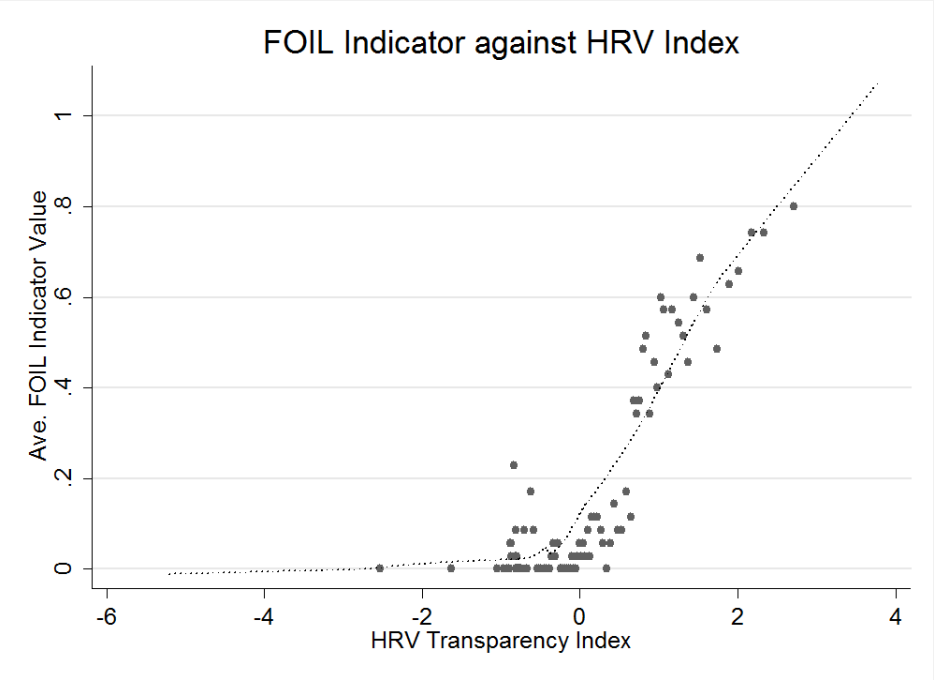
We next turn our attention to the relationship between institutional transparency – as measured by the presence/absence of an effective FOIL – and data disclosure. Our measure of FOILs is drawn from Berliner (2011) who codes the year in which FOILs go into effect in a cross-section of countries from 1990-2008.[21] We recode these data into a binary $\{0, 1\}$ indicator that takes the value of 1 if a given country has an effective FOIL in a given year.

Since our institutional transparency measure is binary, and our data disclosure measure continuous, comparisons between the two indexes are not as natural as between two continuous indexes. Figure 9 applies one method of comparing these two terms. Here, observations are binned by the level of HRV score – each dot on the scatter plot depicts a one percentile change in HRV score. There are thus 22-23 country-year observations per dot. The average presence of FOILs, which lies within the unit interval, is plotted on the y-axis. The normalized HRV index score is plotted on the x-axis. The dotted line depicts a lowess curve.

Figure 9 depicts a strong relationship between these two facets of transparency. As HRV scores rise, the fraction of country-years with a FOIL increases sharply. Country-years that score highly on data

[21] Berliner (2011) also codes the year of FOIL passage. Here we concentrate on the year the law goes into effect, as this is a more appropriate indicator of the level of institutional transparency. A law that is on the books, but not yet in effect, is unlikely to directly influence the flow of information to citizens.

Figure 9: HRV Index Plotted Against Effective Presence of FOILs



A scatter plot of an indicator of whether a FOIL is in effect against (standardized) HRV Index scores. Observations have been binned – each dot corresponds to a one percentile movement in HRV index scores and the average FOIL presence for all country-year observations within that percentile (22-23 country-years per dot). All country-years with observations on both indexes between 1990 and 2008 are plotted. The dotted line is a lowess smoother (fit to all country-year observations).

disclosure are far more likely than average to have a FOIL. However, country-years without FOILs vary substantially in their level of data disclosure. This discrepancy likely reflects the limited range of values the FOIL indicator can assume.

Table 5 examines this relationship more systematically. It reports the results of a regression of HRV scores on the FOIL indicator, a democracy indicator, GDP *per capita*, and the interaction of GDP *per capita* and democracy.

Throughout, the two indexes remain strongly correlated – even in the presence of controls. However, democratic countries score more strongly on the HRV measure than would be predicted from FOIL presence alone – a pattern that is consistent with regressions including media transparency. Neither GDP *per capita* nor the interaction of GDP *per capita* and democracy substantially add predictive power to these regressions.

Given that both FOIL enactment and data dissemination are the product of government decision-making, these results may be seen as rather surprising. Democratic country-years are roughly 30 percentage points more likely to have a FOIL than autocratic country-years. This result may reflect the limited

Table 5: HRV Index Regressed on FOIL Indicator

FOIL	2.436***	1.839***	1.646***	1.268***
	[1.324,3.548]	[0.824,2.853]	[0.716,2.576]	[0.424,2.112]
Democracy		0.983***	0.939***	0.719***
		[0.569,1.396]	[0.533,1.346]	[0.318,1.121]
GDP *per capita*			0.013	0.004
			[-0.014,0.040]	[-0.013,0.021]
Democracy				0.034
$\times$ GDP *per capita*				[-0.038,0.106]
$\hat{\sigma}$	1.245	1.175	1.167	1.159
N	3625	3625	3591	3591

Results of an OLS regression of HRV Index scores against Berliner's (2011) indicator for the effective presence of an FOIL, a democracy indicator, GDP *per capita* (in thousands of PPP US $), and the interaction of GDP *per capita* and democracy. 95 percent confidence intervals are presented in parentheses. All standard errors are clustered by country, and all observations are weighted by the inverse of the standard deviation of the HRV Index score. *** denotes significance at the 99 percent level, ** denotes significance at the 95 percent level, and * denotes significance at the 90 percent level. $\hat{\sigma}$ represents the standard error of the regression.

variation in this measure of institutional transparency. Democratic governments may vary more widely in their level of data disclosure than in their enactment of FOILs.

5 Conclusion

In this paper, we examine the various forms which transparency might take, and propose a taxonomy for the facets of transparency. Specifically, we consider the content and breadth of three facets of transparency: institutional measures, media freedoms, and data dissemination. We link these theoretical conceptions to commonly used cross-national empirical measures, and we present our own measure of one facet of transparency – the disclosure of aggregate economic data – which we argue has desirable properties relative to other measures of the same concept. Finally, we examine the relationships between measures of the different facets of transparency. While all are correlated with one another, and it may well make sense to think of some countries as more broadly 'open' than others – significant discrepancies also exist. Data disclosure is more closely linked to regime-type than are the other facets of transparency – high-income democracies in particular seem to score more highly on this facet than on other aspects of transparency. Moreover, countries appear to vary more widely in the extent to which they disclose data than in aspects of their media markets and the extent of institutional transparency.

More generally, we emphasize the importance of careful theorization of issues of accountability in empirical work. Government accountability varies across issue areas and institutional structures. The relevance of different facets of transparency will vary systematically across these dimensions. Information on government's policy choices and on aspects of policy-implementation is most likely to be valuable when the welfare implications of these policies are clear. Information on policy outcomes is more likely to be of use when citizens are less able to evaluate the appropriateness of policy choices. And aggregation is likely to be critical when factors other than government decisions influence outcomes. The importance of each form of information is likely to be rising in the breadth of its availability and – equally importantly – in the ability of informed citizens to infer that others are similar aware of its content.

In short, empirical assessments of government accountability – and of the role of information in accountability – must pay careful attention to theoretical mechanisms. Researchers should pay close attention to the policy dimension under consideration and assess the relevance of each facet of transparency taking this dimension into consideration. The empirical measure of transparency should be determined by these theoretical considerations.

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